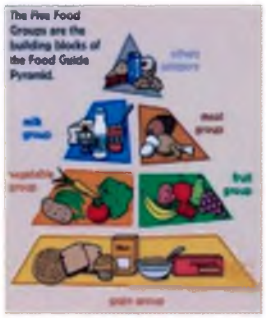
Food Composition Tables and Database for Bangladesh with Special Reference to Selected Ethnic Foods



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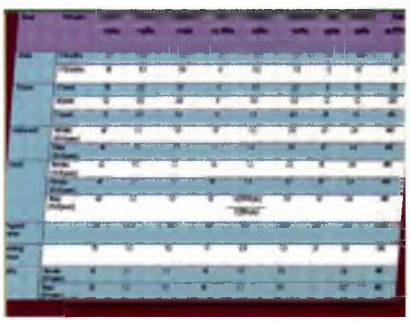

Institute of Nutrition and Food Science
University of Dhaka

2012

FOOD COMPOSITION TABLES AND DATABASE FOR BANGLADESH WITH SPECIAL REFERENCE TO SELECTED ETHNIC FOODS

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Preface

Food is the essential component for human survival. Good health needs a balanced diet. In order to achieve this, the nutrient composition of most frequently consumed foods has to be made well-known and available to the mass population, specially to the researchers. Food Composition Tables (FCTs) provide nutrient composition of foods. It is almost obligatory to know and let others to know what kind of nutrients they receive from the foods that they eat in everyday life. A true FCT is the answer to this basic query. The FCT is indispensable in making assessment for the amount of nutrients contributed by common foods consumed by individual, family and at community levels. The FCT is used in nutrition and public health survey, nutrition education, dietetic and clinical practice, agriculture research, nutritional epidemiology, setting up food standards and establishing food safety regulation and consumer action programs. It is equally promising in making appropriate food choices for the purpose of preparing normal and therapeutic diets. It is, therefore, an important tool for the national planners and policymakers for ensuring food safety and food security for the nation.

There is a worldwide call for updating food composition databases. The third world countries are far behind to address this attempt. Likely, Bangladesh does not have Food Composition Database (FCD) or Food Composition Tables (FCT) that can demand to be exclusively of its own. Until now, data on nutrient values have been obtained from food composition tables (FCT)- *'Deshio Khadder Pustiman'* prepared for Bangladesh by the Institute of Nutrition and Food Science, University of Dhaka (1977), later edited in English version-*'Tables of Nutrient Composition of Bangladeshi Foods'* by Helen Keller International (HKI) (1988). Most of the nutrient data in these FCTs were analyzed long back with much of the data borrowed from neighboring countries and exotic sources. Moreover, the nutrient composition of ethnic foods is not available in the Bangladesh food composition tables. Recently there has been a radical change in our food chain, primarily because of the emergence of new high yielding varieties of foods belonging to both plant and animal origins. The changes in environment and soil conditions may have induced changes in nutrient contents of foods that are grown on the soil. With the increasing concern of the relationships between diet, food habits and degenerative lifestyle diseases, there is increased interest in food composition database. Therefore, nutritive values of these local food items need to be incorporated in the food composition tables.

In line of our continued challenge to "**Preparation of food composition database for Bangladesh with special reference to indigenous and ethnic foods",** this new- '**Food Composition Tables and Database for Bangladesh with Special Reference to Selected Ethnic Foods'** is a robust attempt to cater for the existing nutrients data gap. This Food Composition Tables comprises a wide range of nutrient data of 481 food items of most representative food groups that are consumed by mass people of Bangladesh. Its special characteristic rests on incorporation of the nutrient data of ethnic foods. This FCTs and FCDB contain newly analyzed nutrient data of 93 raw food items comprising 53 indigenous and 40 ethnic key foods. The nutrient data of rest 388 food items were taken from HKI table, published and unpublished sources of local foods; and some nutrient values were also taken from published sources of Asian origin. It is to be noted that a Comprehensive Food Consumption Survey (CFCS) and a number of Focus Group Discussions (FGDs) were conducted among the indigenous and ethnic population in selection and identification of key food items for analysis of nutrient values and for inclusion into the FCTs.

It is hoped that the new FCTs will better promise in making contribution to future research in the field of nutrition in our country. It will have the potentiality to contribute immensely in a wide range of nutrition issues comprising public health, agriculture, nutrition education and training, dietary assessment, food security, and food safety and regulation.

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Foreword

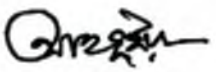
Institute of Nutrition and Food Science (INFS), University of Dhaka is contributing in the identification and problem solving activities of the country through its generation of active man power in the field of nutrition and food science as well as carried out major national level researches such as conducted three National Nutrition Surveys of Bangladesh till 2000. At present, a nationwide Nutrition, Health and Demographic survey of Bangladesh has been conducted.

In this endeavour, some of the research and teaching staff of the institute are involved in different nutrition related research such as identification and analysis of nutrition composition of key foods. This effort will help in ameliorating many nutritional problems of the country as well as will be resource to many researchers who are working in this field.

Three of my colleagues- Professor Dr. Sheikh Nazrul Islam, Professor Dr. Md. Nazrul Islam Khan and Professor Dr. M. Akhtaruzzaman who are actively working in the field of nutrition and food science has come up with a book titled "**Food Composition Tables and Database for Bangladesh with Special Reference to Selected Ethnic Foods**". This book contains wide range of nutritive values of 481 food items, of which 93 foods were newly analyzed which comprised most frequently consumed 40 ethnic and 53 indigenous foods as per content. The nutritive values of rest of the food items are borrowed from the food composition tables of Asian countries. It is to be noted that 20 years back this institute published a Food Composition Tables (FCT) named "Deshio Khaidder Pushtiman" in which few food items were analyzed in the laboratory of INFS by our researchers. The uniqueness of this new book is that it has incorporated nutritive values of 40 ethnic foods consumed by the ethnic people of Bangladesh.

This book also contains some health related information which is very much helpful for the conscious readers and this information will help in maintaining good health and proper nutritional status.

It is hoped that the new FCT and FCDB will serve the needs of the food and nutrition community, academia and industry as well as promote and enhance regional collaboration in food and nutrition research in Asia.



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Acknowledgement is extended to the Food and Agriculture Organization of the United Nations (FAO) and the Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management for their support under the National Food Policy Capacity Strengthening Programme (NFPCSP) with financial assistance from EU and USAID for analysis of a number of key food items.

Finally special thanks are due to the Laboratory team who were involved in the analysis of nutrient profile of the key foods and the CFCS and Publication teams, all of whom made this Food Composition Table and Database success.

Abbreviations

AOAC	Association of Official Analytical Chemists
CARs	Center for Advanced Researches
CF	Crude Fiber
CFCS	Comprehensive Food Consumption Survey
CHT	Chittagong Hill Tracts
DAE	Department of Agriculture Extention
DKPM	Dhesio Khadder Pustiman
EP	Edible Portion
EU	European Union
FAO	Food and Agriculture Organization
FCDB	Food Composition Database
FCT	Food Composition Tables
FGDs	Focus group discussions
HKI	Helen Keller International
ICDDR,B	International Centre for Diarrheal Disease and Research, Bangladesh
ICMR	Indian Council of Medical Research
IFCT	Indian Food Composition Tables
INFOOD	International Network of Food Data System
INFS	Institute of Nutrition and Food Science
IS	Internal Standard
NFCD	National Food Composition Database
QAP	Quality Assurance Program
RDA	Recommended Dietary Allowances
SRM	Standard Reference material
SEM	Standard Error of Mean
TDF	Total Dietary Fiber
WHO	World Health Organization
Conc.	Concentrated
0C	Degree Celsius
CHO	Carbohydrate
%	Percent
µg	Micro gram
mg	Mili gram
g	Gram
Kcal	Kilo calorie
L	Litre
ml	Mill liter
Wt	Weight
/	Per

Contents

Chapter-6 : The Food Composition Tables

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1.1 Introduction

A food composition table (FCT) contains essential information on the nutritive values of key foods consumed by the mass population. The FCT provide values for energy and nutrients, and other important food components or bioactive compounds for each of food listed. The key food list comprises the local staples, cereals, vegetables, fruits, fish, meat, milk and others. Food composition table addresses the basic need for *nutrient information, public health problems in the country, the current knowledge in nutrition, and for food safety and toxicity.* The nutritive values can either be generated by analysis of foods in analytical laboratories or are pulled from other nutrient data sources of the local foods. The earliest known food composition table was produced in 1818[1]. Several countries have developed their own food composition database with analytical nutrient data of their local foods. Some countries are collaborating on making food composition analyses among the institutions in their own country and in the region. Many countries, particularly in the developing world, lack the resources needed for setting up a national food composition programme. Bangladesh is in the process of revisiting and updating the food composition database (FCDBs) by analyzing the nutrient composition of indigenous and ethnic foods. The present attempt for preparation of food composition table for Bangladesh is being made after about 20 years of the previous FCT.

Food is the essential component for human survival. Good health needs a balanced diet. In order to achieve this, the nutrient composition of most frequently consumed foods has to be made well-known and available to the mass population. A food composition database (FCDB) provides detailed information on the nutritive values of foods. It has great importance in health and nutrition. It is used in research which deals with the effects of diets on health, in prevention of food related disease, reproduction and development.

In order to maintain good health, human evolves diet pattern of his own, perhaps by trial and error. Dietary habit of a population depends on the availability of local foods and food practice. Cultural and economic factors also determine food habit. Therefore, food composition table or databases vary from country to country. The FCT/FCDB helps in selection of quality and quantity of healthy foods. The ethnic population has diverse eating habits. Nutrient composition of ethnic food has not yet been included in any global food composition database. This should be addressed to incorporate into the food composition table as a valuable source of information on nutrition and food diversity of this population.

1.2 Rationale for development of FCT/FCD for Bangladesh

Bangladesh is an agriculture based country. Agriculture produces around 90% of its food need including cereals and vegetables[2]. Hybrid rice and vegetables are being grown to feed a large population which is still growing. Bangladesh usually breaks even with its grains production and has to import rice to a very little extent. Due to the high demand of ever increasing population, the high yielding varieties (HYV) of rice covers about 90% of the rice needs and the rest comes from indigenous[3]. The same is true for vegetables and fruits where high yielding varieties are much in demand (or use) while indigenous varieties are grown to a lesser extent. There are 141 varieties of leafy vegetables (commonly known as *shak*) and 25 varieties of non-leafy vegetables in Bangladesh[4]. Among the leafy vegetables, 97 items are identified as ethnic varieties, and the rest are consumed by both the general and ethnic people. Fruits and vegetables are known to be nutritionally rich with vitamins and minerals.

Changes in the food chain due to emergence of high yielding varieties (HYV) newer foods and changes in soil composition (due to environmental changes, increased use of fertilizers and crop intensity) have resulted in possible changes in the composition of nutrient in the foods now being grown. In addition, ethnic people use a diverse variety of foods, nutritive values of which remains globally unexplored. The nutritive values of these abundantly produced indigenous as well as the ethnic foods need to be analyzed for incorporation into the FCDB and FCT. All these facts call for a renewed look and analysis of the most frequently consumed foods.

1.3 Importance of FCDB and FCT

The national food intake pattern in Bangladesh is dominated by cereals contributing up to 74-76% of total dietary energy as against the internationally accepted value 54-55% for developing countries[5, 6, 7, 8]. Vegetables comprise one-fifth of total diet for rural people. Protein and micronutrient rich foods account for less than 10 percent of the rural person's diet. Intake of vegetables and fruits has recently increased considerably. It is still very low, although their consumption is vital for a diversified and nutritious diet[9]. The high intake of cereal based foods and low intake of micronutrient rich foods result in an imbalanced diet causing different health disorders. Diets rich in vegetables and fruits contribute to micronutrients intakes that have specific antioxidant functions and many of which reduce the risk of many health disorders including cardiovascular complications, diabetes related damage, cancers[10, 11, 12] ; even HIV infection[13,14]. Additionally they provide phytochemicals that have marked health significance. Therefore, it is important to identify the food sources of various nutrients that are required for the maintenance of good health.

Until now, data on nutrient values have been obtained from food composition tables (FCT) prepared for Bangladesh by the Institute of Nutrition and Food Science, University of Dhaka in 1977[15,16] and Helen Keller International[17]. Most of the nutrient data in these FCT were analyzed long ago with much of the data borrowed from neighboring countries. Moreover, the nutrient composition of ethnic foods is not available in these FCTs. With the increasing concern of the relationship between diet, food and degenerative lifestyle diseases, there is increased interest in food composition data. At the same time, there is a call for attention to the major limitations in the available data and to support a variety of research activities in this area[18], particularly in food security mapping. This would help to bridge the lack of information about the nutrient and non-nutrient content of different foodstuffs consumed by different populations and subgroups including ethnic populations.

The food composition data are used primarily for the planning, assessment and establishment of human energy and nutrient requirements

and intakes. Its importance is versatile. It is required for nutrition planning and in agriculture, health and nutrition assessment; formulation of national; institutional and therapeutic diets; nutrition education and training; formulation of food based dietary guidelines; research on nutrition, agriculture and epidemiology; product development; nutrition labeling; setting food standards and establishing food safety regulations.

In view of its importance in health and nutrition, the present attempt has been taken to prepare the Food Composition Database and Food Composition Table with generation of nutrient data through analysis of indigenous, ethnic and relatively newer foods. Such a FCDB and the FCT will help in formulating dietary guidelines for different people to meet their nutrient requirements.

In preparation of this Food Composition Table (FCT), a Food Composition Database (FCDB) is being developed by generating nutrient data through laboratory analysis of most frequently consumed key indigenous and ethnic foods of Bangladesh, and by computing the nutrient values of local foods from published FCTs and reports, also from unpublished sources. To generate FCDB, the most frequently consumed key indigenous and ethnic foods have been identified through a comprehensive food consumption survey (CFCS). CFCS was conducted among 1210 indigenous and 805 ethnic households throughout Bangladesh. The CFCS revealed the food consumption pattern of general and ethnic population[19].

From the CFCS data, a key food list has been made. The key foods provide 75% of daily nutrient need[20], and the food items that are consumed by ≥15% of the indigenous and ethnic households are included in the key food list. From the key food list, 93 indigenous and ethnic foods have been analyzed and included in this FCT. Generation of FCDB is being carried out and it will be included in the FCT in the next edition.

2.1 Background

This book provides detailed information on the nutrient composition of a wide range of common indigenous and ethnic Bangiadeshi foods available in different parts of Bangladesh. It includes a total of 481 food items comprising 14 group categories.

Data on nutrient composition of common indigenous and ethnic Bangladeshi foods are tabulated. Information on important nutrient constituents like proximate principles of freshly analyzed foods is given in Table 6A-1 in the FCTs. The data on vitamin is given in Table 6A-2 and data on minerals in the Table 6A-3. In the next three tables 6B-1, 6B-2 and 6B-3, information on combined food list is provided. Tables 6C, 6D, 6E and 6F respectively present data on carotene profile, fatty acid composition, bio-active compounds and total phenol contents.

Although the food items listed in this book are categorized under two main headings as newly analyzed fresh collected foods and all foods including the currently analyzed fresh foods and food items that are taken from other FCTs and published and unpublished reports, they are sub-classed into food groups. The coding/numbering for all the foods is done serially. To facilitate easy reference, the information and data related to each foodstuff is given under the same serial number in all of the tables and appendix.

Absence of data for any nutrient in the tables indicates only that these are not analyzed as well as authentic values are not available and it does not mean total absence of the nutrient in the foodstuff.

2.2 Food grouping, coding and identification

A total of 481 food items are included and are grouped into 14 categories. The major food groups are coded like "100" for "Cereals". Code "101" means first food item of cereals group. Thus each food item has one record and a unique food ID in the first column. In some cases, to facilitate data users newly analyzed food items are coded as "900.a" as this food item is related with food item of code "900" (e.g. fresh/dry form of same food item).The common English name is given for most of the foods. When the English name is not known, the Bengali name is given in English spelling. Bengali and/or local name of all food items are given for easy recognition and understanding. To enable all national and international data users, the scientific name of food items is given in first tables, particularly in the tables of proximate nutrient value and the consequent tables of other nutrients of the same food contain English, Bengali and/or local name.

Table 2.1: Food codes, food groups and total number of food in each group

Code	Food Groups	Currently analyzed			No of Pooled foods	Total number of food in each group
		No of General foods	No of Ethnic foods	Total foods		
100	Cereals	03	00	03	19	22
200	Pulses and Legumes	01	00	01	15	16
300	Leafy Vegetables	12	19	31	39	70
400	Roots and Tubers	03	00	03	13	16
500	Non-Leafy Vegetables	08	15	23	50	73
600	Oil Seeds	00	00	00	23	23
700	Spices and Condiments	00	00	00	19	19
800	Fruits	12	05	17	52	69
900	Fishes	08	00	08	92	100
1000	Meat	03	01	04	12	16
1100	Eggs	03	00	03	01	04
1200	Milk and Milk Products	00	00	00	16	16
1300	Fats and Edible Oils	00	00	00	6	06
1400	Miscellaneous	00	00	00	31	31
	Total	**53**	**40**	**93**	**388**	**481**

In food composition tables, the symbol "*" indicates that the food item is an exclusive ethnic one.

2.3 Nutrients

Nutrients included in this book are prioritized on the basis of their impact on health. Data for each food item listed in the food composition tables includes values for moisture, energy and 30 nutrients which are classified into proximate composition, vitamins, minerals and anti nutrients as follows:

Table: 2.2 List of nutrients analyzed

Sl no	Nutrient Group	Nutrients
1.	Proximate	Moisture Protein Fat Crude Fiber (CF) Dietary Fiber (DF) Total Minerals/Ash Carbohydrate
2.	Energy	Energy
3.	Vitamins	
	a. Vitamin-C	Vitamin-C
	b. Carotene Profile	Total carotenoids α-carotene β-carotene Leutine Lycopene
	c. B-Vitamins	Thiamin (B_1) Riboflavin (B_2) Niacin (B_3) Pyridoxine (B_6) Total Folic Acid
4.	Minerals	
	a. Micro minerals	Copper (Cu) Zinc (Zn) Iron (Fe) Manganese (Mn)
	b. Macro minerals	Calcium (Ca) Magnesium (Mg) Sodium (Na) Potassium (K) Phosphorus (P)
5.	Anti nutrient	Phytic Acid
6.	Fatty Acid	Total Fatty Acid (FA) Saturated Fatty Acid (SFA) Poly Unsaturated Fatty Acid (PUFA)

Expression of data

The nutrient content in the FCTs are expressed as the amount per 100g of edible portion solid foods and as the amount per 100ml for liquid food such as milk.

Edible portion is the part of the food that is customarily eaten by the people depending on their cultures or food habits. Edible portion is expressed as percent. The edible portion is the proportion of edible matter in the food as collected or purchased, expressed on the basis of weight. It is obtained using following formula:

"Edible" Weight = "As Purchased" (A.P.) Weight – "Refuse" Weight (R)

$$\%\text{Edible Portion (E.P.)} = \frac{\text{"Edible" Weight}}{\text{"As Purchased" (A.P.) Weight}} \times 100$$

In FCTs, the symbol "-" indicates only that these are not analyzed as well as authentic data are not available and it does not mean total absence of the nutrient in the foodstuff.

Units of expression

Most common and internationally acceptable units for each nutrient are used in these FCTs which are tabulated below:

Table: 2.3 Units of expression of nutrients

Sl. no	Nutrients	Units/100g Edible Portion
1.	Moisture	g
2.	Protein	g
3.	Fat	g
4.	Crude Fiber (CF)	g
5.	Dietary Fiber (DF)	g
6.	Total Minerals/ Ash	g
7.	Carbohydrate	g
8.	Energy	kcalorie
9.	Vitamin-C	mg
10.	Total carotenoids	µg
11.	β- carotene	µg
12.	Leutine	µg
13.	Lycopene	µg
14.	α-carotene	µg
15.	Thiamin (B_1)	mg
16.	Riboflavin (B_2)	mg
17.	Niacin (B_3)	mg
18.	Pyridoxine (B_6)	mg
19.	Total Folic Acid	µg
20.	Copper (Cu)	µg
21.	Zinc (Zn)	µg
22.	Iron (Fe)	mg
23.	Manganese (Mn)	µg
24.	Calcium (Ca)	mg
25.	Magnesium (Mg)	mg
26.	Sodium (Na)	mg
27.	Potassium (K)	mg
28.	Phosphorus (P)	mg
29.	Phytic Acid	mg
30.	Total Fatty Acid (FA)	mg
31.	Saturated Fatty Acid (SFA)	mg
32.	Poly Unsaturated Fatty Acid (PUFA)	mg

2.4 Sources of data

In this book, food items are presented separately as currently analyzed fresh collected foods and all foods including the currently analyzed items and nutrient data taken from other FCTs and published and unpublished reports. Analysis of current fresh indigenous and ethnic foods was carried out in the laboratories of Institute of Nutrition and Food Science and Center for Advanced Researches (CARs), University of Dhaka; and the mineral content was analyzed in the laboratory of Soil Resource Development Institute and Grain Quality and Nutrition Division, Bangladesh Rice Research Institute, Gazipur, Bangladesh. Some validation work was carried in the Nutrition Biochemistry Laboratory, International Centre for Diarrheal Disease and Research, Bangladesh (ICDDR, B). Nutrient data are directly computed in the tables.

The nutrient data those are not currently analyzed, but are pulled from other sources are used on the basis on the guidelines set by International Network of Food Data System (INFOODS) on generation and compilation of food composition data. Available data and detailed information from various sources are compiled, including from the printed food composition tables published by HKI, published papers in various journals, published data in the thesis and reports from scientific proceedings, as well as unpublished laboratory data from the Institute of Nutrition and Food Science, University of Dhaka.

Published and unpublished food composition data, as a measure of each nutrient per 100 g of food, are Incorporated according to the following criteria:

1. It must be original and analytical data.
2. Sampling, sample preparation, analytical methods and the number of samples analyzed should be documented.
3. Origin of the analytical data can be traced back.
4. Minimum data available includes proximate composition or minerals or vitamins and moisture content.

The data are computed as spreadsheet data files. Microsoft Excel was selected as the compilation system for development of food composition database.

The major bulk of proximate, vitamin and mineral data are taken from "Tables of Nutrient Composition of Bangladeshi Foods" (HKI) and "Nutritive Value of Indian Foods" [21]. All pooled values are borrowed only from those FCTs and literatures that include full and clear food description, specific methods and present result in full detail.

2.5 Methods of analysis

In generation of nutrient data for food composition database, designing and executing sampling protocol, preparation of analytical samples and portions, selection of analytical methods, execution of analytical procedures with appropriate number of analytes and analytical replicates, involvement of skilled laboratory personnel, evaluation of analytical values and documentation of data are of utmost importance[22]. Lapse in any of the process would result in error in the representative nutrient data. The basic principles of producing quality data should give attention to-

- the collection and preparation of food sample
- the selection of the analytical method and its validation within the laboratory carrying out the analysis of a particular food
- proper execution of methods, and
- review of the values obtained.

Therefore, adequate and appropriate care and precaution were taken in designing and addressing these approaches.

A. Food sampling protocol

A sampling plan is the predetermined procedure for selection, collection, preservation, transportation and preparation of the analytical portion to be used from a lot as samples. A sampling plan should be a well organized document for program objectives[23].

Foods are biological materials and exhibit variation in composition, particularly are prone to variation in water, carbohydrate and vitamin contents. This variation is related to a number of factors such as cultivation place (cultivated, wild, garden), geographical location, seasons, state of maturity, cultivar and breed, etc. Therefore, collection of food sample needs to be specific in terms of timing and frequency to overcome the effect of these variations. Food sampling is one of the most important aspects for compositional analysis. It determines the analytical data quality that needs to provide representative nutrient value to the users. However, food sampling is a difficult job because of its variability and heterogeneity in composition. The primary objective in food sampling is to collect a representative food sample and to ensure that changes in nutrient composition do not occur between collection and analysis[24].

In order to minimize the geographical variation, food samples were collected from wholesale markets located at four entry points to Dhaka city, where consumable matured food items come from all over the country for mass people consumption. Two samples were collected from cultivation fields. Also to avoid sampling error, a large portion (approximately 2.0kg) of replicate samples for every item was collected from each collection point.

In this study, general foods are referred to those foods which are consumed by local general people[25, 26] who constitute the majority of the Bangladeshi population. Ethnic foods are those foods which are consumed by ethnic tribal people who are the inhabitants of the Chittagong Hill Tracts (CHT) region and other specific locations in Bangladesh.

To identify the most common key food items consumed by the general and ethnic people, a comprehensive food consumption survey was conducted among 2015 selected households comprising 1210 general and 805 ethnic households. In addition, FGDs (focus group discussions) among *Marma, Chakma, Tripura and Tangchaga* living in Khagrachari and Rangamati were also conducted.

A multi-regions sampling plan was used to collect representative food samples. The identified and selected key food items were collected from four different wholesale markets located at the four entry points to Dhaka city, and from two cultivation fields.

Ethnic food sampling

Ethnic food items were collected from local weekly markets at Rangamati and Khagrachari. Three food samples for each food item were collected from each market. Every two food samples were pooled together to make three analytes (test sample), which were analyzed for their nutrient profile.

Identification of collected food samples

Nutrient profile in food composition database needs to be representative of the foods- "what the mass people consume" and "from where they collect it"? To minimize the compositional variations that may arise by geographical locations, timing of collection, sample preparation; the food samples, particularly vegetables, fruits and fishes, were collected from the wholesale markets where the foods arrive from four geographical regions of the country. It thus ensured the representative consumable food items of all geographical locations. Samples were collected at very early morning from the collection points, taken to the lab and immediately processed for analyte preparation at adequate required lab environment with the help of trained and skilled lab personnel.

The collected food samples were identified and authenticated by personnel from Department of Agriculture Extension (DAE) and an expert taxonomist from the Department of Botany, University of Dhaka, Bangladesh.

B. Methods of nutrient analysis

Use of appropriate and accurate methods employing skilled analysts can only ensure reliable data for preparation of a food composition database. However, the choice of analytical methods is limited to equipment facilities and technical staffs available.

The nutrients analyzed and the analytical techniques employed are summarized in the following table:

Table 2.4 Nutrients analyzed and the analytical techniques employed

Nutrient class	Nutrients	AOAC and Standard methods
Macronutrients	Moisture	Drying in Airovenat 100-105°C(AOAC,1998a)
	Protein	Micro-Kjeldahl method(AOAC,1998b)
	Fat	Soxhlet extraction (Raghuramuluetal,2003a)
	Fatty acids	By calculation(Greenfield&Southgate,2003d)
	Crude fiber	Gravimetric (Raghuramuluetal,2003b)
	Ash	Muffle furnace (AOAC,199c)
	Dietary Fiber	Sigma Kit (AOAC,1998d;SigmaTDF-100A)
	Carbohydrate	By Calculation (Randetal, 1991)
Micronutrients		
Vitamin	Carotenoids	Spectrophotometry (Roriguez-AmayaandKimura,2004; Rahmanetal,1990)
	β-carotene	HPLC (Roriguez-AmayaandKimura,2004)
	Vitamin C	Spectrophotometry (AOAC,1998e)
Mineral	Cu, Zn, Fe, Mn, Ca, Mg, Na, K, P	Atomic Absorption Spectrophotometry (Petersen,2002)
Antinutrients	Phytate	Spectrophotometry (WheeferandFerral,1971)

a. Estimation of moisture

Moisture content is one of the most variable components, particularly in the plant foods. This variability affects the food composition as a whole. Therefore, the moisture value remains as an essential component in food composition database. The moisture content in the food item was determined by measuring the amount of water removed from the food[27]. It was done by direct heating the food in an air oven at 100-105°C to constant weight.

b. Estimation of protein

Protein content in the food item was determined by indirect method estimating total nitrogen in the food. It was calculated by multiplying the total nitrogen using the respective factor as estimated by Micro-Kjeldahlmethod[28].

c. Estimation of total fat and fatty acids

The most frequently used method for fat estimation in food is the continuous extraction of fat with petroleum ether or diethyl ether. For some specific foods, mixture of chloroform and methanol is also used to extract fat.In this study, dried food was subjected to continuous extraction with petroleum ether in a Soxhletextractor[29]. Chloroform-methanol extraction was also used in isolation of fat in some particular food items such as meat and eggs[30].Total fatty acid content in the foods was estimated by calculation and by multiplication of total fat content by a factor[31].

d. Estimation of ash content

In ash estimation, dried food sample is ignited at 600oC to burn out all organic materials. The inorganic materials which are ignited at this temperature are the ash. In this study, ash in the food sample was estimated by heating the dried sample in a Muffle furnace at 600°C for 3 hours[32]. Ash content was calculated from weight difference.

e. Analysis of crude fiber and dietary fiber

Crude fiber was estimated by gravimetric method as described by Raghuramulu et al (2003). The dried and fat free food sample was treated with boiling sulphuric acid at constant volume, cooled, filtered, washed with hot water, made alkaline, boiled, filtered and washed with water followed by ethanol and ether wash. The residue was then heated in a Muffle furnace at 600oC for 3 hours. Crude fiber was finally calculated from the weight difference.

Dietary fibre was analysed by AOAC method (1998d) using total dietary fibre assay kit (TDF-100, Sigma Chemical Co., Saint Louis, Missouri, USA)[33]. In this method, a combination of enzymatic and gravimetric techniques was used. Dried fat free sample was gelatinized with heat stable α-amylase, then enzymatically digested with protease and amyl glycosidase to remove the protein and starch present in the food sample. Ethanol was added to precipitate the soluble dietary fibre. The residue was filtered and washed with ethanol and acetone. After drying, half of the residue was analysed for protein and another half for ash. Total dietary fibre was the weight of the residue minus the weight of the protein and ash.

f. Analysis of phytic acid

Phytic acid was determined by spectrophotometric method[34]. Phytic acid in the food sample by reacting with ferric chloride, developed red colour with potassium thiocyanate. This colour difference was read in the spectrophotometer at 485nm against the water blank. Intensity of the colour is proportional to ferric ion concentration, which was used in the calculation of phytic acid content in the food sample.

g. Calculation of carbohydrate and energy

The content of available carbohydrate in the food sample was determined by difference. Carbohydrate was calculated by subtracting the sum percentage of moisture, protein, fat, ash, crude and dietary fibre[35]. The energy content in the food sample was calculated by the sum of protein, fat and carbohydrate using respective Atwater factors[35].

h. Analysis of vitamin-C

Ascorbic acid in food sample was estimated by spectrophotometric method[36]. The fresh food sample (vegetable or fruit) was homogenized in a mortar with pestle using metaphosphoric acid, filtered, treated, and incubated at 60°C for 60 minutes with 2, 4-dinitrophenyi hydrazine. The reaction was stopped by adding 85% sulphuric acid and absorption was read at 520nm in a spectrophotometer (UV-1601, UV-Visible, Shimadzu).

i. Analysis of carotenoids

Carotenoid content in the vegetable or fruit sample was determined by acetone-petroleumether extraction followed by spectrophotometric measurement[37]. Extraction of carotenoid was performed by *grinding* of processed food sample in mortar and pestle, filtration through sintered glass filter under vacuum and *separation* from acetone to petroleum ether.

When the color of the eluent was orange like, the absorbance was read at 450nm in a spectrophotometer (UV-1601, UV-Visible, Shimadzu) for concentration of total carotenoids; when it was green color containing chlorophyll, the extract was passed through a column packed with activated 1:1 alumina and sodium anhydrous to remove the green pigments. The column eluent was then read at 450nm. All preparative and extractive procedures were performed in dim light to avoid photosensitive damage.

j. Analysis of β-carotene

Reverse phase HPLC (Shimadzu PC based Binary Gradient HPLC Prominence System with PDA Detector, SPD-M20A; Solvent delivery System, LC-20AT; LC Solution Multi Workstation Software) was used to determine the β-carotene (Roriguez-Amaya and Kimura, 2004). The nitrogen dried carotenoid was reconstituted with mobile phase (acetonitrile: methanol: 2-propanol-) and 50µl reconstituted sample was injected into the VYDAC reverse phase C_{18} column (5µm particle size). The column was re-equilibrated with the mobile phase for at least five minutes before the next injection. β-carotene was purchased from Sigma Chemical Co. USA and was used as standard analytes.

k. Analysis of mineral profile

Mineral content in the food sample was analysed by Atomic absorption spectrophotometric method[38]. Dried food sample was subjected to wet digestion with nitric acid and perchloric acid in an auto-digestor at 325°C. The digested sample after appropriate dilution and treatment was aspirated into the spectrophotometer where it was burned into atomic components and absorbance was read at their respective wavelength. Sigma standard elements were used as standard analytes.

Quality assurance programme (QAP)

Method standardization and validation were carried out with internal standard (IS), external standard (ES), intra and inter lab analysis of particular food and percent recovery. Data quality was maintained by precision (co-efficient of variance, CV), accuracy (Standard Reference Material- SRM) and well documented foods, standard error of mean (SEM).

2.6 Comments

Food composition data should have good quality in terms of representativeness, high analytical quality, comprehensiveness for foods and nutrients and food description. Total 93 foods (in which 53 are general and 40 are ethnic) are currently analyzed. The combined pulled data included in this FCT were compiled from various sources of available information, namely publications, food tables, unpublished papers, reports and laboratory data. Publications in journals usually have well documented methods of sampling and analysis, and other details regarding the samples.

The data obtained from these sources, therefore, partially fulfill the ideal food composition data requirements since methods of sampling, sample preparation and analysis and laboratory quality control may not be available. Systematic scrutinization of the compiled data was, therefore, carried out.

To construct and present a well designed and usable food composition database, we have tried to review FCT/FCDs of different countries[39,40,41,42,43] and considered such issues which were seemed very necessary in constructing a complete and well structured FCT/FCD.

There are 21 nutrients presented in these FCTs. Although data on carotene profile, fatty acids, and bio-active compounds are available for only some specific food items, they are separately tabulated because of their nutri-health importance. Data on amino acids, selenium, cholesterol, sugar, fat soluble vitamins (Vitamin E) and some water soluble vitamins (vitamin B_{12}) are available for a limited number of food items and have not yet been compiled or included in this FCT. More data for these particular nutrients are required. Since resources are very limited, it would be necessary to rank foods to be analyzed in order of priority, e.g. the selection of foods which are known or are suspected to contain the components in question, foods most frequently consumed in greater amounts, or foods related to nutrient deficiencies. Inputs from various sources, particularly from the data users are required to assist in the selection of the food items.

2.7 Feedback from the Users

Users who require more data on nutrients or food items which are not included in this FCTs, and those who require greater detail on numeric data, additional nutrients or food items, food descriptions, sample information, analytical source and other related aspects to the data available in these FCTs, are requested to contact the working group at the following address:

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In addition, your comment and suggestion on the use of this FCTs as well as information on the other nutrients and food items required will be highly appreciated.

3.1 Nutrients in the food and their function

Man needs a wide range of nutrients to perform various physiological functions in the body and to lead a healthy life. They obtain nutrients from their ingested foods. Nutrient is a substance that provides nourishment for growth or metabolism. Nutrients are used to build and repair tissues, regulate body processes and converted to and used as energy. A nutrient is said to be "essential" if it must be obtained from an external source, either because the organism cannot synthesize it or produces insufficient quantities. Nonessential nutrients are those nutrients that can be made by the body; they may often also be absorbed from consumed food. The effects of nutrients are dose-dependent and shortages are called deficiencies.

Nutrients needed in very small amounts are *micronutrients* and those that are needed in larger quantities are called *macronutrients*. There are three primary macronutrients defined as being the classes of chemical compounds humans consume in the largest quantities and which provide bulk energy. These are protein, fat, and carbohydrate, all of which humans consume in the largest quantities. The micronutrients are minerals and vitamins. However, currently there are forty-six recognized nutrients and six classes into which nutrients are categorized comprising *carbohydrates, fats, proteins, vitamins, minerals and water.* The foods containing these nutrients which are consumed daily are classified as *cereals, legumes (pulses), nuts and oil seeds, vegetables, fruits, milk and milk products and flesh foods (fish, meat and poultry).*

Foods also contain a wide range of organic chemical compounds, but having no nutritional function. Some of these compounds, however, act as anti-nutritional factors interfering with the utilization of some of the nutrients present in the foods. Some of the compounds like lathyrogens may be toxic and others like phenolic compounds are beneficial. These compounds can be collectively called non-nutrient components.

3.2 Macronutrients

The macronutrients (excluding fibre and water) provide structural constituents such as amino acids from which proteins are made, lipids from which cell membranes and some signaling molecules, and energy are prepared. Some of the structural material can be used to generate energy internally, and in either case it is measured In Joules or kilocalories (often called "Calories"). Carbohydrates and proteins provide 17 kJ approximately (4 kcal) of energy per gram, while fats provide 37 kJ (9 kcal) per gram, though the net energy from either depends on factors such as absorption and digestive effort, which vary substantially from instance to instance.

3.2.1 Carbohydrates

Carbohydrates are a class of energy yielding substances which include starch, glucose, cane sugar etc. There are different kinds of carbohydrates: simple (for example from fruits) and complex (for example from grains such as rice, wheat). Carbohydrates, also referred to as saccharides, may be classified as monosaccharides, disaccharides, or polysaccharides depending on the number of monomer (sugar) units they contain.

Polysaccharides are often referred to as *complex* carbohydrates because they are typically long multiple branched chains of sugar units. Complex carbohydrates take longer to digest and absorb since their sugar units must be separated from the chain before absorption. Simple carbohydrates are absorbed quickly, and therefore raise blood-sugar levels more rapidly than other nutrients.

The Dietary Guidelines recommend 45% to 65%, or about half of daily calories, should come from carbohydrate foods. Most carbohydrates should come from foods such as breads, cereals, grains, vegetables, fruits, and legumes.

Functions of carbohydrates

- Carbohydrates are good and quick source of energy. This energy is needed to carry on body physiological processes such as breathing, maintaining body temperature, and contraction and relaxation of the heart and muscles.
- Carbohydrates provide fuel for the central nervous system.
- They spare proteins so that proteins can be used for their more important function, i.e. to build and repair tissues.
- Carbohydrates provide fibers as a form of cellulose which increases faecal bulk and thus facilitates elimination.
- The 5-carbon monosaccharide ribose is an important component of coenzymes (e.g., ATP, FAD, and NAD) and the backbone of the genetic molecule known as RNA. The related deoxyribose is a component of DNA. Saccharides and their derivatives include many other important biomolecules that play key roles in the immune system, fertilization, preventing pathogenesis, blood clotting, and development.

Continuous deficiency of proteins and calories in children cause wasting of muscles and affect immune responses. Lack of dietary carbohydrates causes the brain to stop regulating serotonin, which is responsible for suppressing appetite, uplifting a person's moods and also functions as a tranquilizer. Low carbohydrate in our diet causes the fat reserves to be used as fuel source producing ketosis that may lead to tiredness and lethargy.

Carbohydrate sources

Grain foods, vegetables, fruits and legumes provide a plenty of carbohydrates and fibers. Adults get between 45–65% of dietary energy from carbohydrates. FAO and WHO jointly recommend that national dietary guidelines set a goal of 55–75% of total energy from carbohydrates, but only 10% directly from sugars.

3.2.2 Protein

Protein are biochemical compounds consisting of one or more polypeptides typically folded into a globular or fibrous form, facilitating a biological function. Proteins are the basis of animal body structures such as muscles, skin, and hair. They also form the enzymes which catalyze chemical reactions throughout the body. Each protein molecule is composed of amino acids which are characterized by containing nitrogen and sometimes sulphur. The body requires amino acids to produce new proteins (protein retention) and to replace damaged proteins (maintenance). Some amino acids are *essential* (human body cannot produce them internally) and some are *non essential* (human body can produce them from other amino acids). Twenty two amino acids can be found in the human body, and about ten of these are essential, and therefore must be included in the diet. A diet that contains adequate amounts of amino acids (especially those that are essential) is particularly important in some situations such as during early development and maturation, pregnancy, lactation, or injury (a burn, for instance). A *complete* protein source contains all of the essential amino acids and an *incomplete* protein source lacks one or more of the essential amino acids.

Functions of proteins

- Require for building and repair of body cells/tissues (including muscle).
- Enzymes, hormones, and many immune molecules are proteins.
- Involve in the process of cell signaling and signal transduction.
- Structural proteins confer stiffness and rigidity to otherwise-fluid biological components.
- Serve structural functions in generating mechanical forces.
- Essential body processes such as water balancing, nutrient transport, and muscle contractions require protein to function.
- Protein is a source of energy.
- Protein helps keep skin, hair, and nails healthy.

Severe protein deficiency in children causes marasmus (massive reduction in body weight) and kwashiorkor (stunted growth). Protein deficiency also causes cachexia, depletion of skeletal muscle, and abnormal blood clotting.

Protein Sources

Sources of dietary protein include meats, fishes, eggs, grains, legumes, and dairy products such as milk and cheese. The Dietary Guidelines recommend 15% to 20% of daily calories, should come from protein foods.

3.2.3 Fat

A molecule of dietary fat typically consists of several fatty acids (containing long chains carbon and hydrogen atoms), bonded to a glycerol. Fats are typically found as triglycerides (three fatty acids attached to one glycerol backbone). It may be classified as saturated or unsaturated depending on the structure of the fatty acids involved. Saturated fats have all of the carbon atoms in their fatty acid chains bonded to hydrogen atoms, whereas unsaturated fats have some of these carbon atoms double-bonded, so their molecules have relatively fewer hydrogen atoms than a saturated fatty acid of the same length. Unsaturated fats may be further classified as monounsaturated (one double-bond) or polyunsaturated (multiple double-bonds) including omega (-3, -6, -9) fatty acids. Furthermore, depending on the location of the double-bond in the fatty acid chain, unsaturated fatty acids are classified as omega-3 or omega-6 or omega-9 fatty acids. There may be bad fats such as cholesterol and increase risk of certain diseases, and good fats that protect heart and support overall health. In fact, good fats—such as omega-3 fats—are essential to physical and emotional health.

Most fatty acids are non-essential, meaning the body can produce them as needed, generally from other fatty acids and always by expending energy to do so. However, in humans at least two fatty acids are essential and must be included in the diet. An appropriate balance of essential fatty acids - omega-3 and omega-6 fatty acids - seems to be important for health.

Functions of fatty acids

Important function of fats is the transportation and use of vitamins A, D, E, K, and for other substances which are fat soluble. Without fat in the diet, those vitamins would not be able to function. Body fat provides the most important reservoir of stored energy as adipose tissue.

- Fat has numerous health benefits which include controlling blood levels of cholesterol and glucose, preventing the development of cancer, reducing heart disease risk and supporting vital organs including brain, heart, liver and lungs.
- Fat provides back-up energy if blood sugar supplies run out (after 4-6 hours without food).
- It is necessary for absorption of vitamins, nutrients and phytochemicals from fruits and vegetables.
- Body uses fat to make a variety of other building blocks needed for everything from hormones to immune function.
- Fat, in the form of structural body fat, provides important protection for the vital internal organs.
- Fat is a fairly poor conductor of heat, body fat in the subcutaneous tissues (under the skin) acts as insulation, and tends to prevent loss of body heat.
- Fats are required for brain structure.
- Substances made from fats also provide the covering for nerves, and thereby allows nerves to carry the impulses necessary to function.
- Fat provides the makeup of the cell walls, the cell membranes, which are required to allow the passage in and out of essential chemicals.
- Fats are part of the structure of the skin which literally holds us together. The skin is often overlooked as being important for existence, but consider what would happen if the skin were to 'come apart' like old fabric.
- Fats are necessary for the production of hormones to regulate and initiate body activities.
- Another function of dietary fats is the stimulation of the flow of bile, and the emptying of the gallbladder. Bile is important in elimination of the waste products created by the normal breakdown of red blood cells. If the bile does not leave the gallbladder as it should, gallstones may form.
- Fat is absolutely necessary for milk production in nursing mothers, and is required during pregnancy for the proper development of the child.
- It protects organs and bones from shock and provides support for organs.
- Fat is part of every cell membrane in the body. It helps transport nutrients and metabolites across cell membranes.
- Omega-3 fatty acids prevents clotting, lowers cholesterol, help prevent cancer cell growth. Its need is increased in depression, cardiovascular disease, type 2 diabetes, fatigue, dry, itchy skin, brittle hair and nails, inability to concentrate, and joint pain.

Diets too low in fat (less than 20 - 25%) may trigger cravings. Fat helps food to stay in the stomach longer, giving a greater sense of satisfaction and preventing hunger soon after meals. Fat is needed to prevent essential fatty acid deficiency. Deficiency of fat causes- dry scaly skin, hair loss, low body weight, cold intolerance, bruising, poor growth, lower resistance to infection, poor wound healing, loss of menstruation.

Sources of fats

Saturated fatty acids are found in animal products such as whole milk, cream, butter, cheese, egg-yolk, meat, fish, coconut, margarine, chocolate, lard etc. Good sources of essential fatty acids include most vegetables, nuts, seeds, and marine oils. Some of the best sources are fish, soy beans, pumpkin seeds, sunflower seeds, Decreased dietary intake of fats/oils cause marasmus.

3.2.4 Water

Water is more important than food. Human body contains about 65 percent water. In the human body it is found as intracellular fluid and also around organs as extracellular fluid, and between the cells as intercellular fluid. All the constituents of protoplasm are suspended in water. It is structural component; it cushions all cells.

Functions of water

- It acts as a solvent in all stages of digestion.
- It keeps nutrients in solution form so that they may be absorbed through the intestinal walls.
- It transports nutrients through blood to all the tissues.
- It acts as a vehicle for the waste products which are excreted either through the kidneys.
- Water regulates body temperature through evaporation from the lungs and skin.

Sources of water

The body has two sources of water –

- The water contained in food, e.g. fruits and vegetable, and
- Drinking water

3.3 Micronutrients

Micronutrients are nutrients required by humans and other living things throughout life in small quantities to orchestrate a whole range of physiological functions, but which the organism itself cannot produce. For human, they include dietary trace minerals in amounts generally less than 100 milligrams/day. Micronutrients also include vitamins, which are organic compounds required as nutrients in tiny amounts. Micronutrient deficiencies are widespread. Some 50% of world cereal soils are deficient in zinc and 30% of cultivated soils globally are deficient in iron. These substances are the "magic wands" that enable the body to produce enzymes, hormones and other substances essential for proper growth and development. As tiny as the amounts are, however, the consequences of their absence are severe. Iodine, vitamin A and iron are most important in global public health terms; their lack represents a major threat to the health and development of populations the world over, particularly children and pregnant women in low-income countries.

Natural sources of micronutrients are abundant. Micronutrients are vitamins and minerals mostly present in green-yellow fresh fruits and vegetables, flesh foods and in animal and vegetable fats. It can be of primary sources that contain the micronutrients such as foods, and of secondary sources that enhance utilization of micronutrient such as animal foods like red meat which also improve absorption of micronutrients from plant sources. Some non-foods also contain micronutrients.

3.3.1 Vitamins

Vitamins are organic substances present in small amounts in many foods. They are required for carrying out many vital functions of the body and many of them are involved in the utilization of the major nutrients like proteins, fat and carbohydrates. Although they are needed in small amounts, they are essential for health and wellbeing of the society. Vitamins have diverse biochemical functions. Some have hormone-like functions as regulators of mineral metabolism (e.g., vitamin D), or regulators of cell and tissue growth and differentiation (e.g., some forms of vitamin A). Others function as antioxidants (e.g., vitamin E and sometimes vitamin C). The largest number of vitamins (e.g., B complex vitamins) functions as precursors for enzyme cofactors that help enzymes in their work as catalysts in metabolism. In this role, vitamins may be tightly bound to enzymes as part of prosthetic groups. For example, biotin is part of enzymes involved in making fatty acids. Vitamins may also be less tightly bound to enzyme catalysts as coenzymes, detachable molecules that function to carry chemical groups or electrons between molecules. For example, folic acid carries various forms of carbon group – methyl, formyl, and methylene – in the cell. Although these roles in assisting enzyme-substrate reactions are vitamins' best-known function, the other vitamin functions are equally important.

In nutrition and diseases, vitamins are essential for the normal growth and development of body. Using the genetic blueprint inherited from its parents, a fetus begins to develop, at the moment of conception, from the nutrients it absorbs. It requires certain vitamins and minerals to be present at certain times. These nutrients facilitate the chemical reactions that produce among other things, skin, bone, and muscle. If there is serious deficiency in one or more of these nutrients, a child may develop a deficiency disease. Even minor deficiencies may cause permanent damage.

Once growth and development are completed, vitamins remain essential nutrients for the healthy maintenance of the cells, tissues, and organs that make up a multicellular organism; they also enable a multicellular life form to efficiently use chemical energy provided by food it eats, and to help process the proteins, carbohydrates, and fats required for respiration.

Humans must consume vitamins to avoid its deficiency. Human bodily stores for different vitamins vary widely; vitamins A, D, and B_{12} are stored in significant amounts in the human body, mainly in the liver, and an adult human's diet may be deficient in vitamins A and D for many months and B_{12} in some cases for years, before developing a deficiency condition. However, vitamin B_3 (niacin and niacinamide) is not stored in the human body in significant amounts, so stores may last only a couple of weeks.

Deficiencies of vitamins are classified as either primary or secondary. A primary deficiency occurs when human does not get enough of the vitamin in its food. A secondary deficiency may be due to an underlying disorder that prevents or limits the absorption or use of the vitamin, due to a "lifestyle factor", such as smoking, excessive alcohol consumption, or the use of medications that interfere with the absorption or use of the vitamin. People who eat a varied diet are unlikely to develop a severe primary vitamin deficiency. In contrast, restrictive diets have the potential to cause prolonged vitamin deficits, which may result in often painful and potentially deadly diseases

Vitamins are classified by their biological and chemical activity, not by their structure. However, Vitamins can be broadly classified as water soluble and fat soluble vitamins. In humans there are 13 vitamins: 4 fat-soluble (A, D, E, and K) and 9 water-soluble (8 B vitamins and vitamin C). Water-soluble vitamins dissolve easily in water and, in general, are readily excreted from the body, to the degree that urinary output is a strong predictor of vitamin consumption. Because they are not as readily stored, more consistent intake is important. Many types of water-soluble vitamins are synthesized by bacteria. Fat-soluble vitamins are absorbed through the intestinal tract with the help of lipids. Because they are more likely to accumulate in the body, they are more likely to lead to hypervitaminosis than are water-soluble vitamins. Fat-soluble vitamin regulation is of particular significance in cystic fibrosis.

Anti-vitamins or antinutrient present in foods inhibit the absorption or actions of vitamins. For example, avidin, a protein in egg whites, inhibits the absorption of biotin. Pyrithiamine is similar to thiamine, vitamin B_1, and inhibits the enzymes that use thiamine. Phytic acid inhibits vitamin D function. Sometimes one vitamin spares for other one such as vitamin A is spared by vitamin E.

3.3.1.1 Fat soluble vitamins

Vitamin A- Retinol

Vitamin A is a generic term for a group of lipid soluble compounds related to retinol. Retinol is often referred to as preformed vitamin A. It is found only in animal sources, mainly as retinyl esters and in food supplements. It is needed by the retina of the eye in the form of a specific metabolite, the light-absorbing molecule retinal that is necessary for both low-light (scotopic vision) and color vision. Vitamin A also functions in a very different role as an irreversibly oxidized form of retinol known as retinoic acid, which is an important hormone-like growth factor for epithelial and other cells.

Functions of vitamin A

- Vision- receptor cells in the retina of the eye (rod cells) contain a light-sensitive pigment called rhodopsin, which is a complex of the protein opsin and the vitamin A metabolite retinal.
- Cellular differentiation- vitamin A is necessary for normal differentiation of epithelial cells, the cells of all tissues lining the body such as skin, mucous membranes, blood vessel walls and the cornea.
- Growth and development-retinoic acid plays an important role in reproduction and embryonic development, particularly in the development of the spinal cord and vertebrae, limbs, heart, eyes and ears.
- Antioxidant- functions as to some extent as antioxidant.
- Immune function-vitamin A is required for the normal functioning of the immune system and therefore helps to protect against infections in a number of ways. It is essential in maintaining the integrity and function of the skin and mucosal cells, which function as a mechanical barrier and defend the body against infection.

Sources of vitamin A

- Dark-colored fruit
- Dark leafy vegetables
- Egg yolk
- Fortified milk and dairy products (cheese, yogurt, butter, and cream)
- Liver, beef, and fish

Vitamin A can be found in two principal forms in foods-

- Retinol (vitamin A of animal food source) is a yellow, fat-soluble substance. Since the pure alcohol form is unstable, the vitamin is found in tissues in a form of retinyl ester. It is also commercially produced and administered as esters such as retinyl acetate or palmitate.
- The carotenes which comprise α-carotene, β-carotene, gama-carotene; and the xanthophyll- β -cryptoxanthin function as provitamin A.

Because the conversion of retinol from provitamin carotenoids by the human body is actively regulated by the amount of retinol available to the body, the conversions apply strictly only for vitamin A-deficient humans. The absorption of provitamins depends greatly on the amount of lipids ingested with the provitamin; lipids increase the uptake of the provitamin. Fruits and vegetables are not as useful for obtaining vitamin A as in animal foods. This is important for vegetarians, as night blindness is prevalent in countries where little meat or vitamin A-fortified foods are available.

Vitamin D- Cholecalciferol

Vitamin D is the general name given to a group of fat-soluble compounds that are essential for maintaining the mineral balance in the body. In humans, vitamin D is unique both because it functions as a prohormone and because the body can synthesize it (as vitamin D_3) when sun exposure is adequate.

Functions of vitamin D

Vitamin D helps the body absorb calcium, which one needs for the normal development and maintenance of healthy teeth and bones. It also helps maintain proper blood levels of calcium and phosphorus. Other functions include control of cell proliferation and differentiation, and modulation of immune system.

A diet deficient in vitamin D causes osteomalacia (called rickets when it occurs in children), which is a softening of the bones. In the developed world, this is a rare disease

Sources of vitamin D

Fatty marine fish, fish liver oils (cod's liver oil), fortified cereals, fortified milk and dairy products (cheese, yogurt, butter, and cream).

Vitamin E-Tocopherols and Tocotrienols

The term vitamin E covers eight fat-soluble compounds found in nature. Four of them are called tocopherols and the other four tocotrienols. It plays a role in the formation of red blood cells and helps the body use vitamin K. It is a fat-soluble antioxidant that stops the production of reactive oxygen species formed when fat undergoes oxidation.

Functions of vitamin E

- Antioxidant function: The major biological function of vitamin E is that of a lipid soluble antioxidant preventing the propagation of free-radical reactions. Vitamin E is located within the cellular membranes. It protects polyunsaturated fatty acids (PUFAs) and other components of cellular membranes from oxidation by free radicals. Apart from maintaining the integrity of the cell membranes in the human body, it also protects low density lipoprotein (LDL) from oxidation.
- Enzymatic activity regulator: It includes inhibition of protein kinase C activity, which is involved in cell proliferation and differentiation.
- Vitamin E inhibits platelet aggregation and enhances vasodilation.
- Effect on gene expression: Vitamin E enrichment of endothelial cells downregulates the expression of cell adhesion molecules, thereby decreasing the adhesion of blood cell components to the endothelium. It downregulates the expression of the CD_{36} scavenger receptor gene and the scavenger receptor class A (SR-A) and modulates expression of the connective tissue growth factor (CTGF) gene, which when expressed, is responsible for the repair of wounds and regeneration of the extracellular tissue that is lost or damaged during atherosclerosis.
- Neurological functions: Vitamin E also plays a role in neurological functions. It is essential nutrient for maintaining the structural and functional integrity of the developing human nervous system, skeletal muscle, and the retina. Supplementation of vitamin E prevents the development of the neurological complications, that can arrest or reverse the neuropathy.

Vitamin E deficiency can cause spinocerebellar ataxia, myopathies, peripheral neuropathy, ataxia, skeletal myopathy, retinopathy, impairment of the immune response[44].

Sources of vitamin E

Vegetable oils (olive, soya beans, palm, corn, safflower, sunflower, etc.), nuts, whole grains and wheat germ are the most important sources of vitamin E. Other sources are seeds and green leafy vegetables. The vitamin E content of vegetables (tomatoes, pumpkin sweet potatoes), fruits (mangoes, papaya), dairy products, fish and meat is relatively low.

Vitamin K

Vitamin K is a group of structurally similar, fat-soluble vitamins that are needed for the post-translational modification of certain proteins required for blood coagulation and in metabolic pathways in bone and other tissue. Vitamin K is essential for the synthesis of the biologically active forms of a range of proteins called vitamin K-dependent proteins.

Functions of vitamin K[45]

- Coenzyme for vitamin K-dependent carboxylase
- Blood coagulation: promotes healthy blood clotting
- Bone metabolism: protects bones from weakening or fracture
- Vascular biology: prevents calcification of blood vessels or heart valves
- Other specific biological function: protection against oxidative damage, proper regulation of inflammatory response, and support of brain and nervous system structure.

Like other liposoluble vitamins (A, D, E), vitamin K is stored in the fat tissue of the human body. Average diets are usually not lacking in vitamin K and primary vitamin K deficiency is rare in healthy adults. Newborn infants are at an increased risk of deficiency. Osteoporosis and coronary heart disease are strongly associated with lower levels of vitamin K. High deficiency may relate to problematic blood clotting or bleeding.

Sources of vitamin K

The rich sources of vitamin K are dark green leafy vegetables (spinach), cabbage, cauliflower, tomatoes, turnip green, green mustard, cereals, soybean oil, fish, liver, beef, eggs.

3.3.1.2 Water soluble vitamins

Vitamin C- L-ascorbic acid

Vitamin C or L-ascorbic acid or L-ascorbate is an essential nutrient for humans and certain other animal species. In living organisms ascorbate acts as an antioxidant by protecting the body against oxidative stress. It is also a cofactor in at least eight enzymatic reactions

including several collagen synthesis reactions that, when dysfunctional, cause the most severe symptoms of scurvy. Ascorbate (an ion of ascorbic acid) is required for a range of essential metabolic reactions in all animals and plants. It is made internally by almost all organisms. Poor absorption of vitamin C during pregnancy may decrease a baby's chances of survival.

Functions of vitamin C[46]

In humans, vitamin C is essential to a healthy diet as well as being a highly effective antioxidant, acting to reduce oxidative stress. Ascorbic acid also performs numerous physiological functions in the human body including the synthesis of collagen, carnitine, and neurotransmitters; the synthesis and catabolism of tyrosine; and the metabolism of microsome. As vitamin C enhances iron absorption, iron poisoning can become an issue to people with rare iron overload disorders, such as haemochromatosis. A very large dosage of vitamin C can develop hemolytic anemia in a genetic condition that results in inadequate levels of the enzyme glucose-6-phosphate dehydrogenase. It regenerates vitamin E supply. The important physiological functions of vitamin C are

- Immune stimulation
- Anti-allergic
- Anti-oxidant
- "cement" for connective tissues
- Wound healing
- Teeth and gum health
- Aids iron absorption
- Eye health

Sources of vitamin C

The dietary sources of vitamin c are Citrus fruits like guava, amla/amloki, green mango, orange, pineapple, lemon, watermelon, grapefruit, grape, papaya, banana, apple, plum and vegetables like spinach, cabbage, cauliflower, papaya, green beans, tomatoes, turnip green, green chili, garlic, onion, cucumber, mustard green, carrot, potatoes, sweet potatoes etc.

B-vitamins

B vitamins are a group of water-soluble vitamins that play important roles in cell metabolism. The B vitamins are necessary to:

- Support and increase the rate of metabolism
- Maintain healthy skin, hair and muscle tone
- Enhance immune and nervous system function
- Promote cell growth and division, including that of the red blood cells that help prevent anemia
- Reduce the risk of pancreatic cancer - one of the most lethal forms of cancer when consumed in food, but not when ingested in vitamin tablet form.

All B vitamins are water-soluble, and are dispersed throughout the body. Most of the B vitamins must be replenished regularly, since any excess is excreted in the urine. B vitamins have also been hypothesized to reduce the symptoms of attention deficit hyperactivity disorder. However, taking large doses of certain B vitamins may produce harmful effects. Several vitamin deficiency diseases may result from the lack of sufficient B-vitamins.

Vitamin	Deficiency effects
Vitamin B_1 (thiamine)	Deficiency causes beriberi, symptoms of which involve nervous system including weight loss, emotional disturbances, Wernicke's encephalopathy (impaired sensory perception), weakness and pain in the limbs, periods of irregular heartbeat, and edema. Heart failure and death may occur in advanced cases. Chronic thiamine deficiency can also cause Korsakoff's syndrome, an irreversible psychosis characterized by amnesia and confabulation.
Vitamin B_2 (riboflavin)	Deficiency causes ariboflavinosis, symptoms of which may include cheilosis (cracks in the lips), high sensitivity to sunlight, angular cheilitis, glossitis (inflammation of the tongue), seborrheic dermatitis or pseudo-syphilis (particularly affecting the scrotum or labia majora and the mouth), pharyngitis (sore throat), hyperemia, and edema of the pharyngeal and oral mucosa.
Vitamin B_3 (niacin)	Deficiency, along with a deficiency of tryptophan causes pellagra. Symptoms include aggression, dermatitis, insomnia, weakness, mental confusion, and diarrhea. In advanced cases, pellagra may lead to dementia and death; 4Ds: dermatitis, diarrhea, dementia, and death.
Vitamin B_5 (pantothenic acid)	Deficiency can result in acne and paresthesia, although it is uncommon.
Vitamin B_6 (pyridoxine)	Deficiency may lead to microcytic anemia, depression, dermatitis, hypertension, edema, and elevated levels of homocysteine.
Vitamin B_7 (biotin)	Deficiency does not typically cause symptoms in adults but may lead to impaired growth and neurological disorders in infants. Multiple carboxylase deficiency, an inborn error of metabolism, can lead to biotin deficiency even when dietary biotin intake is normal.
Vitamin B_9 (folic acid)	Deficiency results in a macrocytic anemia, and elevated levels of homocysteine. Deficiency in pregnant women can lead to birth defects including the insidious effects of age on the brain. Supplementation is often recommended during pregnancy.
Vitamin B_{12} (cobalamin)	Deficiency results in a macrocytic anemia, elevated homocysteine, peripheral neuropathy, memory loss and other cognitive deficits. It is most likely to occur among elderly people, as absorption through the gut declines with age; the autoimmune disease pernicious anemia; can also cause symptoms of mania and psychosis. In rare extreme cases, paralysis can result.

Vitamin B_1 –Thiamine

The main functions of thiamin are as a coenzyme in the form of thiamin pyrophoshate (TPP). Coenzymes are 'helper molecules' which activate enzymes, the proteins that control the thousands of biochemical processes occurring in the body. TPP acts as a "helper molecule" in about 25 enzymatic reactions and plays an essential role in the production of energy from food in the carbohydrate metabolism as well as in the links between carbohydrate, protein and fat metabolism. It is a coenzyme in the catabolism of sugars and amino acids.

***Functions of* vitamin B_1**

- Acts as a coenzyme in metabolism of carbohydrates and amino acids
- Acts as a coenzyme which catalyses reactions in the pentose phosphate pathway. This pathway is the basis for the production of many prominent compounds, such as ATP, GTP, NADPH and the nucleic acids DNA and RNA.
- Nerve impulse conduction and muscle action
- It is used in the biosynthesis of the neurotransmitter acetylcholine and gamma-aminobutyric acid (GABA).

Thiamine deficiency adversely affects all of the organ systems. However, the nervous system and the heart are particularly sensitive to thiamine deficiency, because of their high oxidative metabolism. Its subacute deficiency can lead to metabolic coma and death. Well-known thiamine deficiency syndromes include beriberi, Wernicke-Korsakoff syndrome,and optic neuropathy.

Sources of vitamin B_1

Whole grains, dried milk, egg, enriched bread and flour, lean meats, legumes (dried beans), nuts and seeds, organ meats, peas. Caffeic acid, chlorogenic acid, tannic acid, flavonoid- quercetin and rutin are thiamine antagonist.

Vitamin B_2 - Riboflavin

Riboflavin, also known as vitamin B_2, is an easily absorbed micronutrient with a key role in maintaining health in humans and animals. It is the central component of the cofactors FAD and FMN, and is therefore required by all flavoproteins. As such, vitamin B_2 is required for a wide variety of cellular processes. It plays a key role in energy metabolism, and for the metabolism of fats, ketone bodies, carbohydrates, and proteins. It is also used as an orange-red food colour additive.

Functions of vitamin B_2

Vitamin B_2 involves in-

- Oxidation-reduction reaction
- Energy production
- Anti-oxidant functions
- Conversion of pyridoxine (vitamin B6) and folic acid into their active coenzyme forms
- Growth and reproduction
- Growth of skin, hair and nails

Riboflavin deficiency (ariboflavinosis) include cracked and red lips, inflammation of the lining of mouth and tongue, mouth ulcers, cracks at the corners of the mouth (angular cheilitis), a sore throat, dry and scaling skin, fluid in the mucous membranes, and iron-deficiency anemia. The eyes may also become bloodshot, itchy, watery and sensitive to bright light Riboflavin deficiency is classically associated with the oral-ocular-genital syndrome. Angular cheilitis, photophobia, and scrotal dermatitis are the classic remembered signs.

Sources of vitamin B_2

Milk, cheese, yogurt, yeast, lean meat, eggs, liver, kidneys, fish, eggs, legumes, green leafy vegetables, tomatoes, okra, mushrooms, almonds are good sources of vitamin B_2, but exposure to light destroys riboflavin. Cereal grains, although poor sources of riboflavin, are important for those who rely on cereals as their main dietary component. Riboflavin is destroyed by exposure to ultraviolet light, so milk sold in transparent (glass/plastic) bottles will likely contain less riboflavin than milk sold in opaque containers.

Vitamin B_3 -Niacin

The term niacin refers to both nicotinic acid and its amide derivative, nicotinamide (niacinamide). Both are used to form the coenzymes nicotinamide adenine dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP).

Functions of vitamin B_3

The coenzymes NAD and NADP are required for many biological oxidation-reduction (redox) reactions. About 200 enzymes require NAD or NADP. NAD is mainly involved in reactions that generate energy in tissues by the biochemical degradation of carbohydrates, fats and proteins. NADP functions in reductive biosyntheses such as the synthesis of fatty acids and cholesterol. NAD is also required as a substrate for non-redox reactions. It is the source of adenosine diphosphate (ADP)-ribose, which is transferred to proteins by different enzymes. These enzymes and their products seem to be involved in DNA replication, DNA repair, cell differentiation and cellular signal transduction.

The important functions of vitamin B_3 are-

- key role in metabolism of carbohydrates, fat and protein
- assists production of energy within the body
- improves circulation and reduces the cholesterol level in the blood
- helps maintain the nervous system
- reduces high blood pressure
- increases energy through proper utilization of food
- helps maintain a healthy skin, tongue and digestive system.

Its deficiency induces mainly pellagra, nervousness, mental depression, insomnia, muscle weakness and a wide variety of other symptoms.

Sources of vitamin B_3

The rich sources of Vitamin B_3 are eggs, fish (sea-water fish), lean meats, organ meats, legumes, nuts, potato, and poultry.

Vitamin B_5- Pantothenic acid

Pantothenic acid, also called pantothenate or vitamin B_5, is a water-soluble vitamin. For many animals, pantothenic acid is an essential nutrient. Animals require pantothenic acid to synthesize coenzyme-A (CoA), as well as to synthesize and metabolize proteins, carbohydrates, and fats. It also plays a role in the production of hormones and cholesterol.

Function of vitamin B_5

It's functions are-

- Metabolism of carbohydrates, proteins and fats
- Supply of energy from foods
- Synthesis of essential lipids, sterol, hormones, neurotransmitters
- aids in the utilization of vitamins
- improves the body's resistance to stress
- helps in cell building and the development of the central nervous system
- helps the adrenal glands
- fights infections by building antibodies

Sources of vitamin B_5

Its richest sources are yeast and organ meats (liver, kidney, heart, brain), lean meat, but eggs, milk, vegetables, legumes and wholegrain cereals are more common sources.

Vitamin B_6 – Pyridoxine

There are three different natural forms (vitamers) of vitamin B_6, namely pyridoxine, pyridoxamine, and pyridoxal, all of which are normally present in foods. The active derivative of this vitamin pyridoxal phosphate (PLP) is a cofactor in many reactions of amino acid metabolism, including transamination, deamination, and decarboxylation.

Functions of vitamin B_6[47]

- Vitamin B_6 serves as a coenzyme of approximately 100 enzymes that catalyse essential chemical reactions in the human body. It plays an important role in protein, carbohydrate and lipid metabolism.
- Its major function is the production of serotonin from the amino acid trytophan in the brain and other neurotransmitters, and so it has a role in the regulation of mental processes and mood.
- It is involved in the conversion of tryptophan to the vitamin niacin, the formation of haemoglobin and the growth of red blood cells, the absorption of vitamin B_{12}, the production of prostaglandines and hydrochloric acid in the gastrointestinal tract, the sodium-potassium balance, and in histamine metabolism.
- It assists in the balancing of sodium and potassium as well as promoting red blood cell production.
- It is required for the production of the monoamine neurotransmitters serotonin, dopamine, norepinephrine and epinephrine
- Vitamin B_6 also plays a role in the improvement of the immune system.
- It is implicated in the treatment of depression and anxiety.
- Involves in gene expression.
- Pyridoxal phosphate generally serves as a coenzyme for many reactions and can help facilitate decarboxylation, transamination, racemization, elimination, replacement and beta-group interconversion reactions.

The liver is the site for vitamin B_6 metabolism. The classic clinical syndrome for B_6 deficiency is a seborrhoeic dermatitis-like eruption, atrophic glossitis with ulceration, angular cheilitis, conjunctivitis, intertrigo, and neurologic symptoms of somnolence, confusion, and neuropathy.

Sources of vitamin B_6

Banana, legumes (dried beans), meat, nuts, yeast, poultry, whole grains

Vitamin B_9 - Folic acid, pteroyl-L-glutamic acid

Folic acid is a generic term for a water-soluble group of B vitamins including folic acid and naturally occurring folates. Folic acid is itself not biologically active, but its biological importance is due to tetrahydrofoiate and other derivatives after its conversion to dihydrofolic acid in the liver. Low levels of folate are linked to birth defects such as spina bifida.

Functions of folic acid

- Adequate folate intake during the periconception period, the time right before and just after a woman becomes pregnant, helps protect against a number of congenital malformations, including neural tube defects

- Folate coenzymes play an important role in the metabolism of several amino acids, the constituents of proteins. The synthesis of the amino acid methionine from homocysteine requires a folate coenzyme and, in addition, vitamin B_{12}.
- Folate is important for cells and tissues that rapidly divide.
- Tetrahydrofolic acid is involved in the synthesis of nucleic acids DNA and RNA, the molecules that carry genetic information in cells and also in the formation of blood cells. Folates are, therefore, essential for normal cell division, proper growth and for optimal functioning of the bone marrow.
- Folic acid supplementation affects noradrenaline and serotonin receptors within the brain, which could be the cause of folic acid's possible ability to act as an antidepressant

Folic acid deficiency during the periconception period can cause a number of congenital malformations, including neural tube defects that produce malformations of the spine, skull, and brain including spina bifida and anencephaly. The risk of neural tube defects is significantly reduced when supplemental folic acid is consumed in addition to a healthy diet prior to and during the first month following conception.

Folate deficiency during pregnancy may also increase the risk of preterm delivery, infant low birth weight and fetal growth retardation, as well as increasing homocysteine level in the blood, which may lead to spontaneous abortion and pregnancy complications, such as placental abruption and pre-eclampsia.

Prenatal high folic acid in the presence of low Vitamin B_{12} causes epigenetic changes in the unborn predisposing them to metabolic syndromes, central adiposity and adult diseases such as Type 2 diabetes. Excess folic acid in utero causes epigenetic changes to the brain leading to autism spectrum disorders.

Sources of folic acid

Liver, dark green leafy vegetables, beans, lentils, wheat germ, yeast, egg yolk, milk and dairy products, peanut butter, beets, orange and orange juice and whole wheat bread.

Vitamin B_{12}- cobalamin

Vitamin B_{12} plays a key role in the normal functioning of the brain and nervous system. It is crucial for the formation of blood. The vitamin B_{12} is generic for a specific group of cobalt-containing corrinoids with biological activity in humans. Cyanocobalamin is a form of vitamin B_{12} that is widely used clinically due to its availability and stability. It is transformed into active factors in the body.

Functions of vitamin B_{12}

- Vitamin B_{12} is necessary for the formation of blood cells, nerve sheaths and various proteins. It is therefore, essential for the prevention of certain forms of anaemia and neurological disturbances.
- It is involved in fat and carbohydrate metabolism and is essential for growth.
- In humans, vitamin B_{12} functions primarily as a coenzyme in intermediary metabolism.
- In its methylcobalamin form vitamin B_{12} is the direct cofactor for methionine synthase, the enzyme that recycles homocysteine back to methionine.
- There is evidence that vitamin B_{12} is required in the synthesis of folate polyglutamates (active coenzymes required in the formation of nerve tissue) and in the regeneration of folic acid during red blood cell formation.

Vitamin B_{12} deficiency can potentially cause severe and irreversible damage, especially to the brain and nervous system. Its deficiency also causes tiredness, short breathing, and palpitation. With folate deficiency, it induces anaemia.

Sources of Vitamin B_{12}

Rich sources of vitamin B_{12} are meat, eggs, fortified foods such as soymilk, milk and milk products, organ meats (liver and kidney), poultry and shellfish

Biotin- Vitamin B_7

Biotin is a colorless, water-soluble member of the B-complex group of vitamins. Biotin is necessary for cell growth, the production of fatty acids, and the metabolism of fats and amino acids.

Functions of blotin

- It acts as a coenzyme of acetyl-CoA carboxylase which is involved in the synthesis of fatty acids from acetate
- It acts as a critical coenzyme of pyruvate carboxylase which is involved in energy metabolism, necessary for the metabolism of amino acids, cholesterol, and odd chain fatty acids.
- Biotin may have a role in DNA replication and transcription arising from its interaction with nuclear histone proteins.
- It owes its reputation as the "beauty vitamin" to the fact that it activates protein/amino acid metabolism in the hair roots and fingernail cells.

Sources of biotin

The good dietary sources of biotin are yeast, liver, kidney. eggyolk, soybeans, nuts and cereals, legumes, chocolate, milk and pork.

Table 3.1: Sources, highest consumption limit, and effects of deficiency and excess intake of vitamins

Vitamin	Chemical name	Deficiency disease	Upper Intake level	Overdose disease	Good sources
Vitamin B_1	Thiamine	Beriberi, Wernicke-Korsakoff syndrome	N/D	Drowsiness or muscle relaxation with large doses	Brown rice, vegetables, potatoes, liver, eggs, pork, oatmeal,
Vitamin B_2	Riboflavin	Ariboflavinosis	N/D		Dairy products, bananas, popcorn, green beans, asparagus
Vitamin B_3	Niacin, niacinamide	Pellagra	35.0 mg	Liver damage (doses > 2g/d and other problems	Meat, fish, eggs, many vegetables, mushrooms, tree nuts
Vitamin B_5	Pantothenic acid	Paresthesia	N/D	Diarrhea; nausea, heartburn.	Meat, broccoli, avocados
Vitamin B_6	Pyridoxine, pyridoxamine, pyridoxal	Anemia, peripheral neuropathy.	100 mg	Impairment of proprioception, nerve damage (doses > 100 mg/d)	Meat, vegetables, tree nuts, bananas
Vitamin B_7	Biotin	Dermatitis, enteritis	N/D		Raw egg yolk, liver, peanuts, certain vegetables
Vitamin B_9	Folic acid, folinic acid	Megaloblast, neural tube defects during pregnancy	1,000 µg	May mask symptoms of vitamin B_{12} deficiency; other effects.	Leafy vegetables, pasta, bread, cereal, liver
Vitamin B_{12}	Cyanocobalamin, hydroxycobalamin, methylcobalamin	Megaloblastic anemia	N/D	Acne-like rash [causality is not conclusively established].	Meat and other animal products
Vitamin C	Ascorbic acid	Scurvy	2,000 mg	Vitamin C megadosage	Many fruits and vegetables, liver
Vitamin A	Retinol, retinal, carotenoids including beta carotene	Night-blindness, Hyperkeratosis, and Keratomalacia	3,000 µg[48]	Hypervitaminosis A	Orange, ripe yellow fruits, leafy vegetables, carrots, pumpkin, squash, spinach, liver
Vitamin D	Cholecalciferol	Rickets and Osteomalacia	50 µg	Hypervitaminosis D	Fish, eggs, liver, mushrooms
Vitamin E	Tocopherols, tocotrienols	Deficiency is very rare; mild hemolytic anemia in newborn infants.	1,000 mg	Increased congestive heart failure seen in one large randomized study	Many fruits and vegetables
Vitamin K	phylloquinone, menaquinones	Bleeding diathesis	N/D	Increases coagulation in patients taking warfarin	Leafy green vegetables such as spinach, egg yolks, liver

3.3.2 Minerals

Minerals are often referred to as "the spark plugs of life". Minerals are required for every single metabolic action and reaction, starting at the cellular level. Minerals work with each other and with other nutrients, such as vitamins and enzymes, to keep the body in perfect balance. Deficiencies in any one mineral can cause health problems.

Minerals are elements that originate in the soil and cannot be created by living beings, such as plants and animals. Yet plants, animals and humans need minerals in order to be healthy. Plants absorb minerals from the soil, and animals get their minerals from the plants or other animals they eat. Most of the minerals in the human diet come directly from plants, such as fruits and vegetables, or indirectly from animal sources. Minerals may also be present in drinking water, but this depends on where one lives, and what kind of water you drink (bottled, tap). Minerals from plant sources may also vary from place to place, because the mineral content of the soil varies according to the location in which the plant was grown.

Minerals are indispensable for normal life processes. They are required for metabolic activities which are critical for cell differentiation and replication. Minerals, particularly the trace elements, are essential to form endogenous antioxidant enzymes that are required for endogenous antioxidant activity and immune modulation. Minerals help to build tissues, regulate body fluids or assist in various body functions. They are required in the small amounts but are vital to the body.

A mineral is an inorganic element occurring in the form of its salt such as calcium, magnesium, sodium, potassium, phosphorus, chloride, iodine, copper, zinc, iron, manganese, etc. In foods, minerals are of two types- *macrominerals* (required in larger amounts in the body) and *microminerals* (required in minute amounts in the body).

3.3.2.1 Macrominerals

Macrominerals are essential minerals that are found in the body in abundance and are critical ingredients to health. The macrominerals are required in larger amount for proper functioning of the body. These include calcium, magnesium, sodium, potassium, phosphorous, chloride, sulphur.

Calcium

Calcium is an important component of a healthy diet and a mineral necessary for life. Of all minerals, calcium is the most abundant mineral found in the skeletal and bone tissues. Calcium plays an important role in building stronger, denser bones early in life and keeping bones strong and healthy later in life. Approximately 99 percent of the body's calcium is stored in the bones and teeth.

Functions of calcium in human body

- Calcium gives hardness to the bones and enable them to hold the weight of the body
- prevents osteoporosis
- It makes strong bones and teeth.
- Helps nerves and muscles function
- It catalyzes the clotting of blood.
- Involves in intracellular regulation, extracellular enzyme cofactor, blood pressure

Long-term calcium deficiency can lead to rickets and poor blood clotting and in case of a menopausal woman, it can lead to osteoporosis[49], in which the bone deteriorates and there is an increased risk of fractures. While a lifelong deficit can affect bone and tooth formation, over-retention can cause hypercalcemia (elevated levels of calcium in the blood), impaired kidney function and decreased absorption of other minerals.

Excessive consumption of calcium carbonate antacids/dietary supplements over a period of weeks or months can cause milk-alkali syndrome, with symptoms ranging from hypercalcemia to potentially fatal renal failure

Dietary sources of calcium

The dietary sources of calcium are dairy products such as milk, cheese, and yogurt, small fish eaten with bone, dark green leafy vegetables, mustard greens, spinach, colocasia etc.

Magnesium

Magnesium is an essential mineral nutrient for life and is present in every cell type In every living being. For example, ATP (adenosine triphosphate), the main source of energy in cells, must be bound to a magnesium ion in order to be biologically active. What is called ATP is often actually Mg-ATP. Similarly, magnesium plays a role in the stability of all polyphosphate compounds in the cells, including those associated with DNA- and RNA synthesis. Over 300 enzymes require the presence of magnesium ions for their catalytic action, including all enzymes utilizing or synthesizing ATP, or those that use other nucleotides to synthesize DNA and RNA. Magnesium is found in the body in much smaller amounts than calcium and phosphorus. It is found mainly as phosphate and carbonate. Magnesium is present close to the surface of the bone.

Functions of magnesium in human body

- Magnesium is required in many biochemical functions.
- Magnesium is needed for bone formation, making new cells, activating B vitamins, relaxing nerves and muscles, blood clotting, and in energy production.
- Magnesium also assists in the absorption of calcium, vitamin C and potassium.
- It involves in bone mineralization, protein synthesis, converting blood sugar to energy, muscular contraction and relaxation, proper heart function, nerve transmission, absorption of *calcium, vitamin C, phosphorus, sodium,* and *potassium.*

The adult human daily nutritional requirement is 300-400 mg/day. Inadequate magnesium intake frequently causes muscle spasms, and has been associated with cardiovascular disease, diabetes, high blood pressure, anxiety disorders, migraines, osteoporosis and cerebral infarction. Acute deficiency (hypomagnesemia) is rare. Mg ions close certain types of calcium channels, which conduct a positively charged calcium ion into neurons. With an excess of magnesium, more channels will be blocked and nerve cells will have less activity

Dietary sources of magnesium

Magnesium is present in dark green vegetables, nuts, seeds, whole grains, legumes and, dairy products, sea food and meats.

Sodium

Sodium is an essential nutrient found in salt and many foods. A small amount of sodium is required in the body to be healthy, but too much can lead to high blood pressure, a major risk factor for stroke, heart disease, liver disease- cirrhosis, and kidney disease. Sodium intake has also been linked to an increased risk of osteoporosis, stomach cancer and severity of asthma.

Functions of sodium in human body

- Sodium is a principal electrolyte in the extracellular fluid which maintains normal osmotic pressure and water balance.
- Regulate blood pressure and blood volume.
- Involves in acid-base balance, fluid retention,
- Helps muscle contraction and nerve impulse transmission.
- It regulates cell permeability.
- Sodium is critical for the functioning of muscles and nerves.

Dietary sources of sodium

Sodium occurs naturally in most foods. The most common form of sodium is sodium chloride- table salt. Drinking water also contains sodium. The other source of sodium are milk and cheese, poultry, beef and pork, fish, eggs and legumes.

Potassium

Potassium is necessary for the human body in all tissue cells. Potassium is the eighth or ninth most common element by mass (0.2%) in the human body, so that a 60 kg adult contains a total of about 120 g of potassium. Potassium ion diffusion is a key mechanism in nerve transmission, and potassium depletion in animals, including humans, results in various cardiac dysfunctions.

Functions of potassium in human body

- Potassium is essential for the body's growth and maintenance.
- It is important for nervous system function, muscle contraction and fluid balance in the body.
- It is necessary to keep a normal water balance between the cells and body fluids.
- Potassium plays an essential role in proper heart function.

Dietary sources of potassium

Potassium is found in especially high concentrations within plant cells, and in a mixed diet it is mostly concentrated in fruits. Thus, potassium is found in fruits and vegetables such as bananas, tomatoes, legumes, potatoes with skins, green leafy vegetables like spinach, citrus fruits like oranges, fruits, also in meat and fish.

Individuals suffering from kidney diseases may suffer adverse health effects from consuming large quantities of dietary potassium, end stage renal failure.

Phosphorus

Phosphorus is second to calcium in abundance in the body. Phosphorus is a mineral that makes up 1% of a person's total body weight. It is present in every cell of the body, but most of the phosphorus in the body is found in the bones and teeth. It is very widely distributed in both plant and animal foods. It involves in mineral component of bones and teeth, acid-base balance, DNA/RNA structure, energy (as part of ADP/ATP), enzyme cofactor, found in every cell as part of phosopholipid structures, assimilation of niacin, transfer of nerve impulses, metabolism of fats and starches.

Functions of phosphorous in human body

- In combination with calcium, phosphorus is necessary for the formation of bones and teeth and of the nerve cells.
- Phosphorus regulates many metabolic processes that involve phosphorylation.
- It is important for energy production and normal cell membranes
- It is necessary for a continuous storage and controlled release of energy
- Phosphorus works with the B vitamins. It also assists in the contraction of muscles, in the functioning of kidneys, in maintaining the regularity of the heartbeat, and in nerve conduction.

Dietary source of phosphorous

Foods that are high in protein such as meats, nuts, seeds and legumes are also high in phosphorus. Dairy products, such as milk, cheese, and yogurt, red meat (beef, pork, and lamb), poultry, fish, eggs, nuts, peas are good sources for phosphorous. Fruits and vegetables contain only small amounts of phosphorus

Chloride

Chlorine is found in the body as chloride ion. Large amount of chloride are found in the extracellular fluid but some amount is also found in the red blood cells and to a lesser degree in other cells.

Functions of chloride in human body

- In the extracellular fluid, chloride is necessary for the regulation of osmotic pressure, water balance, and acid-base balance.
- Chloride activates amylase.

Dietary source of chloride

Salt, tomatoes, lettuce, olives, beef and pork, cheese are good sources of dietary chloride.

Sulphur

This mineral is present in all body cells, especially as sulphur containing amino acid –methionine, cysteine and cystine.

Function of sulphur in human body

- The sulphur in the body purifies blood
- It maintains hardness with some elasticity in nails, hair and cartilages.
- It helps in carrying of oxygen and oxidative processes of the body.
- It takes part in tissue oxidation as a constituent of thiamine and biotln.

Dietary source of sulphur

A diet sufficient in protein is generally considered to be adequate in sulphur. Meat, milk, eggs, fish, poultry, cheese and nuts are good sources.

3.3.2.2 Microminerals

Microminerals, also referred to as trace elements, are present in body tissues in extremely small amounts but have critically important roles to play in human nutrition. The required intake of each micromineral is less than 100 milligrams per day, and the total body content of these minerals is less than 5 grams.

Copper

In the human body, copper is a constituent of several enzymes and is found in combination with several proteins in the blood. The liver, brain, kidneys, heart, and hair contain relatively high concentrations of copper. Copper may play a role in the prevention of wide ranges of diseases like allergies, anemia, heart disease, even HIV/AIDS, hypothyroid disease, leukemia, osteoporosis, rheumatoid arthritis etc.

Functions of copper in human body

- Copper is required for absorption of iron.
- Reduce tissue damage caused by free radicals
- Maintain the health of bones and connective tissues
- Help body produce the pigment called melanin
- Keep thyroid gland functioning normally
- Preserve the myelin sheath that surrounds and protects nerves
- Catalyses the oxidation of the ferrous ion to ferric ion, and thereby enables iron to be trapped by transferrin, the protein carrying iron in the body.
- Integral part of certain enzymes likes tyrosinase, uricase, oxidase, cytochrome etc.
- Necessary for formation of collagen, regulate oxygen levels, essential to utilization of *vitamin C*.

Excessive intake of copper can cause abdominal pain and cramps, diarrhea, and liver damage. High copper levels, especially when zinc levels are also low, may be a contributing factor in many medical conditions including schizophrenia, hypertension, stuttering, autism, fatigue, muscle and joint pain, headaches, childhood hyperactivity, depression, insomnia, senility, premenstrual syndrome, postpartum depression.

Dietary source of copper

Molluscs and shellfish are rich sources of copper, as are betel leaves, nuts, dried fruits, green leafy vegetables. It is also available in liver, kidney, and dried legumes. Also good sources of copper include eggplant, tomatoes, green peas, garlic, sunflower seeds, green beans, beets, olives, leeks, sweet potato, barley, soybeans, shrimp, walnuts, pumpkin seeds, flaxseeds, peanuts, almonds, pineapple, raspberries, lentils, garbanzo beans, lima beans, kidney beans, ginger, and black pepper.

Zinc

Zinc is an essential mineral of "exceptional biologic and public health importance". Zinc is found in nearly 100 specific enzymes, serves as structural ions in transcription factors and is stored and transferred in metallothioneins. It is "typically the second most abundant transition metal in organisms" after iron and it is the only metal which appears in all enzyme classes. The human need for zinc is small, but its role in growth and well-being is enormous, starting even before birth.

Functions of zinc in human body

- Zinc is an important regulator of many genetic activities.
- It is needed for immune system to properly work.
- It plays a role in cell division, cell growth, wound healing, and the breakdown of carbohydrates.
- Zinc is necessary for a healthy skin and hair, proper healing of wounds, successful pregnancies, and male virility.
- It plays a vital role in guarding against disease and infection.
- It is needed to transport vitamin A to the retina.
- Almost all the enzymes in the body require zinc for their functioning.
- It is an integral and essential element of insulin molecule.

Zinc deficiency affects about two billion people in the developing world and is associated with many diseases. In children it causes growth retardation, delayed sexual maturation, infection susceptibility, and diarrhea, contributing to the death of about 800,000 children worldwide per year. Zinc deficiency is usually due to insufficient dietary intake, but can be associated with malabsorption, acrodermatitis enteropathica, chronic liver disease, chronic renal disease, sickle cell disease, diabetes, malignancy, and other chronic illnesses. Zinc deficiencies causes decreased appetite, impaired taste, growth failure in children, delayed development of sex organs, reduced immune function, poor wound healing, metabolic disturbances. Zinc deficiency may be one of the causes, or at least a perpetuating factor, in the eating disorder anorexia nervosa.

Consumption of excess zinc can cause ataxia, lethargy and copper deficiency[50]. Toxicity may induce fever, vomiting, diarrhea, gastric distress, dizziness. Excessive zinc intake may interfere with absorption of iron.

Dietary source of zinc

Animal foods are good source of zinc like crabs, oysters, lean meat, liver, eggs, cheese, poultry, and fish. It is also present in whole wheat, breakfast cereals, nuts, legumes, pumkin seed, green peas, green vegetables. However, fruits and vegetables are not good sources

Iron

Iron is of great importance in human nutrition for healthy blood and vitality. Though it is considered as a trace element, it is responsible for oxygen transport and cellular respiration.

Functions of iron in human body

- Iron is required for formation of haemoglobin (Hb)
- Development of red cells by their formation and maturation
- Carrying of oxygen in blood in the form of Hb
- Supply of oxygen to the muscle, as the myoglobin of muscle is an iron-containing chromoprotein like haemoglobin, which combines with oxygen and acts as an oxygen store for muscle
- Cell nucleus function, the chromatin of the nucleus contains iron which takes an active part (may be oxidative) in the functions of nuclei
- Prevents fatigue and aids growth
- Iron increases resistance to stress and disease
- Helps energy utilization, needed to convert beta-carotene to *vitamin A*.

Iron deficiencies induces anemia, weakness, headaches, depressed immunity, behavioral abnormalities, reduced cognitive function. High iron intake can cause rise of blood levels of free ferrous iron that reacts with peroxides to produce highly reactive free radicals and can damage DNA, proteins, lipids, and other cellular components. Iron typically damages cells in the heart, liver and elsewhere, which can cause significant adverse effects, including coma, metabolic acidosis, shock, liver failure, coagulopathy, adult respiratory distress syndrome, long-term organ damage, and even death.

Dietary source of iron

The two forms of iron are haeme iron and non-haeme iron. Haeme iron is better absorbed than no-haeme iron. Foods rich in haeme iron are liver, meats, poultry and fish. Foods containing non-haeme iron are wholegrain cereals, pulses and legumes, green leafy vegetables. Also rich sources of dietary iron include red meat, lentils, beans, poultry, fish, leaf vegetables, tofu, chickpeas, black-eyed peas, blackstrap molasses.

Manganese

Manganese is found in the body as a trace element and is essential for life.

Functions of manganese in human body

- Manganese is an important component of many enzyme systems which are involved in the metabolism of carbohydrates, fats, and proteins.
- In combination with choline, it helps in the digestion and utilization of fat.
- Manganese helps to nourish the nerves and brain and assists in the proper coordinative action between the brain, nerves and muscles in every part of the body.
- It is also involved in normal reproduction and the function of mammary glands.
- Help utilize several key nutrients such as biotin, thiamin, ascorbic acid, and choline
- Keep bones strong and healthy
- Help synthesize fatty acids and cholestorol
- Maintain normal blood sugar levels
- Promote optimal function of thyroid gland
- Maintain the health of nerves
- Protect cells from free-radical damage
- Manganese also play a important role in the prevention of allergies, asthma, diabetes, epilepsy, heart disease, learning disabilities, multiple sclerosis, myasthenia gravis, osteoporosis, premenstrual syndrome, rheumatoid arthritis, schizophrenics.

In humans, manganese deficiency is associated with nausea, vomiting, poor glucose tolerance (high blood sugar levels), skin rash, loss of hair color, excessive bone loss, low cholesterol levels, dizziness, hearing loss, and compromised function of the reproductive system. Severe manganese deficiency in infants can cause paralysis, convulsions, blindness, and deafness.

Dietary sources of manganese

Excellent food sources of manganese include mustard greens, raspberries, pineapple, strawberries, spinach, garlic, grapes, turnip greens, eggplant, brown rice, blackstrap molasses, maple syrup, cloves, cinnamon, thyme, black pepper, and turmeric; also nuts, whole grains, tea and dried legumes are excellent sources of manganese.

Selenium

In humans, selenium is a trace element nutrient that functions as cofactor for reduction of antioxidant enzymes, such as glutathione peroxidases. It is an antioxidant and acts with vitamin E as a non-specific antioxidant to protect cell membranes and tissues. Selenium salts are toxic in large amounts, but trace amounts are necessary for cellular function. It is a component of the enzymes glutathione peroxidase and thioredoxin reductase. It is also found in three deiodinase enzymes, which convert one thyroid hormone to another.

Functions of selenium in human body

- It prevents or slows down the ageing process and hardening of tissues. Selenium aids in maintaining youthful elasticity in tissues.
- Selenium has been found beneficial in the prevention and treatment of Keshan disease, a degenerative disease characterized by degeneration of the muscle fibres of the heart. During their child-bearing years, women are particularly susceptible to this disease. Selenium binds cadmium and other metal's and mitigates their toxic effects.
- This mineral also helps in the regeneration of the liver after damage, especially by cirrhosis.
- Selenium is also used for preventing serious complications and death from critical illnesses such as head injury and burns; also used for preventing bird flu, treating HIV/AIDS, and reducing side effects from cancer chemotherapy.

Dietary source of selenium

Dietary selenium comes from nuts, cereals, meat, mushrooms, fish, and eggs. High amounts are also found in kidney, tuna, crab, and lobster. Wholegrain cereals like wheat germ, barley, and wholewheat bread are the best sources of selenium.

Selenium deficiency is rare in healthy, well-nourished individuals. Excess intake of selenium is toxic. Exceeding the tolerable upper intake level of 400 micrograms per day can lead to selenosis.

Iodine

Iodine is an important trace element for healthy thyroid gland, which makes up its own hormone (thyroxin) and rebuilds energy.

Functions of iodine in human body

- Thyroxine, which is secreted by thyroid gland, contains iodine. It controls the basic metabolism and oxygen consumption of tissues.
- It regulates the rate of energy production and body weight and promotes proper growth.
- It increases the heart rate as well as urinary calcium excretion.
- It improves mental alacrity and promotes healthy hair, nails, skin, and teeth.

Iodine deficiency is the leading cause of preventable mental retardation, also makes baby hypothyroidic.

Dietary source of iodine

Sea foods like sea fish, sea weeds, cod liver oil are best sources of iodine. Iodized salt is also a good source of iodine, trace amounts in grains. The upper limit of safe daily iodine intake is 1100 mcg/day for adults; it is lower for children.

Table 3.2: Sources, functions, highest consumption limit, and effects of deficiency and excess intake of minerals

Mineral	Food Sources	Function	Highest amount of consumption taken without risk	Deficiency	Excess
Calcium	Milk, yogurt, hard cheeses, fortified cereals, spinach	Essential for bone growth and strength, blood clotting, muscle contraction, the transmission of nerve signals, blood cell formation	2,500mg/day	hypocalcaemia	Hypercalcaemia
Magnesium	Green leafy vegetables, Brazil nuts, almonds, soybeans, halibut, quinoa	Helps with heart rhythm, muscle and nerve function, bone strength, required for ATP and bones	For magnesium in food and water, there is no upper limit. For magnesium in supplements or fortified foods: 350mg/day	Neurologic or neuro-muscular defects,anorexia, nausea, muscular weakness, lethargy, staggering.	Hypermagnesemia,nausea, hypotension and diarrhea.
Sodium	Foods to which Nacl add like salted meats, nuts, butter, and a vast number of processed foods	Important for fluid balance, coregulating ATP with potassium	2,300mg/day	hyponatremia	hypernatremia
Potassium	Sweet potato, bananas, yogurt, yellowfin tuna, soybeans	Maintain fluid balance; helps control blood pressure; reduces risk of kidney stones, coregulate ATP with sodium	Unknown	hypokalemia	hyperkalemia
Phosphorus	Milk and other dairy products, peas, meat, eggs, some cereals and breads	Allows cells to function normally; helps the body produce energy; key in bone growth	Adults up to age 70: 4,000mg/d & >70: 3,000mg/d; Pregnant women: 3500mgs/d; Breastfeed women: 4,000mg/d	Hypophosphatemia	Hyperphosphatemia
Copper	Seafood, nuts, seeds, wheat bran cereals, whole grains	Important in the metabolism of Iron, redox enzymes	10,000µg/day	Anemia in undernourished children, Menkes' (kinkyhair) syndrome	Wilson's disease, copper poisoning
Zinc	Red meats, some seafood, fortified cereals	Supports the body's immunity and nerve function; important in reproduction, require in many enzymes	40mg/day	Impaired growth and delayed sexual maturation, hypogonadism, hypogeusia	Impaired immune responses, Low iron and copper status, RBC microcytosis, neutropenia.
Iron	Fortified cereals, beans, lentils, beef, eggs	Key component of red blood cells and many enzymes	45mg/day	Anemia, pica, glossitis, angular cheilosis	Liver cirrhosis, diabetes mellitus (in Hemochromatosis)
Manganese	Nuts, beans and other legumes, tea, whole grains	Important in forming bones and some enzymes	11mg/day	Growth retardation, impaired skeletal development and pancreatic insulin synthesis and secretion.	Neurologic symptoms including hypeirritability, violent acts, hellucinations which are similar to parkinsonism disease
Selenium	Organ meats, seafood, Brazil nuts	Protects cells from damage; regulates thyroid hormone	400µg /day	Keshan disease (viral cardiomyopathy), muscle weakness	Hair loss, abnormal nails, nausea, dermatitis, peripheral neuropathy
Iodine	Processed foods and iodized salt	Important in the production of thyroid hormones	1,100µg/day	Simple (colloid, endemic) goiter, cretinism, deafmutism, impaired fetal growth.	Hyperthyroidism or Hypothyroidism

3.4 Non-nutrient compounds

The non-nutrient compounds are those substances which do not have any nutritive values, but present in foods. They have health benefit in preventing many health disorders ranging cardiac complications, diabetes, cancers, even HIV/AIDS.

3.4.1 Dietary fibers

The dietary fibers are the substances in plant food that are not digested by human digestive enzymes. It provides almost no calories. It has two main components-

- soluble (prebiotic, viscous) fiber that is readily fermented in the colon into gases and physiologically active byproducts, and
- insoluble fiber that is metabolically inert, absorbing water as it moves through the digestive system, easing defecation.

Functions of dietary fibers

- The main action of dietary fiber is to change the nature of the contents of the gastrointestinal tract, and to change how other nutrients and chemicals are absorbed.
- Soluble fiber binds to bile acids in the small intestine, making them less likely to enter the body; this in turn lowers cholesterol levels in the blood.
- Soluble fiber also attenuates the absorption of sugar, reduces sugar response after eating, normalizes blood lipid levels and, once fermented in the colon, produces short-chain fatty acids as byproducts with wide-ranging physiological activities.
- Insoluble fiber is associated with reduced diabetes risk.
- Fiber is thought to be a protective agent for certain diseases, including colon cancer, diverticulosis, and coronary heart disease.

Sources of dietary fibers

Whole grains (rye, oat), wheat and corn bran, nut and legumes, green leafy vegetables, raisins, almonds are rich source of fibre.

3.4.2 Bio-active compounds

Bioactive compounds are extranutritional constituents that typically occur in small quantities in foods. They are being intensively studied to evaluate their effects on health. Biologically-active compounds are substances which when present in defined quantitative and qualitative amounts in foods that provide a clinically proven and documented health benefit, and thus, an important source in the prevention, management and treatment of chronic diseases of the modern age. These are a large family of natural compounds widely distributed in plant foods. Bio-active compounds are usually found in multiple forms such as glycosylated, esterified, thiolyated or hydroxylated. Several bio-active compounds are: alkaloid, glycoside, flavonoids, phenolics.

Flavonoids

Flavonoids are a subclass of polyphenols. Flavones (apigenin, luteolin), flavonols (catechin, epicatechin, quercetin, kaempferol), anthocyanins, isoflavones (genistein, daidzein) are example of flavonoids present in foods.

Functions of flavonoids

A number of medical conditions could be prevented or improved with the use of the bioactive compounds. The Most of the flavonoids have health benefits that include

- antioxidant capacity
- antimicrobial activity
- anti-carcinogenicity properties
- a high intake of polyphenols is likely to have beneficial effects on the cardiovascular system

Phenolic acids

Phenolic acids are simple molecules such as caffeic acid, vanillin, and courmaric acid. Phenolic acids form a diverse group that includes the widely distributed hydroxybenzoic (gallic acid, ellagic acid) and hydroxycinnamic acids (p-coumaric, caffeic acid, ferulic acid). Sources of phenolic acids are coffee, blueberries, pomegranate, also present in fruits and vegetable. Phenolic compounds are present in all plants and have been studied extensively in cereals, legumes, nuts, olive oil, vegetables, fruits, tea, and red wine. Many phenolic compounds have antioxidant properties, and some demonstrated favorable effects on thrombosis and tumorogenesis and promotion.

3.4.3 Anti-nutrients

Anti-nutritional factors are natural or synthetic substances found in the human diet or animal feed that have the potential to adversely affect health and growth by preventing the absorption of nutrients from food. Antinutrients are found at some level in almost all foods. However, their levels are reduced in modern crops, probably as an outcome of the process of domestication. Excessive intake of required nutrients can also result in them having an anti-nutrient action. Excessive intake of fiber can reduce the transit time through the intestines to such a degree that other nutrients cannot be absorbed.

Protease Inhibitors

Protease inhibitors are substances that inhibit the actions of trypsin, pepsin and other proteases in the gut, preventing the digestion and subsequent absorption of protein. Bowman-Birk Trypsin Inhibitor found in soybeans.

Lipase Inhibitors

Lipase inhibitors interfere with enzymes such as human pancreatic lipase that catalyze the hydrolysis of lipids.

Amylase Inhibitors

Amylase inhibitors prevent the action of enzymes that break the glycosidic bonds of starches and other complex carbohydrates, preventing the release of simple sugars and absorption by the body. Amylase inhibitors are present in many types of beans.

Phytic acid

Phytic acid has a strong binding affinity to minerals such as calcium, magnesium, iron and zinc; this results in precipitation, making the minerals unavailable for absorption in the intestines. Phytic acids are common in the hulls of nuts, seeds and grains.

Glucosinolates

Glucosinolates prevent the uptake of iodine, affecting the function of the thyroid and thus are considered goitrogens. They are found in broccoli, cabbage and cauliflower.

Tannins

Tannins are condensed polyphenolic compounds which are present in high amount in seed coat of most legumes, spices, tamarind, turmeric and in some fruits and vegetables. Tannins bind with iron irreversibly and interfere with iron absorption.

4.1 Food Preparation

Inhouse food preparation includes two steps- *raw food dressing* and *food cooking*. Many techniques are used for food dressing and cooking. Some techniques involve such steps which may cause various degrees of nutrient loss.

Dressing of raw foods

Prior to cooking raw foods are needed to be dressed which may includes peeling, cutting and washing of vegetables or washing of cereals. Sometimes these steps are done wrong resulting in precious nutrient loss. The factors associated with nutrient loss during food dressing should be made known to the persons involved food preparation so that they can take measure to prevent loss.

Cooking of foods

Cooking is not only a culinary art but also a source of nutrition, taste and good health. There are a number of reasons why food is cooked; and these are:

- The most important one is to remove bacteria from the food. Heat is necessary to kill the germs that live in food. Cooking kills bacteria and other pathogens that may be harmful to human and thus makes food safe.
- Cooking improves and adds some desirable flavor and texture of food.
- Cooking food usually makes it taste better.
- Cooked food releases more nutritional benefits and makes vitamins and minerals and some other nutrients more available for the body.
- Cooking sometimes reduces the moisture content of food and improves its preservation quality.
- Cooking adds variety in foods and makes food more interesting and tasty.

4.2 Nutrient Losses during Preparation

Though attempt is to eat healthy and cook healthy, it is overiooked or forgotten that all foods must be eaten as freshly and with as little handling as possible to retain their maximum benefits. Becoming aware of what happens to the food when it is over-handled will enable to adjust how the food is prepared and how best to retain its nutrients. Possible losses of nutrients during food preparation are:

- The most easily destroyed nutrients are the water soluble ones such as vitamin B complex and vitamin C that are lost by exposure to excess water, air, heat and light.
- Fat-soluble vitamins on the other hand such as A, D, E, and K are more stable. Cooking in acid media has a protective effect against loss of vitamins.
- Proteins are not lost that much in daily cooking. They may get denatured if overcooked.
- Minerals leach out from boiled legumes but their loss is lesser than vitamins.

The extents of loss for important nutrient in some foods are given below for example

Food	Nutrient	Method	% Nutrient Loss
Beans	Calcium	Cooking	49%
Beans	Copper	Cooking	59%
Beans	Iron	Cooking	51%
Carrots	Folate	Boiling	79%
Milk	vitamin B12	Boiling (2-5minutes)	30%
Carrots	Folate	Boiling	79%

Vitamin A

Vitamin A is found in foods like spinach, pumpkin, carrots and others. It is easily dissolved in fats and oils. So, when food is fried in oil, vitamin A comes out from the food and goes into oil.

Vitamin B

Vitamin B, being water soluble, goes out of the cereals and washes away with the water. Often after washing rice, it is soaked in water. Some more vitamin B goes out from the rice into the water during this process. Next, rice is boiled in water. A lot of water used to cook rice and the extra water is thrown away with this dissolved B-vitamins. Cooking soda also destroys B-vitamin.

Vitamin C

Vitamin C is an important nutrient which is easily destroyed by cooking. During cutting of vegetables and fruits some vitamin C is lost. It is also lost when vegetables and fruits are washed after cutting and exposing the cut vegetables to air for long periods before cooking. Loss of vitamin C also occurs when the foods are cooked for a long time or the extra water is thrown away along with some vitamin C. Cooking soda also destroys vitamin C. Therefore, cooking procedures that minimize the loss of vitamin C result in conserving all other nutrients.

Proteins

All proteins present in the foods coagulate by heat. Cooking results in softening of proteins in foods such as egg, fish, and meat, and become water bound in the process of coagulation. If the coagulated protein is further heated, it loses moisture and becomes dry and rubbery, and also become difficult to digest.

Minerals

Minerals like sodium, potassium, etc. dissolve in water. Minerals get lost when food is first cut, and then washed and the extra water in which they are boiled, is thrown away.

Loss of nutrients in vegetables begins from preparation onward and is greater during the cooking process. Probable losses occur in the following preparation stages:

- When fruits and vegetables are peeled, the vitamins present under the skin may be lost.
- Nutrients are also lost when the edible leaves of carrot, beetroot and outer layer of cabbage are discarded.
- B-vitamins and vitamin C are water soluble and are lost when the water in which vegetables are cooked is discarded.
- Sodium, potassium and chlorine are also lost when cooking water is discarded.
- Vitamin C is lost by oxidation due to exposure in air.
- During dehydration ascorbic acid and carotene are lost.
- Addition of soda results in heavy loss of B-vitamins during cooking.

4.3 Healthy food preparation practices

The way that food is cooked is absolutely essential for avoiding unnecessary nutrient loss. Five minutes can make an enormous difference in the nutritional quality of a meal. The following preparation steps are recommended to reduce loss of nutrients in food during preparation:

1. When peeling the skin of vegetables, do peel as thinly as possible.
2. The nutrients in vegetables and fruits are concentrated just below the skin, so peeling before boiling increases the loss of vitamin C, folic acid and other B vitamins. The peels of carrot, radish, gourd and ginger can be scraped instead of peeling. Peel only when absolutely necessary.
3. Do not cut vegetables into very small cubes as each small part comes in contact with oxygen, destroying vitamins.
4. Do not soak vegetables in water to prevent discoloration. Almost 40% of the water soluble vitamins and minerals are lost in the soaking water. If it must soak, use up the soaking water to knead dough, prepare soup and gravies.
5. Root vegetables should be boiled with skins on and then peeled after boiling. This helps the nutrients to migrate to the center of the vegetables, helping better retention of its nutrients. Do eat with skin on whenever possible.
6. Certain amount of minerals and vitamins are lost even during preliminary washing before cooking. Washing may remove as much as 40% of the thiamine and nicotinic acid. That's why it is preferable to wash rice with minimum amount of water.
7. Salads should be prepared just before serving and should be served in closed dishes to avoid excessive exposure to air.
8. Do not throw away the excess water drained after boiling rice or vegetables. When preparing cheese, the water left over after curdling, is called whey. It is extremely rich in good quality proteins and vitamins and therefore, should be used up in preparing gravies, kneading dough or simply as a refreshing drink after flavoring with lemon juice, salt and pepper.
9. Do not keep milk open or exposed to light, as considerable destruction of riboflavin can occur.
10. Baking soda makes cooking water alkaline and thus helps retain the color of vegetables as well as speed up the cooking process, but it destroys thiamin and vitamin C.
11. Cooked vegetables when exposed to the atmosphere before serving may also experience loss of vitamin C. It is preferable to cook vegetables in minimum amount of water keeping the vessel covered and to consume it as soon as possible. Reheating cooked vegetables further destroys vitamins.

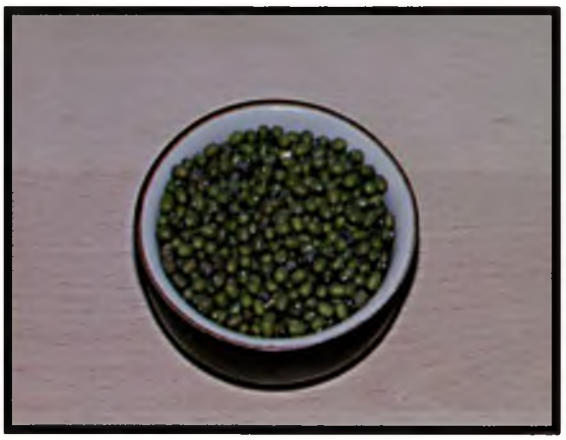
Extra care, as is recommended, can save precious nutrients. Instead of cooking only for taste and relish, it should try to get the most of the nutrients from the food.

5.1 Images of rarely consumed nutrient rich foods

1. RAGI (*Eleusine coracana*)

2. HORSE GRAM (*Dolichos biflorus*)

3. WHEAT GERM (*Triticum aestivum*)



4. MOTH BEAN (*Phaseolus aconitifolius*)

5. RAJMAH (*Phaseolus vulgaris*)

6. CELERY STALKS (*Apium graveolens*)

Figure 5.1.1: Images of some rarely consumed nutrient rich foods

7. CURRY LEAVES (*Murraya koenigii*)

8. KUPPAMENI (*Acalypha indica*)

9. SUSNI SAG (*Marsilea minuta*)

10. TELAKOCHU (*Coccinia cordifolia*)

11. LOKOOCH (*Artocarpus lakoocha*)

12. LEEKS (*Allium porrum*)

Figure 5.1.1: Images of some rarely consumed nutrient rich foods (Cont.)

13. WATER CHESTNUT (DRY) (*Trapa bispinosa*)

14. NIGER SEEDS (*Guizotia abyssinica*)

15. SAFFLOWER SEEDS (*Carthamus tinctorius*)

16. NUTMEG (RIND) (*Myristica fragrans*)

17. MELON (MUSK) (*Cucumis melo*)

18. PEACHES (*Amygdalis persica*)

Figure 5.1.1: Images of some rarely consumed nutrient rich foods (Cont.)

5.2: Images of some selected ethnic food

1. BAT SLAI* (Portulaca oleracea)

2. IDURER KAAN* (*Agaricus sp.*)

3. BARUNA SHAK* (*Xanthoxylum rhetsa*)

4. BAS KORAL* (*Melocanna baccifera*)

5. ROSHKO* (*Syzygium balsameum*)

6. DIMEY PATA* (*Glinus oppositifolius*)

Figure 5.2.1: Images of some selected ethnic food

7. MAISA PAGOH* (*Eryngium foetidum*)

8. MAYTRABA* (*Saraca thaipingensis*)

9. SAKUMU BAKLA/THANKUNI* (*Hydrocotyle sibthorpioides*)

10. SENG E TUR / SENG E / THORAI* (*Amomum corynostachyum*)

11. AMILA PATA* (*Hibiscus sabdariffa*)

12. BETAGI*

Figure 5.2.1: Images of some selected ethnic food (Cont.)

13. GACHH OAL* (*Agaricus sp.*)

14. OJAN SHAK* (*Spilanthes calva*)

15. SINEIYE SAK*

16. BAT BAITTA SAK* (*Commelina benghalensis*)

17. KUSUMGULU* (*Elaeocarpus angustifolius*)

18. KONGULO AGA/TAOKHARONG BOCHOUK*

Figure 5.2.1: Images of some selected ethnic food (Cont.)

19. SABARANG* (*Ajuga macrosperma*)

20. SIMEI ALU PATA* (*Manihot esculenta*)

21. SHIMUL FUL* (*Bombax ceiba*)

22. MISTTI BEGUN* (*Solanum spinosa*)

23. MOIKHUMU BOCHOUK/DHEKI SAK* (*Diplazium esculentum*)

24. SINDERA* (*Cumis melo*)

Figure 5.2.1: Images of some selected ethnic food (Cont.)

6.1: Tables of currently analyzed food items

Table 6A-1: Proximate nutrient composition of currently analyzed food items

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	FA
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
100	**Cereals**	**Shasswo khabar**										
103	Maize / corn (mature)	Bhutta (paka)	*Zea mays*	11.18	10.99	2.89	2.53	-	1.38	71.98	358	1.94
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	*Oryza sativa*	12.14	6.96	0.31	0.24	-	0.6	79.75	350	0.26
111	Rice sunned (milled)	Atap chal(cole chata)	*Oryza sativa*	12.98	7.74	0.43	0.26	-	0.54	78.11	348	0.37
200	**Pulses & umes**	**Dal khabar**										
209	Lentils (deshi)	Mashur dal	*Lens culinaris*	11.38	23.91	0.73	0.69	-	2.63	60.66	345	0.7
300	**bles**	**Shak**										
302	Spleen amaranth	Data shak	*Amaranthus dubius*	91.4	2.36	0.3	0.88	4.35	0.93	4.13	29	0.24
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	*Amaranthus gangeticus*	90.75	2.39	0.19	0.9	4.23	1.42	4.35	29	0.15
308	Bottle gourd leaves	Lau shak	*Lagenaria siceraria*	92.82	2.58	0.22	1.17	4.38	2.19	1.02	17	0.18
314	Coriander leaves	Dhane shak	*Coriandrum sativum*	88.99	3.04	0.23	0.99	5.92	2.17	4.58	33	0.18
321	Indian spinach	Pui shak	*Basella alba*	93.84	1.5	0.22	0.54	2.18	0.99	2.91	20	0.18
322	Jute (leaves)	Pat shak	*Corchorus capsularis*	85.7	5.2	0.63	1.36	5.75	2.31	8.47	61	0.5
324	Swamp morning-glory	Kalmi shak	*Ipomoea aquatic*	92.32	1.99	0.32	0.95	3.71	0.63	3.79	26	0.26
331	Spearmint/mint leaves	Pudina pata	*Mentha viridis*	87.16	3.07	0.42	1.36	6.91	1.23	6.76	44	0.34
334	Radish leaves	Mula pata	*Raphanus sativus*	95.33	1.82	0.25	0.62	2.58	1.12	0.85	13	0.2
337	Spinach	Palong shak	*Spinacia oleracea*	89.93	2.26	0.21	0.73	2.92	2.12	4.75	30	0.17
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	*Colocasia esculenta*	89.29	2.45	0.41	0.77	2.9	2.14	4.94	34	0.33
345	Thankuni leaves	Thankuni pata	*Centella asiatica*	81.84	2.3	0.85	0.9	8.66	1.7	12.41	67	0.68
352	Bitter gourd*	Karola pata*	*Momordica charantia*	91.57	2.13	0.15	0.62	2.25	1.7	3.83	26	0.12
353	Not known*	Sabarang*	*Ajuga macrosperma*	88.63	2.57	1.29	1.25	-	1.7	4.56	41	1.03
354	Roselle*	Amila pata*	*Hibiscus sabdariffa*	90.56	2.86	1.53	1.2	-	0.75	3.1	38	1.22
355	Not known*	Lemon pata*	*Premna obtusifolia*	86.91	3.38	1.3	1.79	-	2.18	5.44	43	1.04
356	Indian ivy-rue*	Baruna shak*	*Xanthoxylum rhetsa*	77.7	3.17	1.82	2.51	-	1.95	12.85	81	1.46
357	Not known*	Ojan shak*	*Spilanthes calva*	89.03	3.1	1.08	1.31	-	1.92	3.56	37	0.86
358	Not known*	Ghanda batali*	*Paederia foetida*	82.87	2.9	2.84	3.41	-	1.79	6.19	62	2.27

Table 6A-1: Proximate nutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	FA
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
359	Not known*	Oral balai*	*Premna esculenta*	78.81	4.22	2.44	3.71	-	3.05	7.77	70	1.95
360	Purslane*	Bat slai*	*Portulaca oleracea*	91.68	1.95	0.66	0.89	-	2.12	2.7	25	0.53
361	Yellow saraca*	Maytraba*	*Saraca thaipingensis*	78.72	7.8	2.79	2.7	-	2.46	5.53	79	2.23
362	Mollugo*	Dimey pata*	*Glinus oppositifolius*	92.89	2.29	0.62	1.03	-	1.56	1.6	22	-
363	Wild coriander*	Maisa pagoh*	*Eryngium foetidum*	91.04	2.15	0.93	1.09	-	1.27	3.52	32	-
364	Kassava*	Simei alu pata*	*Manihot esculenta*	83.12	3.56	1.30	2.77	-	1.17	8.08	59	-
365	Not known*	Kongulo aga/taokharong bochouk*	-	84.95	2.71	0.84	1.05	-	1.35	9.1	55	-
366	Not known*	Sineiye sak*	-	89.74	3.28	2.13	3.04	-	0.76	1.05	37	-
367	Blue commelina/ venus bath*	Bat baitta sak*	*Commelina benghalensis*	89.83	1.05	0.76	1.43	-	2.03	4.9	31	-
368	Edible fern*	Moikhumu bochouk/dheki sak*	*Diplazium esculentum*	91.64	2.04	0.56	0.97	-	1.08	3.71	29	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	*Hydrocotyle sibthorpioides*	81.90	1.22	2.15	1.22	-	2.19	11.32	70	-
370	Not known*	Taolingashku*	-	83.17	1.93	1.22	1.89	-	1.29	10.5	61	-
400	**Roots & tubers**	**Mul[illegible]o khabar**										
402	Carrot	Gajor	*Daucus carota*	89.67	0.81	1	0.57	3.68	0.92	10.33	42	0.8
407	Potato	Gole aloo	*Solanum tuberosum*	79.65	2.07	0.62	0.36	-	0.76	16.54	81	0.5
409	Sweet potato (red)	Misti aloo	*Ipomoes batatas*	65.05	1.17	0.29	0.78	-	1.05	31.66	134	0.23
[illegible]	**Non- leafy vegetables**	**[illegible]obji**										
502	Egg plant	Begun/brinjal	*Solanum melongena*	93.42	1.21	0.05	0.74	2.28	1.14	3.44	20	0.04
510	Green chilli	Kacha marich	*Capsicum frutescens*	84.83	2.86	0.83	4.9	4.91	1.13	5.45	41	0.66
516	Folwal	Potol	*Trichosanthes dioica*	92.89	1.31	0.07	1.44	-	0.58	4.29	24	0.06
518	Gourd (bitter)	Korola	*Momordica charantia*	93.91	1.11	0.07	1.16	0.41	0.87	2.88	17	0.06
523	Gourd (sweet) pumpkin	Misti kumra	*Cucurbita maxima*	93.33	0.59	0.08	0.23	1.14	0.67	5.1	24	0.06
526	Kakrol	Kakrol	*Momordica cochinchinensis*	89.33	1.47	0.1	1.55	0.44	1.25	6.3	32	0.08
528	Lady's finger/okra	Dherosh	*Abelmoschus esculentus*	92.65	1.31	0.19	0.57	3.1	1.19	4.09	24	0.15
532	Papaya (green/immature)	Kacha pepe	*Carica papaya*	93.85	0.6	0.05	0.64	2.71	1.32	3.54	18	0.04
559	Pea eggplant*	Mistti begun*	*Solanum spinosa*	84.43	2.45	2.13	4.21	-	1.12	5.66	52	1.7
560	Solanum*	Tak begun*	*Solanum virginianum*	78.94	2.7	5.27	6.97	-	1.57	4.55	77	4.22
561	Sigon data*	Sigon data*	*Lasia spinosa*	96.09	0.66	0.32	0.59	-	0.83	1.51	12	0.26
562	Yam*	Pan/jhum alu*	*Dioscorea pentaphylla*	66.05	2.69	1.17	1.72	-	1.14	28.23	126	0.14

Table 6A-1: Proximate nutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	FA
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
563	Banchalta*	Banchalta*	*Dillenia pentagyna*	89.58	2.12	0.63	1.22	-	1.34	5.11	35	0.51
564	Fekong*	Fekong*	*Alpinia nigra*	97	0.44	0.27	0.89	-	0.79	0.61	7	0.22
565	Not known*	Gachh oal*	*Agaricus sp.*	91.09	1.89	0.60	1.15	-	0.62	4.66	32	-
566	Not known*	Idurer kaan*	*Agaricus sp.*	95.23	0.85	0.28	0.16	-	0.18	3.3	20	-
567	Red silk/ cotton tree*	Shimul ful*	*Bombax ceiba*	90.55	1.20	0.35	1.66	-	0.82	5.43	30	-
568	Not known*	Seng e tur / seng e / thorai*	*Amomum corynostachyum*	94.1	1.79	0.45	0.78	-	1.48	1.4	17	-
569	Not known*	Betagi*	-	69.71	3.53	3.87	2.87	17.33	2.50	17.51	120	-
570	Not known*	Seon sak / gandri*	*Alpinia sp.*	89.14	1.84	0.67	1.99	-	1.57	4.78	33	-
571	Berry bamboo*	Bas koral*	*Melocanna baccifera*	91.89	3.40	1.25	0.68	-	1.04	1.74	32	-
572	Not known*	Maira bokong*	-	94.39	1.63	0.19	0.86	-	1.21	1.72	16	-
573	Not known*	Lalgrao bokong*	-	85.02	2.22	0.27	1.22	-	2.04	9.24	49	-
800	**Fruits**	**Phol**										
802	Amla	Amloki	*Emblica officinalis*	82.52	0.6	0.12	0.85	7.3	1.18	14.73	63	0.1
807	Banana (ripe)	Paka kola	*Musa sapientum*	74.56	1.31	0.36	0.26	1.9	0.97	22.54	99	0.29
820	Jackfruit (ripe)	Paka kathal	*Artocarpus heterophyllus*	77.88	1.53	0.14	0.58	5.14	0.79	19.08	84	0.11
827	Lichis (deshi)	Lichu	*Lichi sinensis*	83.7	1.26	0.93	0.66	-	0.8	13.45	68	0.74
831	Mango ripe (deshi)	Paka am	*Mangifera indica*	86.84	0.61	0.63	0.73	3.65	0.35	10.84	52	0.5
832	Melon (mix)	Bangee/futi	*Cucumis melo*	95.02	0.19	0.21	0.17	2.15	0.25	4.16	20	0.17
839	Palm (ripe)	Paka tal	*Borassus flabellifer*	81.21	0.66	0.42	0.97	-	0.92	30.48	160	0.34
840	Papaya (ripe)	Paka pepe	*Carica papaya*	91.14	0.61	0.14	0.74	0.59	0.53	6.84	32	0.11
843	Pineapple	Anarosh (joldugee)	*Ananas sativus*	85.08	0.61	0.58	1.06	-	0.45	12.22	57	0.46
853	Wood apple	Bel	*Aegle marmelos*	61.86	3.55	2.56	1.33	6.96	0.22	30.48	160	2.05
854	Water melon	Tarmuz	*Citrullus lanatus*	92.97	0.73	0.2	0.09	1.61	0.36	5.65	28	0.16
855	Black berry (deshi)	Kalo jam	*Syzygium cumini*	86.32	0.62	0.27	1.08	7.25	1.05	11.66	52	0.22
865	Monkey jack*	Deuwa*	*Artocarpus lakoocha*	60.74	1.97	8.73	3.63	2.11	0.98	24.31	181	6.7
866	Burmese grape*	Lotkon*	*Pirardia sapida*	90.54	1.61	2.49	4.2	-	0.52	0.64	32	1.99
867	Wild melon*	Sindera*	*Cumis melo*	95.88	0.36	0.52	0.79	-	0.54	1.91	14	0.42
868	Not known*	Roshko*	*Syzygium balsameum*	87.12	0.7	1.54	1.32	-	1.33	7.99	49	1.23
869	Bead tree*	Kusumgulu*	*Elaeocarpus angustifolius*	92.51	0.95	0.94	0.88	-	0.81	3.91	28	0.75

Table 6A-1: Proximate nutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	FA
				g	g	g	g	g	g	g	Kcal	Mg
1	2	3	4	5	6	7	8	9	10	11	12	13
[illegible]	**Fishes**	**Mach**										
924	Dragon fish/yellowtail catfish	Pangash	*Pangasius pangasius*	71.91	13.71	11.95	-	-	0.47	1.96	171	8.37
940	Sunfish/mola/pale carplet (bony)	Mola	*Amblypharyngodon mola*	76.29	12.96	6.39	-	-	1.61	2.75	121	4.47
954	Carp/rohu	Ruhi/ruee	*Labeo rohita*	75.63	15.6	5.07	-	-	0.57	3.13	121	3.55
967	Tilapia/mozambique telapia	Tilapia	*Oreochromis mossambicus*	73.92	16.87	5.11	-	-	0.59	3.51	128	3.58
968	Pama croaker/poa fish	Poa mach	*Otolithoides pama*	77.69	15.52	3.46	-	-	0.51	2.82	105	2.42
969	Ganges river sprat (sweet water,fresh, bony)	Kachki mach (taza)	*Corica soborna*	80.73	12.99	2.13	-	-	1.09	3.06	84	1.49
972	Silver carp	Silver carp	*Hypophthalmichthys molitrix*	75.45	14.59	6.1	-	-	0.52	3.34	127	4.27
973	Spotted snake head	Taki	*Channa puncpatus*	79.71	17.18	1.47	-	-	0.6	1.04	87	1.03
1000	**Meat**	[illegible]**naw**										
1001	Beef	Gorur mangshaw	*Beef cattle*	75.67	12.49	8.64			1.03	2.17	137	8.16
1003	Chicken (deshi)	Murgir mangshaw (deshi)	*Gallus bankiva murghi*	74.92	15.61	3.05	-	-	0.72	5.7	113	2.88
1010	Pork*	Shukorer mangshaw	*Sus scrofa domesticus*	47.96	11.49	38.72	-	-	1.59	1.83	402	36.05
1014	Chicken (farm)	Murgir mangshaw (farm)	*Gallus bankiva murghi*	74.61	16.29	5.65	-	-	1.13	2.32	126	5.34
1100	**Eggs**	**Dim**										
1101	Duck egg	Hasher dim	*Anas platyrhyncha*	68.39	15.47	15.87	-	-	0.95	0.27	206	13.17
1102	Hen egg (deshi)	Murgir dim (deshi)	*Gallus bankiva murghi*	76.12	11.33	11.60	-	-	0.89	0.95	154	9.63
1103	Hen egg (farm)	Murgir dim (farm)	*Gallus bankiva murghi*	75.78	12.07	11.37	-	-	0.77	0.78	154	9.44

Table 6A-2: Vitamins and antinutrient composition of currently analyzed food items

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
100	**Cereals**	**Shasswo jatio khabar**												
103	Maize / corn (mature)	Bhutta (paka)	-	-	-	-	-	-	-	-	-	-	-	959.85
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	-	-	-	-	-	-	-	-	-	-	-	116.86
111	Rice sunned (milled)	Atap chal(cole chata)	-	-	-	-	-	-	-	-	-	-	-	147.97
200	**Pulses & legumes**	**Dal [illegible]o khabar**												
209	Lentils (deshi)	Mashur dal	-	-	-	-	-	-	-	-	-	-	-	516.12
300	**Leafy vegetables**	**Shak [illegible]**												
302	Spleen amaranth	Data shak	26.32	4904	4450	5.17	-	188.35	-	-	-	-	-	16.4
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	22.55	4310	1256.53	-	80.22	83.69	-	-	-	-	-	10.37
308	Bottle gourd leaves	Lau shak	22.2	3050	2370.64	-	8.23	526.7	-	-	-	-	-	3.31
314	Coriander leaves	Dhane shak	76.56	6830	1470.54	-	64.99	15.1	2.07	0.83	1.03	3.86	-	-
321	Indian spinach	Pui shak	55.59	8170	1775.1	-	72.38	489.81	-	-	-	-	-	-
322	Jute (leaves)	Pat shak	54.43	9140	-	-	-	-	-	-	-	0.97	-	16.4
324	Swamp morning-glory	Kalmi shak	41.83	5660	2383.68	-	74.83	50.89	-	-	-	-	-	2.43
331	Spearmint/mint leaves	Pudina pata	57.03	7610	-	-	-	-	-	-	0.04	-	-	-
334	Radish leaves	Mula pata	68.85	4220	-	-	-	-	-	-	-	-	-	1.88
337	Spinach	Palong shak	22.44	4350	2249.57	-	-	-	-	-	-	-	-	-
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	60.09	8350	7146.59	-	296.93	1723.09	-	-	-	-	-	11.46
345	Thankuni leaves	Thankuni pata	37.77	7470	-	-	-	-	0.19	0.28	0.13	2.01	-	3.41
352	Bitter gourd*	Karola pata*	107.9	10470	-	-	-	-	-	-	-	-	-	3.74
353	Not known*	Saberang*	12.92	5970	467.28	-	37.6	-	-	-	-	-	-	
354	Roselle*	Amila pata*	16.08	4410	1606.83	-	20.22	145.59	-	-	-	-	-	15.9
355	Not known*	Lemon pata*	18.86	3030	860.22	-	129.35	54.49	-	-	-	-	-	-
356	Indian ivy-rue*	Baruna shak*	38.04	6110	1465.49	-	77.51	-	-	-	-	-	-	-
357	Not known*	Ojan shak*	15.11	4610	1102.88	212.59	153.87	-	-	-	-	-	-	-
358	Not known*	Ghanda batali*	7.36	6990	1708.97	-	55.46	-	-	-	0.24	-	-	-
359	Not known*	Orai balai*	22.94	4450	1110.74	-	207.81	276.66	-	-		-	-	-
360	Purslane*	Bat slai*	3.24	2240	-	-	-	-	-	-	0.15	10.07	-	-
361	Yellow saraca*	Maytraba*	92.6	13180	1486.42	-	-	-	21.68	-	1.5	-	-	-
362	Mollugo*	Dimey pata*	7.03	796	-	-	-	-	-	-	-	-	-	-
363	Wild coriander*	Maisa pagoh*	6.27	1292	-	-	-	-	-	-	-	-	-	-

Table 6A-2: Vitamins and antinutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
364	Kassava*	Simei alu pata*	27.30	19730	-	-	-	-	-	-	-	-	-	-
365	Not known*	Kongulo aga/taokharong bochouk*	17.88	1827	-	-	-	-	-	-	-	-	-	-
366	Not known*	Sinelye sak*	8.33	1851	-	-	-	-	-	-	-	-	-	-
367	Blue commelina/ venus bath*	Bat baitta sak*	20.04	4178	-	-	-	-	-	-	-	-	-	-
368	Edible fern*	Moikhumu bochouk/dheki sak*	4.13	1043	-	-	-	-	-	-	0.10	4.76	-	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	15.10	4069	-	-	-	-	-	-	-	-	-	-
370	Not known*	Taolingashku*	24.45	3834	-	-	-	-	-	-	1.36	29.49	-	-
400	**Roots & tubers**	**Muli [illegible]o khabar**												
402	Carrot	Gajor	11.17	8560	1689.43	604.58	0	2123.56	0.09	0.1	0.04	0.73	-	9.28
407	Potato	Gole aloo	8.8	-	-	-	-	-	-	-	-	-	-	16.36
409	Sweet potato (red)	Misti aloo	23.92	250	-	-	-	-	-	-	-	-	-	20.25
500	**Non- l[illegible]bles**	**Shobji**												
502	Egg plant	Begun/brinjal	6.66	-	-	-	-	-	-	-	-	-	-	10.88
510	Green chilli	Kacha marich	101	1010	-	-	-	-	5.47	0.96	0.39	-	-	13.72
516	Folwal	Potol	44.18	-	-	-	-	-	-	-	-	-	-	-
518	Gourd (bitter)	Korola	136.39	1790	-	-	-	-	-	-	-	-	-	8.27
523	Gourd (sweet) pumpkin	Misti kumra	12.12	3810	51.41	378.39	-	29.91	-	-	-	-	-	15.85
526	Kakrol	Kakrol	119.06	270	163.01	-	-	19.43	-	-	-	-	-	5.25
528	Lady's finger/okra	Dherosh	10.18	380	-	-	-	-	-	-	-	-	-	5.98
532	Papaya (green/immature)	Kacha pepe	13.74	-	-	-	-	-	-	-	-	-	-	7.72
559	Pea eggplant*	Mistti begun*	6.99	3620			-	-	0.57	-	0.66	3.81	-	-
560	Solanum*	Tak begun*	16.66	4580	142.66	824.05	-	31.46	2.09	2.2	0.13	5.19	-	-
561	Sigon data*	Sigon data*	2.63	950	-	-	-	-	-	-	-	-	-	-
562	Yam*	Pan/jhum alu*	19.25	480	-	-	-	-	11.85	-	0.62	3.1	-	-
563	Banchalta*	Banchalta*	31.16	15170	55.47	12.97	-	14.97	-	-	-	-	-	-
564	Fekong*	Fekong*	3.24	130	-	-	-	-	0.37	-	2.55	1.73	-	-
565	Not known*	Gachh oal*	-	-	-	-	-	-	-	-	-	-	-	6.64
566	Not known*	Idurer kaan*	-	-	-	-	-	-	-	-	-	-	-	25.55
567	Red silk/ cotton tree*	Shimul ful*	-	-	-	-	-	-	-	-	-	-	-	-
568	Not known*	Seng e tur / seng e / thorai*	2.19	997	26.46	-	-	-	1.94	-	-	-	-	-
569	Not known*	Betagi*	19.97	815	57.59	-	-	17.42	-	-	-	-	-	24.2

Table 6A-2: Vitamins and antinutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
570	Not known*	Seon sak / gandri*	7.51	6770	-	-	-	-	-	-	-	-	-	-
571	Berry bamboo*	Bas koral*	2.26	747	6.61	-	-	14.65	-	-	-	-	-	-
572	Not known*	Maira bokong*	5.12	3978	-	-	-	-	-	-	0.06	3.24	-	-
573	Not known*	Laigrao bokong*	3.22	3237	-	-	-	-	-	-	-	-	-	-
800	**Fruits**	**Phol**												
802	Amla	Amloki	434.05	-	-	-	-	-	-	-	-	-	-	8.2
807	Banana (ripe)	Paka kola	15.65	-	-	-	-	-	-	-	-	-	-	18.34
820	Jackfruit (ripe)	Paka kathal	11.08	710	28.86	124.67	-	-	-	-	-	-	-	26.42
827	Lichis (deshi)	Lichu	7	70	-	-	-	-	-	-	-	-	-	-
831	Mango ripe (deshi)	Paka am	10.88	2560	356.28	368.96	22.3	-	-	-	-	-	-	9.28
832	Melon (mix)	Bangee/futi	3.65	800	663.68	-	-	-	-	-	-	-	-	19.82
839	Palm (ripe)	Paka tal	35.13	3570	140.86	51.21	67.16	-	-	-	-	-	-	-
840	Papaya (ripe)	Paka pepe	7.48	2330	425.77	23.22	21.18	-	-	-	-	-	-	26.83
843	Pineapple	Anarosh (joldugee)	27.82	710	-	-	-	-	-	-	-	-	-	-
853	Wood apple	Bel	15.67	150	-	-	-	-	-	-	0.8	-	-	120.95
854	Water melon	Tarmuz	3.84	4200	299.73	54.55	1257.53	-	-	-	0.1	-	-	9.48
855	Black berry (deshi)	Kalo jam	65.58	390	-	-	-	-	-	-	-	-	-	10.05
865	Monkey jack*	Deuwa*	11.68	4130	-	-	-	-	-	-	-	-	-	30.9
866	Burmese grape*	Lotkon*	12.05	120	-	-	-	-	-	-	-	-	-	13.57
867	Wild melon*	Sindera*	9.95	1840	9.89	-	-	45.91	-	-	-	0.67	-	-
868	Not known*	Roshko*	13.12	1190	8.9	126.7	-	-	-	-	-	-	-	-
869	Bead tree*	Kusumgulu*	6.08	260	388.43	-	12.96	115.5	-	1.42	0.02	0.84	-	-
900	**Fishes**	**Mach**												
924	Dragon fish/yellowtail catfish	Pangash	-	-	-	-	-	-	-	-	-	-	-	-
940	Sunfish/mola/pale carplet (bony)	Mola	-	-	-	-	-	-	-	-	-	-	-	-
954	Carp/rohu	Ruhi/ruee	-	-	-	-	-	-	-	-	-	-	-	-
967	Tilapia/mozambique telapia	Tilapia	-	-	-	-	-	-	-	-	-	-	-	-
968	Pama croaker/poa fish	Poa mach	-	-	-	-	-	-	-	-	-	-	-	-
969	Ganges river sprat (sweet water, fresh, bony)	Kachki mach (taza)	-	-	-	-	-	-	-	-	-	-	-	-
972	Silver carp	Silver carp	-	-	-	-	-	-	-	-	-	-	-	-
973	Spotted snake head	Taki	-	-	-	-	-	-	-	-	-	-	-	-

Table 6A-2: Vitamins and antinutrient composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1000	**Meat**	**Mang[illegible]**												
1001	Beef	Gorur mangshaw	-	-	-	-	-	-	-	-	-	-	-	-
1003	Chicken (deshi)	Murgir mangshaw (deshi)	-	-	-	-	-	-	-	-	-	-	-	-
1010	Pork*	Shukorer mangshaw	-	-	-	-	-	-	-	-	-	-	-	-
1014	Chicken (farm)	Murgir mangshaw (farm)	-	-	-	-	-	-	-	-	-	-	-	-
1100	**[illegible]**	**Dim**												
1101	Duck egg	Hasher dim	-	-	-	-	-	-	-	-	-	-	-	-
1102	Hen egg (deshi)	Murgir dim (deshi)	-	-	-	-	-	-	-	-	-	-	-	-
1103	Hen egg (farm)	Murgir dim (farm)	-	-	-	-	-	-	-	-	-	-	-	-

Table 6A-3: Mineral composition of currently analyzed food items

Food Code	English Name	Bengali/Local Name	Microminerals				Macrominerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
100	**Cereals**	**Shasswo o khabar**									
103	Maize / corn (mature)	Bhutta (paka)	430.21	400.9	1.31	552.97	17	176.76	13.79	248.4	281.99
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	510	310.31	0.99	612.45	12.75	42.72	10.97	109.89	125.96
111	Rice sunned (milled)	Atap chal(cole chata)	490.13	740.49	0.91	592.27	11.67	43.29	5.43	108.62	140.67
200	**Pulses & le umes**	**Dal atlo khabar**									
209	Lentils (deshi)	Mashur dal	1620.91	4166.00	6.13	987.83	66.12	104.16	33.15	561.18	313.26
300	**Leafy vegetables**	**Shak sabji**									
302	Spleen amaranth	Data shak	87.55	977.31	28.9	4205.93	104.89	25.74	78.53	261.78	34.9
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	444.03	1128.58	2.37	4995.37	241	27.94	83.26	277.52	41.63
308	Bottle gourd leaves	Lau shak	157.71	659.5	2.11	243.73	85.66	18.49	35.84	222.22	26.89
314	Coriander leaves	Dhane shak	1233.48	1585.9	4.98	462.56	113.33	28.19	121.15	396.48	30.29
321	Indian spinach	Pui shak	49.29	431.33	0.99	739.37	55.14	19.1	104.74	110.91	18.48
322	Jute (leaves)	Pat shak	20.99	1469.27	9.72	1619.19	132.98	41.83	59.97	224.89	59.97
324	Swamp morning-glory	Kalmi shak	2010.74	767.46	1.09	414.43	34.08	16.42	107.44	207.21	36.45
331	Spearmint/mint leaves	Pudina pata	183.97	1760.84	3.97	289.09	110.12	33.25	78.84	354.8	36.14
334	Radish leaves	Mula pata	89.34	457.85	0.9	89.34	83.92	14.13	83.75	223.34	22.33
337	Spinach	Palong shak	60.24	512.01	1.57	1430.72	77	22.36	248.49	173.19	24.47
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	226.74	684.49	10.47	1155.08	124	26.1	53.48	374.33	42.78
345	Thankuni leaves	Thankuni pata	508.17	2431.94	3.7	2250.45	140	50.09	199.64	508.17	45.37
352	Bitter gourd*	Karola pata*	66.45	865.95	1.35	99.92	170.94	22.9	66.61	258.12	22.9
353	Not known*	Sabarang*	1159.09	522.62	2.82	1659.09	49.34	-	0.4	268.18	52.27
354	Roselle*	Amila pata*	1026.61	513.31	3.95	2737.64	30.57	0.49	0.31	144.5	38.02
355	Not known*	Lemon pata*	1396.57	1554.67	3.85	4295.13	35.84	-	0.45	376.81	44.79
356	Indian ivy-rue*	Baruna shak*	312.53	312.45	4.38	12946.4	84.82	-	0.67	348.21	44.79
357	Not known*	Ojan shak*	351.26	461.03	2.63	2678.38	26.23	-	0.46	338.08	50.58
358	Not known*	Ghanda batali*	305.02	135.59	3.42	4779.66	64.51	0.07	0.51	298.31	40.85
359	Not known*	Orai balai*	253.69	1818.19	3.55	175.48	54.41	0.13	0.88	600.42	43.65
360	Purslane*	Bat slai*	215.77	414.94	2.72	2356.86	20.28	8.3	0.5	285.47	24.34
361	Yellow saraca*	Maytraba*	251.57	1006.29	1.43	1299.79	39.83	2.64	0.71	469.6	109.94
362	Mollugo*	Dimey pata*	-	-	-	-	-	-	-	-	-
363	Wild coriander*	Maisa pagoh*	-	-	-	-	-	-	-	-	-

Table 6A-3: Mineral composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macrominerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
364	Kassava*	Simei alu pata*	-	-	-	-	-	-	-	-	-
365	Not known*	Kongulo aga/taokharong bochouk*	-	-	-	-	-	-	-	-	-
366	Not known*	Sineiye sak*	-	-	-	-	-	-	-	-	-
367	Blue commelina/ venus bath*	Bat baitta sak*	-	-	-	-	-	-	-	-	-
368	Edible fern*	Moikhumu bochouk/dheki sak*	-	-	-	-	-	-	-	-	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	-	-	-	-	-	-	-	-	-
370	Not known*	Taolingashku*	-	-	-	-	-	-	-	-	-
400	**Roots & tubers**	**Mull [illegible]o khabar**									
402	Carrot	Gajor	53.72	327.39	0.64	3.82	0.23	5.03	68.26	87.46	292
407	Potato	Gole aloo	290	790	0.4	10.43	9.38	41.96	10.42	403.61	43.3
409	Sweet potato (red)	Misti aloo	100	170	0.25	12.31	47.09	33.59	10.85	304	38.2
500	**Non-[illegible]bles**	[illegible]									
502	Egg plant	Begun/brinjal	184.09	197.24	0.29	65.75	21	11.51	32.87	157.79	19.72
510	Green chilli	Kacha marich	1832.06	1190.84	4.49	183.21	12.21	27.94	76.34	274.81	38.17
516	Folwal	Potol	70.39	239.44	0.31	84.51	17.32	15	28.17	147.89	17.61
518	Gourd (bitter)	Korola	182.04	388.35	0.4	254.85	10.92	14.32	36.41	182.04	19.72
523	Gourd (sweet) pumpkin	Misti kumra	40.03	306.87	0.4	13	13.74	3.54	26.68	120.08	13.34
526	Kakrol	Kakrol	2401.66	476.19	0.54	62.11	9.83	19.57	51.76	186.34	25.88
528	Lady's finger/okra	Dherosh	103.93	430.59	0.28	29.7	86	19.67	37.12	178.17	27.84
532	Papaya (green/immature)	Kacha pepe	24.59	258.14	0.42	9.83	17.76	13.09	43.02	129.07	15.37
559	Pea eggplant*	Mistti begun*	305.35	122.14	0.21	549.62	26.81	0.65	0.4	277.86	63.05
560	Solanum*	Tak begun*	345.57	302.38	1.86	734.34	19.27	4.49	0.52	336.96	69.83
561	Sigon data*	Sigon data*	91.22	224.56	0.2	1340.35	1.64	0.49	0.2	147.32	19.48
562	Yam*	Pan/jhum alu*	1152.54	338.98	1.08	610.17	1.89	17.09	0.78	352.54	34.9
563	Banchalta*	Banchalta*	447.28	575.08	0.66	1853.04	15.98	0.64	0.47	287.54	40.72
564	Fekong*	Fekong*	89.53	131.3	0.54	1020.6	1.48	33	0.21	134.89	19.22
565	Not known*	Gachh oal*	-	-	-	-	-	-	-	-	-
566	Not known*	Idurer kaan*	-	-	-	-	-	-	-	-	-
567	Red silk/ cotton tree*	Shimul ful*	-	-	-	-	-	-	-	-	-
568	Not known*	Seng e tur / seng e / thorai*	-	-	-	-	-	-	-	-	-
569	Not known*	Betagi*	-	-	-	-	-	-	-	-	-

Table 6A-3: Mineral composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macrominerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
570	Not known*	Seon sak / gandri*	-	-	-	-	-	-	-	-	-
571	Berry bamboo*	Bas koral*	-	-	-	-	-	-	-	-	-
572	Not known*	Maira bokong*	-	-	-	-	-	-	-	-	-
573	Not known*	Laigrao bokong*	-	-	-	-	-	-	-	-	-
800	**Fruits**	**Phol**									
802	Amla	Amloki	8146.85	734.27	0.12	104.9	25	8.08	69.93	174.83	13.11
807	Banana (ripe)	Paka kola	45.92	714.29	1.12	204.08	10	26.28	102.04	255.1	19.13
820	Jackfruit (ripe)	Paka kathal	30.5	566.45	0.92	261.44	12.64	26.8	87.15	305.01	10.89
827	Lichis (deshi)	Lichu	251.63	522.88	1.01	88.35	20.83	5.15	119.21	134.8	15.77
831	Mango ripe (deshi)	Paka am	173.23	543.31	1.31	577.43	16.08	152.34	27.9	98.48	7.74
832	Melon (mix)	Bangee/futi	61.87	62.71	0.25	177.97	22	10.2	28.6	27.54	14.64
839	Palm (ripe)	Paka tal	4172.93	413.53	1.24	150.37	7.89	13.91	93.98	375.94	14.1
840	Papaya (ripe)	Paka pepe	1431.11	2933.33	0.15	186.67	25	6.62	11.85	133.33	11.02
843	Pineapple	Anarosh (joldugee)	240	601.48	1.6	671.16	24.82	12	41.81	122.22	6.82
853	Wood apple	Bel	2031.41	432.81	2.23	202.44	59	16.58	6.92	427.57	23.04
854	Water melon	Tarmuz	80.81	176.43	0.5	78.11	13.47	4.01	31.94	58.92	6.36
855	Black berry (deshi)	Kalo jam	116.42	1090.52	1.76	147.3	26.73	11.99	50.57	106.91	11.64
865	Monkey jack*	Deuwa*	796.18	3980.89	5.25	549.36	66.68	23.69	79.17	348.33	22.69
866	Burmese grape*	Lotkon*	248.14	903.23	1.49	1091.81	52.11	11.29	7.21	198.51	17.12
867	Wild melon*	Sindera*	32.86	32.87	0.16	49.3	4.27	1.13	0.18	66.74	28.16
868	Not known*	Roshko*	128.58	0.13	0.26	154.04	8.19	5.96	0.39	256.74	39.53
869	Bead tree*	Kusumgulu*	344.05	403.89	1.78	299.18	0.17	2.69	0.31	109.2	14.66
900	**Fishes**	**Mach**									
924	Dragon fish/yellowtail catfish	Pangash	151.7	646.23	1.28	38.62	91	6.05	103.47	169.21	49.9
940	Sunfish/mola/pale carplet (bony)	Mola	2508.31	3431.63	1.34	60.57	165	11.95	110.07	139.79	13.17
954	Carp/rohu	Ruhi/ruee	1853.66	1110.73	1.38	30	455	11.82	133.94	238.49	58.1
967	Tilapia/mozambique telapia	Tilapia	1566 .58	1403.19	1.31	44.39	0.56	12.85	128.45	245.97	7.16
968	Pama croaker/poa fish	Poa mach	2584.27	1188.31	1.58	72.19	0.57	12.42	139.89	270.81	7.49
969	Ganges river sprat (sweet water, fresh, bony)	Kachki mach (taza)	1838.38	310.8	1.06	82.05	185	9.71	67.69	92.6	10.54
972	Silver carp	Silver carp	1679.46	903.66	1.16	28.89	0.49	11.05	104.82	186.35	6.03
973	Spotted snake head	Taki	1804.88	757.16	1.17	33.94	157	10.01	88.58	165.93	5.48

Table 6A-3: Mineral composition of currently analyzed food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macrominerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
1000	**Meat**	**[illegible]haw**									
1001	Beef	Gorur Mangshaw	2776.7	1839.81	13.9	143.93	7	10.69	92.04	145.12	35.3
1003	Chiken (deshi)	Murgir mangshaw (deshi)	2436.55	1572.2	1.48	62.18	18	12.27	131.9	234.5	72
1010	Pork*	Shukorer mangshaw	5738.22	2380.67	3.41	156.02	19	17.37	168.85	179.07	61.6
1014	Chiken (farm)	Murgir mangshaw (farm)	2126.58	1292.25	1.58	53.92	2.4	12.02	117.53	200.93	6.55
1100	**[illegible]**	**Dim**									
1101	Duck egg	Hasher dim	3411.18	1405.57	2.16	87.17	39	10.66	133.96	85.14	142
1102	Hen egg (deshi)	Murgir dim (deshi)	2383.42	2034.18	1.65	56.22	34	10.57	134.75	96.8	64.1
1103	Hen egg (farm)	Murgir dim (farm)	1980.58	1171.45	1.54	59.71	4.3	10.07	126.33	90.06	5.25

6.2: Tables of total food items (freshly analyzed and taken from other sources)

Table 6B-1: Proximate nutrient composition of food items

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
100	**Cereals**	**Shasswo jatio khabar**										
101	Barley(whole)	Jaab	*Hordeum vulgare*	12.5	11.5	1.3	3.9	-	1.2	69.6	336	-
102	Maize/corn (immature)	Bhutta (kochi)	*Zea mays*	67.1	4.7	0.9	1.9	-	0.8	24.6	125	-
103	Maize / corn (mature)	Bhutta (paka)	*Zea mays*	11.18	10.99	2.89	2.53	-	1.38	71.98	358	1.94
104	Millet (french)	Cheena/bhuiro	*Panicum miliaceum*	11.9	12.5	1.1	2.2	-	1.9	70.4	341	-
105	Millet(pearl)	Bajra	*Pennisetum typhoideum*	12.4	11.6	5	1.2	11.3	2.3	67.5	361	-
106	Rice(fried paddy)	Khoi	*Oryza sativa*	-	7.5	0.1	-	-	-	73.6	325	-
107	Rice husk/bran	Chaler kura	*Oryza sativa*	11	13.5	16.2	4.3	-	6.6	48.4	393	-
108	Rice parboiled(husked)	Shiddho chal(dheki chata)	*Oryza sativa*	12.6	8.5	0.6	-	-	0.9	77.4	349	-
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	*Oryza sativa*	12.14	6.96	0.31	0.24	-	0.6	79.75	350	0.26
110	Rice sunned (husked)	Atop chal(dheki chata)	*Oryza sativa*	13.3	7.5	1	0.6	-	0.9	76.7	346	-
111	Rice sunned (milled)	Atap chal(cole chata)	*Oryza sativa*	12.98	7.74	0.43	0.26	-	0.54	78.11	348	0.37
112	Rice(flattened)	Chira	*Oryza sativa*	12.2	6.6	1.2	0.7	-	2	77.3	346	-
113	Rice(puffed)	Moori	*Oryza sativa*	9.4	7.8	0.1	0.3	-	1.8	80.6	354	-
114	Semolina	Suzi	*Triticum aestivum*	-	10.4	0.8	0.2	-	-	74.8	348	-
115	Sorghum	Jowar	*Sorghum vulgare*	11.9	10.4	1.9	1.6	9.7	1.6	72.6	349	-
116	Vermicelli	Shemai	*Triticum aestivum*	11.7	8.7	0.4	0.2	-	0.7	78.3	352	-
117	Wheat (whole)	Gaam	*Triticum aestivum*	12.8	11.8	1.5	1.2	-	1.5	71.2	346	-
118	Wheat flour (coarse)	Atta	*Triticum aestivum*	12.2	12.1	1.7	1.9	-	2.7	69.4	341	-
119	Wheat flour (refined)	Maida	*Triticum aestivum*	13.3	11	0.9	0.3	-	0.6	73.9	348	-
120	Ragi	Madua	*Eleusine coracana*	13.1	7.2	1.3	3.6	11.5	2.7	72	328	-
121	Wheat germ	Wheat germ	*Triticum aestivum*	5.2	29.2	7.4	1.4	-	3.5	53.3	397	-
122	Oatmeal	Jai phal	*Avenabyzantina*	10.7	13.6	7.6	3.5	-	1.8	62.8	374	-
200	**Pulses & [illegible]umes**	**Dal [illegible] khabar**										
201	Bean (field, dry)	Shimer bichi	*Dolichos lablab*	9.6	24.9	0.8	1.4		3.2	60.1	347	-
202	Bengal gram (whole)	Chola	*Cicer arietinum*	9.8	17.1	5.3	3.9	28.3	3	60.9	360	-
203	Bengal gram (split)	Cholar dal	*Cicer arietinum*	9.9	20.08	5.6	1.2	15.3	2.7	59.8	372	-
204	Bengal gram (fried)	Chola bhaja	*Cicer arietinum*	10.7	22.5	5.2	1	-	2.5	58.1	369	-
205	Black gram (split)	Mashkalai dal	*Phaseolus mungo Roxb.*	10.9	24	1.4	0.9	11.7	3.2	59.6	347	-
206	Green gram (whole)	Mug (asta)	*Phaseolus radiatus (L.)*	10.4	24	1.3	4.1	16.7	3.5	56.7	334	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
207	Green gram (split)	Mug dal	*Phaseolus radiatus (L.)*	10.1	24.5	1.2	0.8	8.2	3.5	59.9	348	-
208	Khesari dal	Khesari dal	*Lathyrus sativus*	10	28.2	0.6	2.3	-	2.3	56.6	345	-
209	Lentils (deshi)	Mashur dal	*Lens culinaris*	11.38	23.91	0.73	0.69	10.3	2.63	60.66	345	0.7
210	Peas dried (split)	Matar(shukna)/dal	*Pisum sativum*	16	19.7	1.1	4.5	-	2.2	56.5	315	-
211	Peas fried	Matar bhaja	*Pisum sativum*	10.1	22.9	1.4	4.4	-	2.4	58.8	340	-
212	Red gram /rahar (split)	Arohor dal	*Cajanus cajan*	13.4	22.3	1.7	1.5	9.1	3.5	57.6	335	-
213	Soyabean	Garikalai	*Glycine max Merr.*	8.1	43.2	19.5	3.7	23	4.6	20.9	432	-
214	Horse gram	Kulthi kalai	*Dolichos biflorus*	11.8	22	0.5	5.3	-	3.2	52.2	321	-
215	Moth beans	Mut/kheri	*Phaseolus aconitifolius*	10.8	23.6	1.1	4.5	-	3.5	56.5	330	-
216	Rajmah	Rajmah	*Phaseolus vulgaris*	12	22.9	1.3	4.8	-	3.2	60.6	346	-
300	**Leafy vegetables**	**Shak**										
301	Agathi	Bauk ful shak	*Sesbania grandiflora*	73.1	8.4	1.4	2.2	8.4	3.1	11.8	93	-
302	Spleen amaranth	Data shak	*Amaranthus dubius*	91.4	2.36	0.3	0.88	4.35	0.93	4.13	29	0.24
303	Amaranth leaves (tender)	Naute shak	*Amaranthus viridis*	90	3	0.7	1	4	3.3	2	26	-
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	*Amaranthus gangeticus*	90.75	2.39	0.19	0.9	4.23	1.42	4.35	29	0.15
305	Amaranth (spiney)	Kanta naute	*Amaranthus spinosus*	85	3	0.3	1.1	-	3.6	7	43	-
306	Bathua leaves	Bathua/ beto shak	*Chenopodium album*	89.6	3.7	0.4	0.8	-	2.6	2.9	30	-
307	Beet leaves	Beet shak	*Beta vulgaris*	86.4	3.4	0.8	0.7	-	2.2	6.5	46	-
308	Bottle gourd leaves	Lau shak	*Lagenaria siceraria*	92.82	2.58	0.22	1.17	4.38	2.19	1.02	17	0.18
309	Cabbage	Badha kopi	*Brassica oleracea*	93.3	1.3	0.2	1	2.8	0.5	4.7	26	-
310	Carrot leaves	Gazor shak	*Daucus carota*	76.6	5.1	0.5	1.9	-	2.8	13.1	77	-
311	Cauliflower leaves	Ful kopi shak	*Brassica oleracea*	80	5.9	1.3	2	-	3.2	7.6	66	-
312	Celery leaves	Randhuni shak	*Apium graveolens*	88	6.3	0.6	1.4	-	2.1	1.6	37	-
313	Chukai leaves	Chukai shak	*Hibiscus subdariffa*	-	2.4	0	-	-	-	11.7	56	-
314	Coriander leaves	Dhane shak	*Coriandrum sativum*	88.99	3.04	0.23	0.99	5.92	2.17	4.58	33	0.18
315	Cow pea leaves	Borboti pata	*Vigna catjang*	89	3.4	0.7	1.2	-	1.6	4.1	36	-
316	Drumstick leaves	Shazna shak	*Moringa oleifera*	75.9	6.7	1.7	0.9	9	2.3	12.5	92	-
317	Fenugreek leaves	Methi shak	*Trigonella foenum-graecum*	86.1	4.4	0.9	1.1	4.7	1.5	6	49	-
318	Folwal leaves	Potoi pata	*Trichosanthes dioica*	80.5	5.4	1.1	4.2	-	3	5.8	55	-
319	Gram leaves	Chola shak	*Cicer arietinum*	73.4	7	1.4	2	-	2.1	14.1	97	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
320	Helencha leaves	Helencha	*Enhydra fluctans*	89.1	1.9	0.1	-	-	0.8	8.1	41	-
321	Indian spinach	Pui shak	*Basella alba*	93.84	1.5	0.22	0.54	2.18	0.99	2.91	20	0.18
322	Jute leaves	Pat shak	*Corchorus capsularis*	85.7	5.2	0.63	1.36	5.75	2.31	8.47	61	0.5
323	Kheshari leaves	Khesharee shak	*Lathyrus sativus*	84.2	6.1	1	2.1	-	1.1	5.5	55	-
324	Swamp morning-glory	Kalmi shak	*Ipomoea aquatica*	92.32	1.99	0.32	0.95	3.71	0.63	3.79	26	0.26
325	Lettuce	Letuce/salad pata	*Lactuca sativa*	93.4	2.1	0.3	0.5	-	1.2	2.5	21	-
326	Mesta leaves	Mesta pata	*Hibiscus cannabinus*	86.4	1.7	1.1	-	3.8	0.9	9.9	56	-
327	Mustard leaves	Sharisha shak	*Brassica campestris*	89.8	4	0.6	0.8	-	1.6	3.2	34	-
328	Neem leaves (green)	Nim pata (kochi)	*Azadirachta indica*	59.4	11.6	3	2.2	-	2.6	21.2	158	-
329	Neem leaves yellow (ripe)	Nim pata (paka))	*Azadirachta indica*	59.4	7.1	1	6.2	-	3.4	22.9	129	-
330	Potato leaves	Gool aloo shak	*Solanum tuberosum*	88	4.4	0.9	1.3	-	1.8	3.6	40	-
331	Spearmint/mint leaves	Pudina pata	*Mentha viridis*	87.16	3.07	0.42	1.36	6.91	1.23	6.76	44	0.34
332	Pumpkin leaves	Mishti kumra shak	*Cucurbita maxima*	89.4	2.1	0.2	2.1	-	1.4	7	38	-
333	Punornova leaves	Punornova shak	*Boerhaavia repens*	84.5	6.1	0.9	-	-	1.3	7.2	61	-
334	Radish leaves	Mula pata	*Raphanus sativus*	95.33	1.82	0.25	0.62	2.58	1.12	0.85	13	0.2
335	Safflower leaves	Kushum shak	*Carthamus tinctorius*	91.2	2.5	0.6	-	-	1.3	4.5	33	-
336	Soyabean leaves	Gourikalai pata	*Glycine max*	79.5	6	0.5	-	-	3.2	10.8	72	-
337	Spinach	Palong shak	*Spinacia oieracea*	89.93	2.26	0.21	0.73	2.92	2.12	4.75	30	0.17
338	Spinach sour	Tak palong shak	*Rumex vesicarius*	93.5	2.9	0.1	0.6	3.2	1.4	2.1	21	-
339	Sweet potato leaves	Mishti aloo shak	*Ipomoea batatas*	80.7	4.2	0.8	2.4	-	2.2	9.7	63	-
340	Tamarind leaves (green)	Tetul pata (kochi)	*Tamarindus indica*	70.5	5.8	2.1	1.9	10.6	1.5	18.2	115	-
341	Tamarind leaves (dry)	Tetul pata (shukna)	*Tamarindus indica*	8.9	8.6	3	20.1	-	8.5	60.9	305	-
342	Taro/arum leaves (dried)	Kochu shak (shukna)	*Colocasia antiquorum*	9.3	13.7	5.9	16	-	12.8	42.3	277	-
343	Taro black arum leaves	Kalo kochu shak	*Colocasia spp.*	78.8	6.8	2	1.8	-	2.5	8.1	77	-
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	*Colocasia esculenta*	89.29	2.45	0.41	0.77	2.9	2.14	4.94	34	0.33
345	Thankuni leaves	Thankuni pata	*Centella asiatica*	81.84	2.3	0.85	0.9	8.66	1.7	12.41	67	0.68
346	Turnip leaves	Shalgom pata	*Brassica rapa*	81.9	4	1.5	1	-	2.2	9.4	67	-
347	Celery stalks	Randhuni	*Apium graveolens*	93.5	0.8	0.1	1.2	-	0.9	3.5	18	-
348	Curry leaves	Barsanga/curry pata	*Murraya koenigii*	63.8	6.1	1	6.4	16.3	4	18.7	108	-
349	Ipomoea stems	Kolmi danta	*Ipomoea reptans*	93.7	0.9	0.2	-	-	1.8	3.4	19	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
350	Kuppameni	Mukta jhuri	*Acalypha indica*	80.5	6.7	1.4	2.3	-	3.1	6	84	-
351	Susni sag	Susni sag	*Marsilea minuta*	86.9	3.7	1.4	1.3	-	2.1	4.6	46	-
352	Bitter gourd*	Karola pata*	*Momordica charantia*	91.57	2.13	0.15	0.62	2.25	1.7	3.83	26	0.12
353	Not known*	Sabarang*	*Ajuga macrosperma*	88.63	2.57	1.29	1.25	-	1.7	4.56	41	1.03
354	Roselle*	Amila pata*	*Hibiscus sabdariffa*	90.56	2.86	1.53	1.2	-	0.75	3.1	38	1.22
355	Not known*	Lemon pata*	*Premna obtusifolia*	86.91	3.38	1.3	1.79	-	2.18	5.44	43	1.04
356	Indian ivy-rue*	Baruna shak*	*Xanthoxylum rhetsa*	77.7	3.17	1.82	2.51	-	1.95	12.85	81	1.46
357	Not known*	Ojan shak*	*Spilanthes calva*	89.03	3.1	1.08	1.31	-	1.92	3.56	37	0.86
358	Not known*	Ghanda batali*	*Paederia foetida*	82.87	2.9	2.84	3.41	-	1.79	6.19	62	2.27
359	Not known*	Orai baiai*	*Premna esculenta*	78.81	4.22	2.44	3.71	-	3.05	7.77	70	1.95
360	Purslane*	Bat slai*	*Portulaca oleracea*	91.68	1.95	0.66	0.89	-	2.12	2.7	25	0.53
361	Yellow saraca*	Maytraba*	*Saraca thaipingensis*	78.72	7.8	2.79	2.7	-	2.46	5.53	79	2.23
362	Mollugo*	Dimey pata*	*Glinus oppositifolius*	92.89	2.29	0.62	1.03	-	1.56	1.6	22	-
363	Wild coriander*	Maisa pagoh*	*Eryngium foetidum*	91.04	2.15	0.93	1.09	-	1.27	3.52	32	-
364	Kassava*	Simei alu pata*	*Manihot esculenta*	83.12	3.56	1.30	2.77	-	1.17	8.08	59	-
365	Not known*	Kongulo aga/taokharong bochouk*	-	84.95	2.71	0.84	1.05	-	1.35	9.1	55	-
366	Not known*	Sineiye sak*	-	89.74	3.28	2.13	3.04	-	0.76	1.05	37	-
367	Blue commelina/ venus bath*	Bat baitta sak*	*Commelina benghalensis*	89.83	1.05	0.76	1.43	-	2.03	4.9	31	-
368	Edible fern*	Moikhumu bochouk/dheki sak*	*Diplazium esculentum*	91.64	2.04	0.56	0.97	-	1.08	3.71	29	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	*Hydrocotyle sibthorpioides*	81.90	1.22	2.15	1.22	-	2.19	11.32	70	-
370	Not known*	Taolingashku*	-	83.17	1.93	1.22	1.89	-	1.29	10.5	61	-
400	**Roots & tubers**	**Mull[illegible]o khabar**										
401	Beet root	Beet	*Beta vulgaris*	85.8	2	0.1	0.9	3.5	1.4	11	53	-
402	Carrot	Gajor	*Daucus carota*	89.67	0.81	1	0.57	3.68	0.92	10.33	42	0.8
403	Garlic	Rashon	*Allium sativum*	62	6.3	0.1	0.8	5.1	1	29.8	145	-
404	Ground potato	Mete aloo	*Dioscoria alata*	-	2.5	0.3	-	-	-	24.4	110	-
405	Ole kopi	Ole kopi	*Brassica oleracea L.*	88.5	1	0.1	1.5	-	1.3	9.1	41	-
406	Onion	Peyaj	*Allium cepa*	86.6	1.2	0.1	0.6	2.5	0.6	11.1	50	-
407	Potato	Gole aloo	*Solanum tuberosum*	79.65	2.07	0.62	0.36	1.7	0.76	16.54	81	0.5
408	Radish	Mula	*Raphanus sativus*	92.7	1.3	0.1	0.6	2.3	0.5	5.4	28	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
409	Sweet potato (red)	Misti aloo	*Ipomoes batatas*	65.05	1.17	0.29	0.78	3.9	1.05	31.66	134	0.23
410	Taro/arum	Kachu	*Colocasia esculenta*	70	3	0.8	1	4.2	1.7	24.4	116	-
411	Taro/arum tubers	Kachu mukhee/chora	*Colocasia esculenta*	64.4	1.8	-	-	-	1.5	32.4	266	-
412	Turnip	Shalgom	*Brassica rapa*	92.9	1.4	-	0.9	-	0.6	3.8	21	-
413	Yam (elephant)	Ole kachu	*Amorphophallus campanulatus*	78.7	1.2	0.1	0.8	-	0.8	18.4	79	-
414	Yam (wild)	Bonn aloo	*Dioscorea bulbifera*	70.4	2.5	0.3	1	-	1.4	24.4	110	-
415	Moor sanga	Palasa	*Butea frondosa*	45.4	2.1	0.3	1.6	-	0.6	50	211	-
416	Water lily (red)	Lal shapla	*Nymphea nouchali*	49.1	4.1	0.3	1.5	-	1.6	43.4	193	-
500	Non- [illegible]bles	Shobji										
501	Amaranth (data) stem	Data	*Amaranthus gangeticus*	92.5	0.9	0.1	1.2	-	1.8	3.5	19	-
502	Egg plant	Begun/brinjal	*Solanum melongena*	93.42	1.21	0.05	0.74	2.28	1.14	3.44	20	0.04
503	Bean	Shim	*Lablab purpureus*	89.9	3.9	0.1	1.9	-	0.7	5.4	38	-
504	Bean (broad)	Makhon shim	*Vicia faba*	85.4	4.5	0.1	2	8.9	0.8	7.2	48	-
505	Bean (french)	Forashee shim	*Phaseolus vulgaris*	91.4	1.7	0.1	1.8	-	0.5	4.5	26	-
506	Bean (immature)	Shim (kochi)	*Dolichos lablab*	86.1	3.8	0.7	1.8	-	0.9	6.7	48	-
507	Bean (red)	Lal shim	*Phaseolus spp.*	86.8	3.1	0.4	2.1	-	0.6	7	44	-
508	Cabbage	Badha kopi	*Brassica oleracea*	93.3	1.3	0.2	1	-	0.5	4.7	26	-
509	Cauliflower	Ful kopi	*Brassica oleracea, var. botrytis*	89	2.6	0.1	1.2	3.7	0.8	7.5	41	-
510	Green chilli	Kacha marich	*Capsicum frutescens*	84.83	2.86	0.83	4.9	4.91	1.13	5.45	41	0.66
511	Cow pea	Borboti	*Vigna catjang*	87	3	0.2	3.8	-	0.8	9	50	-
512	Cucumber	Shosha	*Cucumis sativus*	94.9	1.6	0.1	0.4	2.6	0.4	3.5	22	-
513	Drumstick/horse raddish	Sazna data	*Moringa oleifera*	83.3	3.2	0.1	4.8	-	1.9	11.4	60	-
514	Drumstick flower	Sazna ful	*Moringa oleifera*	85.9	3.6	0.8	1.3	5.8	1.3	7.1	50	-
515	Fig(red)	Dumur (lal)	*Ficus carica*	79.4	1.2	0.6	6.4	-	1.6	10.8	53	-
516	Folwal	Potol	*Trichosanthes dioica*	92.89	1.31	0.07	1.44	-	0.58	4.29	24	0.06
517	Gourd (ash)	Chal kumra	*Benincasa hispida*	96.5	0.4	0.1	0.8	-	0.3	1.9	10	-
518	Gourd (bitter)	Korola	*Momordica charantia*	93.91	1.11	0.07	1.16	0.41	0.87	2.88	17	0.06
519	Gourd (bottle)	Lau	*Lagenaria vulgaris*	83.1	1.1	0.1	0.6	2	0.6	15.1	66	-
520	Gourd (ridge)	Jhinga	*Luffa acutangula*	93	1.8	0.6	0.5	1.9	0.3	4.3	30	-
521	Gourd (small bitter)	Uchche	*Momordica charantia*	83.2	2.1	1	1.7	-	1.4	10.6	60	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
522	Gourd (snake)	Chichinga	*Trichosanthes anguina*	94.6	0.5	0.3	0.8	2.1	0.5	3.3	18	-
523	Gourd (sweet) pumpkin	Misti kumra	*Cucurbita maxima*	93.33	0.59	0.08	0.23	1.14	0.67	5.1	24	0.06
524	Gram (red,unripe)	Arohor (kacha)	*Cajanus cajan*	65.1	9.8	1	6.2	22.6	1	16.9	116	-
525	Jackfruit (immature)	Aanchor/kacha	*Artocarpus heterophyllus*	84	2.6	0.3	2.8	-	0.9	9.4	51	-
526	Kakrol	Kakrol	*Momordica cochinchinensis*	89.33	1.47	0.1	1.55	0.44	1.25	6.3	32	0.08
527	Kolmee	Kolmee data	*Ipomoea reptans*	93.7	0.9	0.2	-	-	1.8	3.4	19	-
528	Lady's finger/okra	Dherosh	*Abelmoschus esculentus*	92.65	1.31	0.19	0.57	3.1	1.19	4.09	24	0.15
529	Mango (green/immature)	Kacha am	*Mangifera indica*	87.5	0.7	0.1	1.2	3	0.4	20.1	44	-
530	Marrow	Dhundul	*Luffa cylindrica*	92.3	0.9	0.2	0.8	-	0.7	5.9	23	-
531	Onion & garlic stalk	Peyaj o rashun dagapata	*Alleum spp*	87.6	0.9	0.2	1.6	5.1	0.8	8.9	41	-
532	Papaya (green/immature)	Kacha pepe	*Carica papaya*	93.85	0.6	0.05	0.64	2.71	1.32	3.54	18	0.04
533	Peas (green)	Motor shooti	*Pisum sativum*	67.5	7.4	0.3	4	8.6	1.2	23.7	127	-
534	Plantain	Kacha kola	*Musa sapientum*	78.7	2.6	0.4	0.7	3.5	1	17.3	83	-
535	Plantain flower	Kolar mocha	*Musa sapientum*	89.9	1.7	0.7	1.3	-	1.3	5.1	34	-
536	Plantain stem	Kolar thore	*Musa sapientum*	88.3	0.5	0.1	0.8	-	0.6	9.7	42	-
537	Pumpkin flower	Mishti kumra ful	*Cucurbita maxima*	89.1	2.2	0.8	0.7	-	1.4	5.8	39	-
538	Spinach stalks	Palong data	*Spinacia oleracea*	93.4	2	0.2	-	-	0.6	2.9	21	-
539	Tomato (green)	Tomato (kacha)	*Lycopersicon lycopersicum*	93.1	1.9	0.1	0.7	-	0.6	3.6	23	-
540	Water lily stem (red)	Shapla (lal)	*Nymphaea spp*	49.1	4.1	0.3	1.5	-	1.6	43.4	193	-
541	Water lily stem (white)	Shapla (shada)	*Nymphaea nouchali*	62.5	3.1	0.3	1.1	-	1.3	31.7	142	-
542	Yam stem	Kochu data/lati	*Colocasia esculenta*	94	0.3	0.3	0.6	-	1.2	3.6	18	-
543	Colocasia stem	Kochu danta	*Colocasia antiquorum*	94	0.3	0.3	0.6	3	1.2	3.6	18	-
544	Karonda (fresh)	Karamcha (kancha)	*Carissa carandas*	91	1.1	2.9	1.5	-	0.6	2.9	42	-
545	Karonda (dry)	Karamcha (shukna)	*Carissa carandas*	18.2	2.3	9.6	-	-	2.8	67.1	364	-
546	Kovai	Telakochu	*Coccinia cordifolia*	93.5	1.2	0.1	1.6	2.5	0.5	3.1	18	-
547	Lokooch	Dephal/dahua/dewa	*Artocarpus lakoocha*	89.4	1.6	1.2	1.8	-	1.1	13.9	73	-
548	Leeks	Piyaj (bilati)	*Allium porrum*	78.9	1.8	0.1	1.3	-	0.7	17.2	77	-
549	Lotus stem (dry)	Padma data	*Nelumbium nelumbo*	9.5	4.1	1.3	25	-	8.7	51.4	234	-
550	Sundakai	Titbaigun	*Solanum torvum*	12.3	8.3	1.7	17.6	-	5.1	55	269	-
551	Sword beans	Kath shim	*Canavalia gladista*	87.2	2.7	0.2	1.5	-	0.6	7.8	44	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
552	Chaltha	Chalta	*Dillania indica*	82.3	0.8	0.2	2.5	-	0.8	13.4	59	-
553	Lotus seeds (green)	Padma bij	*Nelumbium nelumbo*	84.6	3.9	0.7	0.9	-	1.1	8.8	57	-
554	Mashroom	Mashroom	*Agaricus bisporus*	88.5	3.1	0.8	0.4	-	1.4	4.3	43	-
555	Sea weed (fresh)	Sea weed	-	92	0.8	0.2	0.3	-	4	3.7	20	-
556	Sea weed (dry)	Sea weed	-	9.5	10.8	0.8	5	-	22.7	51.2	255	-
557	Silk cotton flowers	Simul phul	*Bombax malabaricum*	86.4	1.5	0.3	1.6	-	0.7	9.5	47	-
558	Water lily flower	Shapla phul	*Nymphea nouchali*	90.8	1.6	0.6	0.9	-	0.7	5.4	33	-
559	Pea eggplant*	Mistti begun*	*Solanum spinosa*	84.43	2.45	2.13	4.21	-	1.12	5.66	52	1.7
560	Solanum*	Tak begun*	*Solanum virginianum*	78.94	2.7	5.27	6.97	-	1.57	4.55	77	4.22
561	Sigon data*	Sigon data*	*Lasia spinosa*	96.09	0.66	0.32	0.59	-	0.83	1.51	12	0.26
562	Yam*	Panjhum alu*	*Dioscorea pentaphylla*	66.05	2.69	1.17	1.72	-	1.14	28.23	126	0.14
563	Banchalta*	Banchalta*	*Dillenia pentagyna*	89.58	2.12	0.63	1.22	-	1.34	5.11	35	0.51
564	Fekong*	Fekong*	*Alpinia nigra*	97	0.44	0.27	0.89	-	0.79	0.61	7	0.22
565	Not known*	Gachh oal*	*Agaricus sp.*	91.09	1.89	0.60	1.15	-	0.62	4.66	32	-
566	Not known*	Idurer kaan*	*Agaricus sp.*	95.23	0.85	0.28	0.16	-	0.18	3.3	20	-
567	Red silk/ cotton tree*	Shimul ful*	*Bombax ceiba*	90.55	1.20	0.35	1.66	-	0.82	5.43	30	-
568	Not known*	Seng e tur / seng e / thorai*	*Amomum corynostachyum*	94.1	1.79	0.45	0.78	-	1.48	1.4	17	-
569	Not known*	Betagi*	-	69.71	3.53	3.87	2.87	17.33	2.50	17.51	120	-
570	Not known*	Seon sak / gandri*	*Alpinia sp.*	89.14	1.84	0.67	1.99	-	1.57	4.78	33	-
571	Berry bamboo*	Bas koral*	*Melocanna baccifera*	91.89	3.40	1.25	0.68	-	1.04	1.74	32	-
572	Not known*	Maira bokong*	-	94.39	1.63	0.19	0.86	-	1.21	1.72	16	-
573	Not known*	Lalgrao bokong*	-	85.02	2.22	0.27	1.22	-	2.04	9.24	49	-
600	**Oil seeds**	**Tolio bi**										
601	Cashew nuts	Hizlee badam / kaju badam	*Anacardium occidentale*	5.9	21.2	46.9	1.3	-	2.4	22.3	596	-
602	Chilgoza (nut)	Chilgoza	*Pinus gerardiana*	4	13.9	49.3	1	-	2.8	29	615	-
603	Coconut (dry)	Narikale (shukna)	*Cocos nucifera*	4.3	6.8	62.3	6.6	-	1.6	18.4	662	-
604	Coconut (immature)	Narikale (kacha)	*Cocos nucifera*	36.3	4.5	41.6	3.6	13.6	1	13	444	-
605	Ground nut/ pea nut	China badam	*Arachis hypogaea*	3	25.3	40.9	3.1	11	2.4	26.1	567	-
606	Ground nut/ pea nut (fried)	China badam (bhaza)	*Arachis hypogaea*	1.7	26.2	39.8	3.1	-	2.5	26.7	570	-
607	Linseed	Tishi	*Linum usitatissimum*	6.5	20.3	37.1	4.8	-	2.4	28.9	530	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
608	Mustard	Sharisha	*Brassica campestris*	8.5	22	39.7	1.8	13.6	4.2	23.8	541	-
609	Nuts	Badam	*Prunus dulcis*	5.2	20.8	58.9	1.7	-	2.9	10.5	655	-
610	Oils mustrd etc	Toilo	*Brassica nigra*	-	0.01	100	-	-	-	0	900	-
611	Pistachio	Pesta	*Pistacia vera*	5.6	19.8	53.5	2.1	-	2.8	16.2	626	-
612	Sunflower seeds	Surzomukhir bij	*Helianthus annuus*	5.5	19.8	52.1	1	-	3.7	17.9	620	-
613	Sesame	Til	*Sesamum indicum*	5.3	18.3	43.3	2.9	-	5.2	25	563	-
614	Walnut	Akhrot	*Juglans regia*	4.5	15.6	64.5	2.6	-	1.8	11	687	-
615	Niger seeds	Ram til	*Guizotia abyssinica*	4.2	23.9	39	10.9	-	4.9	17.1	515	-
616	Piyal seeds	Piyal	*Buchanania latifolia*	3	19	59.1	3.8	-	3	12.1	656	-
617	Safflower seeds	Kusum bij	*Carthamus tinctorius*	5.5	13.5	25.6	34.9	-	2.6	17.9	356	-
618	Jangli badam	Jangli badam	*Sterculia foetida*	35.6	11.4	35.5	-	-	2.4	-	-	-
619	Oysternut	Oysternut	*Telfairea pedata*	4.4	29.7	63.3	-	-	2.6	-	689	-
620	Roselle seed	Roselle bij	-	6.5	20.9	21.3	15.5	-	4.9	30.9	399	-
621	Tamarind seed karnel(roasted)	Tetul bijer shash	*Tamarindus indicus*	9.9	16.1	7.3	1	-	1.6	64.1	387	-
622	Okra (whole seed)	Dheros	*Abelmoschus esculentus*	6.6	21.1	17.9	23.4	-	4.7	-	-	-
623	Okra (kernal)	Dheros	*Abelmoschus esculentus*	3.7	38.9	36.5	0.8	-	6	-	-	-
700	**Spices & condiments**	**Moshoila**										
701	Cardamom	Alachi	*Elettaria cardoamomum*	20	10.2	2.2	20.1	23	5.4	42.1	229	-
702	Chilli, red (dry)	Shukna morich	*Capsicum annuum*	10	15.9	6.2	30.2		6.1	31.6	245	-
703	Cloves (dry)	Lobongo (shukna)	*Syzygium aromaticum*	25.2	5.2	8.9	9.5	35.1	5.2	46	285	-
704	Coriander seed	Dhonia	*Coriandrum sativum*	11.2	14.1	16.1	32.6	47.4	4.4	21.6	288	-
705	Cumin seed	Zira	*Cuminum cyminum*	11.9	18.7	15	12	30	5.8	36.6	356	-
706	Fenugreek	Methi	*Trigonella foenum graecum*	13.7	26.2	5.8	7.2	48.6	3	44.1	333	-
707	Ginger	Ada	*Zinziber officinale*	80.9	2.3	0.9	2.4	6	1.2	12.3	67	-
708	Lemon/lime peel	Lebur khosha	*Citrus aurantifolia*	66.5	1.8	0.5	-	-	1.8	29.4	129	-
709	Mace	Joyotree	*Myristica malabarica*	15.9	6.5	24.4	3.8	-	1.6	47.8	437	-
710	Mixed spices	Mishti moshoila	-	-	18.7	15	-	-	-	36.6	356	-
711	Mixed spices (hot)	Garam moshoila	-	-	10.2	2.2	-	-	-	42.1	229	-
712	Nutmeg	Zaiful	*Myristica fragrans*	14.3	7.5	36.4	11.6	-	1.7	28.5	472	-
713	Omum	Zaoan	*Trachyspermum ammi*	7.4	17.1	21.8	21.2	47.2	7.9	24.6	363	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
714	Pepper (black)	Gole morich	*Piper nigrum*	13.2	11.5	6.8	14.9	-	4.4	49.2	304	-
715	Turmeric	Holud	*Curcuma domestica*	13.1	6.3	5.1	2.6	20	3.5	69.4	349	-
716	Arisith[illegible]li	Phul	*Pimpinella anisum*	12.5	13.2	4.7	5.2	-	6	58.4	329	-
717	Asafoetida	Hing	*Ferula foetida*	16	4	1.1	4.1	-	7	67.8	297	-
718	Mango powder	Amchoor	*Mangifera indica*	6.8	2.8	7.8	13.7	-	4.9	64	337	-
719	Nutmeg (rind)	Jai phai	*Myristica fragrans*	86.8	1	0.4	-	-	0.6	11.2	52	-
800	**Fruits**	**Phol**										
801	Ambada (hog plum)	Amra	*Spondias mangifera*	83.2	1.1	0.1	1	-	0.6	15	66	-
802	Amla	Amloki	*Emblica officinalis*	82.52	0.6	0.12	0.85	7.3	1.18	14.73	63	0.1
803	Apple	Apel	*Pyrus malus*	81	0.4	0.3	1	3.2	0.3	18.1	76	-
804	Apricot (boiled)	Khubanee (shiddho)	*Pruncus armeniaca*	85.3	1	0.3	1.1	-	0.7	11.6	53	-
805	Apricot (dried)	Khubanee (shukna)	*Pruncus armeniaca*	19.4	1.6	0.7	2.1	-	2.8	73.4	306	-
806	Bakul flower	Bakul phul	*Mimusops elengi*	54.7	1.8	1	4.3	-	2.3	35.9	160	-
807	Banana (ripe)	Paka kola	*Musa sapientum*	74.56	1.31	0.36	0.26	1.9	0.97	22.54	99	0.29
808	Bilimbi (ripe)	Kamranga	*Averrhoa bilimbi*	83.6	0.5	1	1	-	0.4	9.5	50	-
809	Blackberry (indian)	Kalo jam	*Rubus fruiticosus*	96.6	1	0.8	3.8	3.5	0.1	1.4	11	-
810	Boroi (bitter plum)	Boroy	*Gardenia gummifera*	73.2	2.9	0.1	-	-	1	23.8	104	-
811	Bread fruit	Madar	*Artocarpus altilis*	79.5	1.5	0.2	2.1	-	0.9	15.8	71	-
812	Bullock's heart	Nona ata	*Annona reticulata*	76.8	1.4	0.2	5.2	-	0.7	15.7	70	-
813	Custard apple	Ata phoi	*Annona squamosa*	76.7	1.8	0.1	3.1	5.5	0.9	20.6	90	-
814	Coconut water	Daber pani	*Cocos nucifera*	95	2.3	0.5	-	-	0.3	2.4	23	-
815	Dates	Khezur (taza)	*Phoenix sylvestris*	59.2	1.2	0.4	3.7	7.7	1.7	33.8	144	-
816	Dates (dry)	Khezur (shukna)	*Phoenix sylvestris*	18	2.2	0.6	3.9	8.3	1.7	77.5	324	-
817	Fig (ripe)	Dumur (paka)	*Ficus carica*	88.1	1.3	0.2	2.2	5	0.6	7.6	37	-
818	Guava	Peyara	*Psidium guajava*	81.7	0.9	0.3	5.2	8.5	0.7	11.2	51	-
819	Grapes	Angur	*Vitis vinifera*	75.3	0.5	0.1	2.9	1.2	0.5	23.6	97	-
820	Jackfruit (ripe)	Paka kathal	*Artocarpus heterophyllus*	77.88	1.53	0.14	0.58	5.14	0.79	19.08	84	0.11
821	Kheera	Kheera	*Cucumis sativus*	95.5	0.9	0.1	-	-	1.1	1.6	11	-
822	Kodbele (immature)	Kodbel (kacha)	*Feronia limonia*	81.4	3.1	-	-	-	2	13.5	66	-

Table 6B-1: Proximate nutrient composition of f ood items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
823	Kodbele (ripe)	Kodbel (paka)	*Feronia limonia*	85.6	3.5	0.1	5	-	2.2	8.6	49	-
824	Kusum fruit	Kushum phol	*Schleichera oleosa*	86.2	1.5	0.8	0.6	-	1	9.9	53	-
825	Lemon	Kagogee lebu	*Citrus limon*	84.6	1.5	1	1.3	-	0.7	10.9	59	-
826	Lemon (sweet)	Mishti lebu	*Citrus iimetta*	90.5	0.7	0.3	0.7	-	0.4	7.3	35	-
827	Lichis (deshi)	Lichu	*Lichi sinensis*	83.7	1.26	0.93	0.66	-	0.8	13.45	68	0.74
828	Lime	Lebu	*Citrus aurantifolia*	88.4	0.3	0.7	1.7	-	0.6	10	47	-
829	Lime (sweet)	Mushambee	*Citrus sinensis*	88.4	0.8	0.3	0.5	-	0.7	9.3	43	-
830	Mahua (ripe)	Mohua phol	*Bassia longifolia*	73.6	1.4	1.6	-	-	0.7	22.7	111	-
831	Mango ripe (deshi)	Paka am	*Mangifera indica*	86.84	0.61	0.63	0.73	3.65	0.35	10.84	52	0.5
832	Melon (mix)	Bangee/futi	*Cucumis melo*	95.02	0,19	0.21	0.17	2.15	0.25	4.16	20	0.17
833	Neem (fruit)	Neem phol	*Malia azadirachta*	81.9	1.3	1	-	-	0.7	15.1	75	-
834	Olive (wild)	Jalpai	*Elaeocarpus robustus*	82	1	0.1	1.6	-	0.7	16.2	70	-
835	Orange	Malta	*Citrus sinensis*	86.3	0.2	0.1	0.6	1.1	0.3	13.1	54	-
836	Orange juice	Komolar rosh	*Citrus reticulata*	97.7	0.2	0.1	-	-	0.1	1	6	-
837	Orange/mandarin	Komola	*Citrus chrysocarpa*	89.4	0.7	0.1	0.3	-	0.1	9.7	43	-
838	Palm, palmyra (green)	Kochi tal	*Borassus flabellifer*	92.3	0.6	0.1	0.3	-	0.2	6.5	29	-
839	Palm (ripe)	Paka tal	*Borassus flabellifer*	81.21	0.66	0.42	0.97	-	0.92	30.48	160	0.34
840	Papaya (ripe)	Paka pepe	*Carica papaya*	91.14	0.61	0.14	0.74	0.59	0.53	6.84	32	0.11
841	Pears	Nashpatee	*Pyrus communis*	83	0.6	0.3	1	4.3	0.2	16	69	-
842	Phalsa	Folsha	*Grewia asiatica*	80	1.3	0.9	1.2	-	1.1	14.7	72	-
843	Pineapple	Anarosh (joldugee)	*Ananas sativus*	85.08	0.61	0.58	1.06	2.8	0.45	12.22	57	0.46
844	Pineapple (wild variety)	Anarosh (deshi)	*Ananas sativus*	89.3	1	0.2	0.6	-	0.3	9.3	42	-
845	Pomegranate juice	Bedanar rosh	*Punica granatum*	81.9	1.1	-	-	-	0.4	16.7	71	-
846	Pomegranate	Bedana (bichi shoho)	*Punica granatum*	80.9	1.6	-	5.1	2.8	0.6	16.9	74	-
847	Pommelo (red)	Zambura (lal)	*Citrus grandis*	90.3	0.5	0.3	-	-	0.3	8.5	38	-
848	Rose apple	Jamrui	*Syzygium jambos*	89.1	0.7	0.2	1.2	-	0.3	8.5	39	-
849	Tamarind (immature)	Tetul (kacha)	*Tamarindus indica*	83.6	1.1	0.2	-	-	1.2	13.9	62	-
850	Tamarind (pulp)	Tetul (paka)	*Tamarindus indica*	20.9	3.1	0.1	5.6	-	2.9	66.4	283	-
851	Tetul (bilati)	Bilati tetul	*Pitheceliobium dulce*	79.2	2.7	0.4	1	-	0.7	16	78	-
852	Tomato (ripe)	Paka tometo	*Lycopersicon lycopersicum*	94	0.9	0.2	0.8	1.7	0.5	3.6	20	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
853	Wood apple	Bel	*Aegle marmelos*	61.86	3.55	2.56	1.33	6.96	0.22	30.48	160	2.05
854	Water melon	Tarmuz	*Citrullus lanatus*	92.97	0.73	0.2	0.09	1.61	0.36	5.65	28	0.16
855	Black berry (deshi)	Kalo jam	*Syzygium cumini*	86.32	0.62	0.27	1.08	7.25	1.05	11.66	52	0.22
856	Cherries (red)	Cherry phal	*Prunus cerasus*	83.4	1.1	0.5	0.4	1.5	0.8	13.8	64	-
857	Lichi (bastard)	Ash phal	*Nephelium litchi*	84.1	1.1	0.2	0.5	-	0.5	13.6	61	-
858	Melon (musk)	Kharmuj	*Cucumis melo*	95.2	0.3	0.2	0.4	0.8	0.4	3.5	17	-
859	Peaches	Peach phal	*Amygdalis persica*	86	1.2	0.3	1.2	1.6	0.8	10.5	50	-
860	Persimmon	Gav	*Diospyros kaki*	80	0.7	0.2	0.8	-	0.3	17.9	76	-
861	Plum	Alubokhara	*Prunus domestica*	86.9	0.7	0.5	0.4	2.8	0.4	11.1	52	-
862	Raisins	Kishmish	*Vitis vinifera*	20.2	1.8	0.3	1.1	-	2	74.6	308	-
863	Strawberry	Strawberry	*Fragaria vesca*	87.8	0.7	0.2	1.1	2.3	0.4	9.8	44	-
864	Gab	Gab	*Diospyros embryopteris*	69.6	1.4	0.1	1.5	-	0.8	26.6	113	-
865	Monkey jack*	Deuwa*	*Artocarpus lakoocha*	60.74	1.97	8.73	3.63	2.11	0.98	24.31	181	6.7
866	Burmese grape*	Lotkon*	*Pirardia sapida*	90.54	1.61	2.49	4.2	-	0.52	0.64	32	1.99
867	Wild melon*	Sindera*	*Cumis melo*	95.88	0.36	0.52	0.79	-	0.54	1.91	14	0.42
868	Not known*	Roshko*	*Syzygium balsameum*	87.12	0.7	1.54	1.32	-	1.33	7.99	49	1.23
869	Bead tree*	Kusumgulu*	*Elaeocarpus angustifolius*	92.51	0.95	0.94	0.88	-	0.81	3.91	28	0.75
900	**Fishes**	**Mach**										
901	Aire fish	Aire	*Mystus seenghala*	78.1	15.9	1.3	-	-	1.2	3.5	89	-
902	Bacha fish	Bacha	*Eutropiichthys murius*	68.8	18.1	5.6	-	-	1.4	6.1	147	-
903	Bata fish	Bata (choto)	*Labeo ariza*	79	14.3	2.5	-	-	2	2.2	89	-
904	Bele fish / tank goby (deboned)	Bele	*Glassogobius giuris*	79.7	14.5	0.6	-	-	2.3	2.9	75	-
905	Bombay duck (dry)	Loittya (shukna)	*Harpadon nehereus*	11.82	57.52	6.84	-	-	-	-	-	-
906	Botya loach/hora loach	Betrongi mach	*Botia dayi*	81	14.7	1	-	-	1.3	2	76	-
907	Boga labeo (fresh)	Bhangan(taza)	*Labeo boga*	70.6	14.8	8.8	-	-	2	3.8	154	-
908	Boga labeo (dry)	Bhangan (shukna)	*Labeo boga*	17.9	61.5	2.3	-	-	16.5	1.8	274	-
909	Boga labeo (powdered)	Bhangan (bata)	*Labeo boga*	67.3	19.4	4.4	-	-	2.2	6.7	144	-
910	Barramundi/bhetki (fresh)	Bhetki (taza)	*Lates calcarifer*	79.9	14.9	0.8	-	-	1.4	3	79	-
911	Barramundi/bhetki (dry)	Bhetki (shukna)	*Lates calcarifer*	20.1	60.2	2	-	-	15.9	1.8	266	-
912	Boal/wallago/helicopter cat fish	Boal	*Wallago attu*	73	15.4	2.7	-	-	1.3	7.6	166	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
913	Blackfish/kalbasu	Kalibaush	*Labeo calbasu*	81	14.7	1	-	-	1.3	2	76	-
914	Boicha fish/dwarf red gourami	Boicha	*Colisa lalia*	-	18.2	4.4	-	-	-	0	112	-
915	Bream/barred mackerel (sea, fresh)	Champa (taza)	*Scomberomorus commerson*	63	19.9	0.4	-	-	-	-	92	-
916	Bream/barred mackerel (sea, dry)	Champa (shutki)	*Scomberomorus commerson*	43.3	38.6	6.2	-	-	-	-	210	-
917	Butter fish/pabo catfish (bony)	Pabda	*Ompok pabo*	73	19.2	2.1	-	-	1.1	4.6	114	-
918	Carp/catla	Katol	*Catla catla*	73.7	19.5	2.4	-		1.5	2.9	111	-
919	Cat fish/tor mahseer	Moha shole	*Arius sona*	70.3	25.2	2.3	-	-	1.2	1	126	-
920	Chela/large razorbelly minnow (fresh)	Chela (taza)	*Chela phulo*	77.5	14.6	4.3	-	-	2.1	1.5	103	-
921	Chela/large razorbelly minnow (dry)	Chela (shukna)	*Chela phulo*	4.7	64.8	17	-	-	13.4	0.1	413	-
922	Climbing/walking fish (deboned)	Koi	*Anabas testudineus*	70	14.8	8.8	-	-	2	4.4	156	-
923	Sartorina crab	Kakra	*Paratephusa spinigera*	83.5	8.9	1.1	-	-	3.2	3.3	59	-
924	Dragon fish/yellowtail catfish	Pangash	*Pangasius pangasius*	71.91	13.71	11.95	-	-	0.47	1.96	171	8.37
925	Spiny eel fish (bony)	Bain (bony)	*Mastocembellus armatus*	74.8	16.1	0.9	-	-	1.3	6.9	100	-
926	Fesha fish/gangetic hairfin anchovy (fresh)	Fesha (taza)	*Setipinna phasa*	74	18.4	1.9	-	-	2.5	3.2	104	-
927	Fesha fish/gangetic hairfin anchovy (dry)	Fesha (shukna)	*Setipinna phasa*	10.3	70.9	4.9	-	-	11.9	2	336	-
928	Fishmeal (dry)	Gura (shukna)	-	8.7	88.4	1.1	-	-	2.3	0	364	-
929	Flat fish/clown knife fish	Chitol	*Chitala chitala*	75	18.6	2.3	-	-	1	3.1	108	-
930	Folui/bronze feather back (deboned)	Foli/meni (deboned)	*Notopterus notopterus*	73	19.8	1	-	-	2.5	3.7	103	-
931	Fry /swamp barb/puti (v. Small fresh)) (deboned)	Puti (taza)	*Puntius chola*	75	18.1	2.4	-	-	1.4	3.1	106	-
931.a	Fry/swamp barb/puti (dry,deboned)	Chapa/ puti (shukna)	*Puntius chola*	32.98	34.55	15.18	-	-	-	-	-	-
932	Gahira fish/garua	Gahira mach/gagra/ghaura	*Clupisoma garua*	76.7	16.6	1.4	-	-	0.9	4.4	97	-
933	Mixed small fish	Gura mach	-	-	18.2	4.4	-	-	-	0	112	-
934	Hilsa shad	Ilish	*Clupea ilisha*	53.7	21.8	19.4	-	-	2.2	2.9	273	-
935	Hilsa shad(salted)	Nona ilish	*Clupea ilisha*	51.71	17.06	20.47	-	-	-	5.5	400	-
936	Stripled gourami (deboned)	Khalisha	*Colisa fasciata*	75	16.1	3.9	-	-	1.9	3.1	112	-
937	Spotted snake head/lata fish	Lota	*Ophiocephalus punctatus*	74	19.4	0.6	-	-	2.6	3.4	97	-
938	Walking cat fish	Magur	*Clarius batrachus*	78.5	15	1	-	-	1.3	4.2	86	-
939	Walking cat fish(dried)	Magur(shukna)	*Clarius batrachus*	13.6	69.7	5.4	-	-	8.7	2.6	338	-
940	Sunfish/mola/pale carplet (bony)	Mola	*Amblypharyngodon mola*	76.29	12.96	6.39	-	-	1.61	2.75	121	4.47
941	Mrigal carp	Mrigale/nilotika	*Cirrhinus cirrhosus*	75	19.5	0.8	-	-	1.5	3.2	98	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
942	Mullet	Aine	*Mugil oeur*	69.9	19.1	7.8	-	-	1.1	2.1	155	-
943	Parshee fish (dried)	Parshee (shukna)	*Mugil cephalus*	11.8	65	4.5	-	-	15.8	3	312	-
944	Parshee fish (fresh)	Parshee (taza)	*Mugil cephalus*	70.8	17.5	5.9	-	-	1.5	4.3	140	-
945	Pata fish/ovale sole (dried)	Pata mach (shukna)	*Solea ovate*	12.6	64.5	2.7	-	-	17.6	2.5	293	-
946	Pomfret (black, bony,taza)	Chanda (kalo)	*Parastromateus niger*	74.5	20.3	2.6	-	-	1.1	1.5	111	-
946.a	Pomfret (black,dry)	Chanda (shukna)	*Parastromateus niger*	11.11	42.62	11.97	-	-	-	-	-	-
947	Pomfret (white)	Rupchanda (shada)	*Pampus chinensis*	78.4	17	1.3	-	-	1.5	1.8	87	-
948	Pomfret (small)	Chanda (choto)	*Chanda nama*	76.1	18.2	4.4	-	-	1.4	0	112	-
949	Small prawns whole (dried)	Goora chingree (shukna)	*Leadrites celebensis*	14.9	60	3.2	-	-	17.3	4.6	287	-
950	Prawn (dry)	Chingree shutkee	*Leadrites celebensis*	6	68.1	8.5	-	-	17.4	-	349	-
951	Pumplate (sea fish)	Pumplate	-	81	15.1	1	-	-	0.7	2.2	78	-
952	Ribbon fish	Rupa patia	*Trichiurus lepturus*	76.7	18.1	3.2	-	-	1.5	0.6	104	-
953	Ribbon fish (dried)	Rupa patia (shukna)	*Trichiurus lepturus*	6.7	76.1	8.7	-	-	-	-	383	-
954	Carp/rohu	Ruhi/ruee	*Labeo rohita*	75.63	15.6	5.07	-	-	0.57	3.13	121	3.55
955	Salmon/silond cat fish	Dhain boro shilong	*Solonia silondia*	72	14	12.1	-	-	1.4	0.5	167	-
956	Sarputi/barb olive	Shorpunti/sorna punti	*Puntius sarana*	70.2	16.5	9.5	-	-	1.5	2.3	161	-
957	Scorpion fish/stinging cat fish (deboned)	Shingi/jiol	*Heteropneustes fossilis*	68	22.8	0.6	-	-	1.7	6.9	124	-
958	Shark/milk shark	Hangor	*Carcharias acutus*	76	21.6	0.4	-	-	1.2	0.8	93	-
959	Shrimp	Chingree	*Penaeus latisulcatus*	77.4	19.1	1	-	-	1.7	0.8	89	-
960	Silver fish	Bashpata	*Ailia coilia*	76.1	18.2	4.4	-	-	1.4	0	112	-
961	Snake head murrel/sole (deboned)	Shole	*Channa striatus*	78	16.2	2.3	-	-	1.3	2.2	94	-
962	Tapse /paradise thread fin(dried)	Taposhee (shukna)	*Polynemus paradiseus*	16.2	58.5	12.1	-	-	17.2	-	343	-
963	Tengra/striped dwarf cat fish (fresh,deboned)	Tengra (taza)	*Mystus vittatus*	70	19.2	6.5	-	-	2.1	2.3	144	-
964	Tengra/striped dwarf cat fish (dry)	Tengra (shukna)	*Mystus vittatus*	13.8	54.9	3.9	-	-	27.4	-	255	-
965	White fish/stripled gourami (dry)	Khoira (shukna)	*Gonialosa manminna*	17.3	58.9	6.2	-	-	16.4	1.2	296	-
966	White fish/stripled gourami (fresh)	Khoira (taza)	*Gonialosa manminna*	72	18	3	-	-	1.8	5.2	120	-
967	Tilapia/mozambique telapia	Tilapia	*Oreochromis mossambicus*	73.92	16.87	5.11	-	-	0.59	3.51	128	3.58
968	Pama croaker/poa fish	Poa mach	*Otolithoides pama*	77.69	15.52	3.46	-	-	0.51	2.82	105	2.42
969	Ganges river sprat (sweet water,fresh, bony)	Kachki mach (taza)	*Corica soborna*	80.73	12.99	2.13	-	-	1.09	3.06	84	1.49
970	Ganges river sprat (sweet water,dry)	Kechki (sweet water, shukna)	*Corica soborna*	24.12	54.84	9.28	-	-	-	-	-	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
971	Yellow tail mullet (marine, dry)	Kechki (marine,shukna))	*Sicamugil cascasia*	15.2	69.26	9.95	-	-	-	-	-	-
972	Silver carp	Silver carp	*Hypophthalmichthys molitrix*	75.45	14.59	6.1	-	-	0.52	3.34	127	4.27
973	Spotted snake head	Taki	*Channa puncpatus*	79.71	17.18	1.47	-	-	0.6	1.04	87	1.03
974	Chapila/ indian river shad (fresh,bony)	Chapila (taza)	*Gadusia chapra*	65.86	-	2.29	-	-	-	-	-	-
975	Chapila/ indian river shad (dry,bony)	Chapila (shukna)	*Gudisia chapra*	10.21	56.64	9.8	-	-	-	-	-	-
976	Golden/red snapper	Ranga choikha	*Chrysophrys auratus*	77.28	17.24	1.62	-	-	-	-	-	-
977	White grunter	Sada datina	*Pomadasys hasta*	81.17	13.09	2.05	-	-	-	-	-	-
978	Hard tail torpedo trevally	Kauwa	*Megalaspis cordyla*	72.21	22.46	4.87	-	-	-	-	-	-
979	Tripple tail	Samundra koi	*Lobotes surinamensis*	79.8	17.8	2.21	-	-	-	-	-	-
980	Mottlet nandus/mud perch (deboned)	Meni/bheda/roina	*Nandus nandus*	76.46	-	1.91	-	-	-	-	-	-
981	Skipjack	Tuna	*Euthynnus pelamis*	71.94	24.77	2.3	-	-	-	-	-	-
982	Boggut labeo	Ghainna	*Labeo boggut*	74.58	19.16	5.08	-	-	-	-	-	-
983	Rita	Rita	*Rita rita*	74.95	16.56	4.28	-	-	-	-	-	-
984	Small head hair tail/ribbon fish (dry)	Churi (shukna)	*Leptura canhus*	14.54	39.63	3.46	-	-	-	-	-	-
985	Russell's smooth-back herring (dry)	Fatra (shukna)	*Brachypleura nova zeelandiac*	18.6	51.71	7.26	-	-	-	-	-	-
986	Indian potasi (bony)	Batashi (taza)	*Pseudeutropius atherinoides*	73.51	-	5.7	-	-	-	-	-	-
987	Cotio (bony)	Dhela (taza)	*Rohtee cotio*	73.41	-	1.8	-	-	-	-	-	-
988	Peppered loach/guntea loach (bony)	Gutum (taza)	*Lepidocephalichthys guntea*	69.74	-	3.5	-	-	-	-	-	-
989	Jamuna ailia (fresh,bony)	Kajuli (taza)	*Ailiichthys punctata*	73.82	-	4.9	-	-	-	-	-	-
990	Freshwater gar fish/needle fish (fresh,bony)	Kakya/kakila (taza)	*Xenentodon cancila*	84.79	-	1.44	-	-	-	-	-	-
991	Large razor belly minnow (fresh,bony)	Katari (taza)	*Chela bacaila*	80.12	-	2.1	-	-	-	-	-	-
992	Giant snake head	Gajar/gajal (taza)	*Channa marulius*	75.6	-	5.53	-	-	-	-	-	-
993	Giant river/fresh water prawn(fresh,deboned)	Boro/golda chingri (taza)	*Macrobrachium rosenbergii*	77.6	-	1.05	-	-	-	-	-	-
994	Reba (fresh,deboned)	Tatkani (taza)	*Crossocheilus latius*	71.62	-	3.49	-	-	-	-	-	-
995	Yellow shrimp (fresh,deboned)	Chingri (marine/kucho/nona) (taza)	*Metapenaeus brevicornis*	74.47	-	1.11	-	-	-	-	-	-
996	Yellow shrimp (fresh,bony)	Chingri (marine/kucho/nona) (taza)	*Metapenaeus brevicornis*	90.3	-	0.79	-	-	-	-	-	-
997	Yellow shrimp	Chingri(marine/kucho/nona) (shukna)	*Metapenaeus brevicornis*	10.21	64.93	4.3	-	-	-	-	-	-
998	Kucha	Kuicha (taza)	*Amphipnous cuchia*	76.7	18.7	0.8	-	-	1.4	2.4	92	-
1000	**Meat**	**Mangshaw**										
1001	Beef	Gorur mangshaw	*Beef cattle*	75.67	12.49	8.64	-	-	1.03	2.17	137	8.16

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fbre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
1002	Beef (buffalo)	Mohisher mangshaw	*Bulbus bubalis*	78.7	19.4	1.9	-	-	1	-	86	-
1003	Chicken (deshi)	Murgir mangshaw (deshi)	*Gallus bankiva murghi*	74.92	15.61	3.05	-	-	0.72	5.7	113	2.88
1004	Duck	Hasher mangshaw	*Anas platyrhyncha*	72.3	21.6	4.8	-	-	1.2	0.1	130	-
1005	Goat	Khashir mangshaw	*Capra hyrchusb*	74.2	21.4	3.6	-	-	1.1	-	118	-
1006	Liver (goat)	Khashir koliza	-	76.3	20.9	3	-	-	1.3	-	107	-
1007	Liver (mutton)	Verar koliza	-	70.4	19.3	7.5	-	-	1.5	1.3	150	-
1008	Mutton (lamb)	Verar mangshaw	-	71.5	18.5	13.5	-	-	1.3	-	194	-
1009	Pigeon	Kobutorer mangshaw	*Columba livia intermedia*	70.4	23.3	4.9	-	-	1.4	-	137	-
1010	Pork*	Shukorer mangshaw	*Sus scrofa domesticus*	47.96	11.49	38.72	-	-	1.59	1.83	402	36.05
1011	Snails (small)	Shamuk (choto)	*Viviparus bengalensis*	78.9	12.6	1	-	-	3.8	3.7	74	-
1012	Snails (large)	Shamuk (baro)	*Pila globosa*	74.1	10.5	0.6	-	-	2.4	12.5	97	-
1013	Turtle	Kochchop/jagol	-	79.4	16.5	1.5	-	-	1.1	1.5	86	-
1014	Chicken (farm)	Murgir mangshaw (farm)	*Gallus bankiva murghi*	74.61	16.29	5.65	-	-	1.13	2.32	126	5.34
1015	Yeast dried (brewer's)	Yeast	*Terula saccharomyces*	13.6	39.5	0.6	0.2	-	7	39.1	320	-
1016	Yeast dried (food)	Yeast	*Terula saccharomyces*	7.8	35.7	1.8	-	-	8.4	46.3	344	-
1100	**Egg**	**Dim**										
1101	Duck egg	Hasher dim	*Anas platyrhyncha*	68.39	15.47	15.87	-	-	0.95	0.27	206	13.17
1102	Hen egg (deshi)	Murgir dim (deshi)	*Gallus bankiva murghi*	76.12	11.33	11.60	-	-	0.89	0.95	154	9.63
1103	Hen egg (farm)	Murgir dim (farm)	*Gallus bankiva murghi*	75.78	12.07	11.37	-	-	0.77	0.78	154	9.44
1104	Turtle egg	Kocchoper dim	-	76	12.2	6.7	-	-	1.5	3.6	124	-
1200	**Milk & milk products**	**Dudhe-dudha jato khabar**										
1201	Buffalo milk solids	Mohisher dudher sana	-	54.1	13.4	23	-	-	1.6	7.9	292	-
1202	Butter milk	Ghole	-	97.5	0.8	1.1	-	-	0.1	0.5	15	-
1203	Cheese	Panir	-	40.3	24.1	25.1	-	-	4.6	6.3	348	-
1204	Cow milk solids	Gorur dudher sana	-	57.1	18.3	20.8	-	-	2.6	1.2	265	-
1205	Curd	Doi	-	89.1	3.1	4	-	-	0.8	3	60	-
1206	Human/breast milk	Mayer dudh	-	88	1.1	3.4	-	-	0.1	7.4	65	-
1207	Milk (condensed)	Kheer	-	69	6.9	12.2	-	-	2.3	9.6	176	-
1208	Powdered milk (skim, cow)	Makhon tola gura dudh	-	4.1	38	0.1	-	-	6.8	51	357	-
1209	Powdered milk (whole, cow)	Gura dudh	-	3.5	25.8	26.7	-	-	6	38	496	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
1210	Skim milk (liquid)	Makhon tola dudh (tar)	-	92.1	2.5	0.1	-	-	0.7	4.6	29	-
1211	Whole milk (buffalo)	Mohisher dudh	-	81	4.3	8.8	-	-	0.8	5.1	117	-
1212	Whole milk (cow)	Gorur dudh	-	87.5	3.2	4.1	-	-	0.8	4.4	67	-
1213	Whole milk (goat)	Sagoler dudh	-	86.8	3.3	4.5	-	-	0.8	4.6	72	-
1214	Yogurt (buffalo)	Khoya (mohisher dudh)	-	30.6	14.6	31.2	-	-	3.1	20.5	421	-
1215	Yogurt (buffalo, skim)	Khoya (makhon tola)	-	46.1	22.3	1.6	-	-	4.3	25.7	206	-
1216	Yogurt (cow)	Khoya (gorur dudh)	-	25.2	20	25.9	-	-	4	24.9	403	-
1300	**Fats & edible oils**	**Toilo**										
1301	Butter (us imported)	Makhon	-	19	-	81	-	-	2.5	-	729	-
1302	Cooking oil(groundnut, gingelly,musturd)	Toilo	-	-	-	100	-	-	-	-	900	-
1303	Fish liver oil	Mach koliza toilo	-	-	-	100	-	-	-	-	900	-
1304	Ghee (buffalo)	Ghee (mohisher)	-	-	-	100	-	-	-	-	900	-
1305	Ghee (cow)	Ghee (gorur)	-	-	-	100	-	-	-	-	900	-
1306	Ghee (vegetable)	Bonoshpati	-	-	-	100	-	-	-	-	900	-
1400	**Miscellaneous**	**Bibidha**										
1401	Areca/betel nut	Shuparee	*Areca catechu*	31.3	4.9	4.4	11.2	-	1	47.2	249	-
1402	Betel leaves	Pan pata	*Piper betel*	85.4	3.1	0.8	2.3	-	2.3	6.1	44	-
1403	Biscuit (salted)	Nonta biskut	-	4.5	6.3	32.4	-	-	1.9	54.6	534	-
1404	Biscuit (sweet)	Mishti biskut	-	5.4	6.4	15.2	-	-	1.1	71.9	450	-
1405	Bread (brown)	Ruti (badamee)	-	33	8.8	3.4	1.2	-	-	49	244	-
1406	Bread (loaf)	Pauruti	-	-	8.8	1.4	-	-	-	49	244	-
1407	Bread (white)	Ruti (shada)	-	39	7.8	0.7	0.2	-	-	51.9	245	-
1408	Coconut milk	Narikeler dudh	*Cocos nucifera*	42.8	3.4	40	-	-	0.9	11.9	430	-
1409	Date juice	Khejur rash	*Phoenix sylvestris*	-	-	-	-	-	-	0	310	-
1410	Honey	Modhu	-	20	0.3	-	-	-	0.2	79.5	319	-
1411	Jackfruit seed	Kathaler bichi	*Artocarpus heterophyllus*	64.5	6.6	0.4	1.6	-	1.2	25.8	133	-
1412	Lotus seed (dry)	Khoyare	*Nelumbo nucifera*	13.8	6.4	8.4	11.8	-	1.8	57.8	332	-
1413	Lotus seed (ripe)	Poddo gota (shukna)	*Nelumbo nucifera*	10	17.2	2.4	2.6	-	3.8	64	346	-
1414	Lotus seed (green)	Poddo gota (poripokko sobuj)	*Nelumbo nucifera*	84.6	3.9	0.7	0.9	-	1.1	8.8	57	-

Table 6B-1: Proximate nutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Scientific Name	Moisture	Protein	Fat	Crude Fibre	Dietary Fibre	T Min /Ash	Carbohydrate	Energy	Fatty Acid
				g	g	g	g	g	g	g	Kcal	mg
1	2	3	4	5	6	7	8	9	10	11	12	13
1415	Mahua flower	Mohua ful	*Madhuca indica*	18.6	4.4	0.6	1.7	-	2.7	72	311	-
1416	Makhana	Makhana	*Euryale ferox*	12.8	9.7	0.1	-	-	0.5	76.9	347	-
1417	Molasses	Akher gur	*Saccharum officinarum*	-	0.1	-	-	-	-	99.4	398	-
1418	Molasses (date)	Khejur gur	*Phoenix sylvestris*	-	1.5	0.3	-		-	86.1	353	-
1419	Oil cakes (ground nut)	Khoil (china badamer)	*Arachis hypogeal*	7.2	40.9	7.4	3.2	-	2.5	38.8	386	-
1420	Pappadom	Papor	-	20.3	18.8	0.3	-	-	8.2	52.4	288	-
1421	Pickles	Amchur	-	6.8	2.8	7.8	13.7	-	4.9	64	337	-
1422	Poppy seed	Posto dana	*Papaver somniferum*	4.3	21.7	19.3	8	-	9.9	36.8	408	-
1423	Pumpkin/sweet gourd seed	Kumrar bichi	*Cucurbita maxima*	8	24.3	47.2	0.2	-	4.7	15.6	584	-
1424	Sago	Shabu	*Metroxylon sagu*	12.2	0.2	0.2	-	-	0.3	87.1	351	-
1425	Sugar	Chini	-	0.4	-	-	-	-	0.1	99.4	398	-
1426	Sugar candy	Misri	-	-	0.1	-	-	-	-	99.4	398	-
1427	Sugarcane juice	Akher rosh	*Saccharum officinarum*	91.7	0.7	-	-	-	0.1	7.5	33	-
1428	Tamarind seed (dried)	Tetuler bichir sas	*Tamarindus indicus*	9.9	16.1	7.3	1	-	1.6	65.1	387	-
1429	Toddy (fermented)	Tari	-	84.7	0.1	0.3	-	-	0.7	14.3	59	-
1430	Water chestnut	Pani fol	*Trapa bispinosa*	84.9	2.5	0.9	0.6	-	0.9	11.7	65	-
1431	Water chestnut (dry)	Pani phal (shukna)	*Trapa bispinosa*	13.8	13.4	0.8	-	-	3.1	68.9	330	-

In tables (6B-1 – 6B-3), data those are not analyzed by our research team, are pulled from:

a. HKI 1988. Tables of Nutrient Composition of Bangladeshi Foods, Helen Keller International (HKI), INFS/WFP, Dhaka, Bangladesh
b. Gopalan C, Sastri R, Balasubramanian, SC, 2004. Nutritive value of Indian foods, National Institute of Nutrition, Indian Council of Medical Research; Hyderbad: India.
c. Unpublished thesis papers of students of INFS, University of Dhaka and Jahangirnagar University. (Reference; 50-60)

Detail information on sources of pulled data is given in Explanatory Note and in Reference (50-60).

Table 6B-2: Vitamins and antinutrient composition of food items.

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
100	**Cereals**	**Shasswo [illegible] khabar**												
101	Barley(whole)	Jaab	-	10	-	-	-	-	0.47	0.2	5.4	-	-	-
102	Maize/corn (immature)	Bhutta (kochi)	6	32	-	-	-	-	0.11	0.17	0.6	-	-	-
103	Maize / corn (mature)	Bhutta (paka)	-	90	-	-	-	-	0.42	0.1	1.8	-	20	959.85
104	Millet (french)	Cheena/bhuiro	-	-	-	-	-	-	0.2	0.18	-	-	-	-
105	Millet(pearl)	Bajra	-	132	-	-	-	-	0.33	0.16	2.3	-	45.5	-
106	Rice(fried paddy)	Khoi	-	-	-	-	-	-	0.21	-	-	-	-	-
107	Rice husk/bran	Chaler kura	-	-	-	-	-	-	2.7	0.48	29.8	-	-	-
108	Rice parboiled(husked)	Shiddho chal(dheki chata)	-	9	-	-	-	-	0.27	0.12	4	-	-	-
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	-	-	-	-	-	-	0.21	0.09	3.8	0.24	11	116.86
110	Rice sunned (husked)	Atop chal(dheki chata)	-	2	-	-	-	-	0.21	0.16	3.9	-	-	-
111	Rice sunned (milled)	Atap chal(cole chata)	-	-	-	-	-	-	0.06	0.06	1.9	-	8	147.97
112	Rice(flattened)	Chira	-	-	-	-	-	-	0.21	0.05	4	-	-	-
113	Rice(puffed)	Moori	-	-	-	-	-	-	0.21	0.12	4.1	-	-	-
114	Semolina	Suzi	-	-	-	-	-	-	0.12	0.03	-	-	-	-
115	Sorghum	Jowar	-	47	-	-	-	-	0.37	0.13	3.1	0.21	20	-
116	Vermicelli	Shemai	-	-	-	-	-	-	0.19	0.05	3.2	-	9	-
117	Wheat (whole)	Gaam	-	64	-	-	-	-	0.45	0.12	5.5	0.57	36.6	-
118	Wheat flour (coarse)	Atta	-	29	-	-	-	-	0.49	0.29	4.3	-	35.8	-
119	Wheat flour (refined)	Maida	-	25	-	-	-	-	0.12	0.07	2.4	-	-	-
120	Ragi	Madua	-	42	-	-	-	-	0.42	0.19	1.1	-	18.3	-
121	Wheat germ	Wheat germ	-	-	-	-	-	-	1.4	0.54	2.9	-	-	-
122	Oatmeal	Jai phal	-	-	-	-	-	-	0.98	0.16	1.1	-	34	-
200	**Pulses & [illegible]umes**	**Dal [illegible]o khabar**												
201	Bean (field,dry)	Shimer bichi	-	-	-	-	-	-	0.52	0.16	1.8	-	-	-
202	Bengal gram (whole)	Chola	3	189	-	-	-	-	0.3	0.51	2.9	-	186	-
203	Bengal gram (split)	Cholar dal	1	129	-	-	-	-	0.48	0.18	2.4	-	147.5	-
204	Bengal gram (fried)	Chola bhaja	-	113	-	-	-	-	0.2	-	1.3	-	139	-
205	Black gram (split)	Mashkalai dal	-	38	-	-	-	-	0.42	0.37	2	-	132	-
206	Green gram (whole)	Mug (asta)	-	94	-	-	-	-	0.47	0.39	2.1	-	-	-
207	Green gram (split)	Mug dal	-	49	-	-	-	-	0.72	0.15	2.4	-	140	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
208	Khesari dal	Khesari dal	-	120	-	-	-	-	0.39	0.41	2.9	-	-	-
209	Lentils (deshi)	Mashur dal	-	270	-	-	-	-	0.45	0.49	2.6	-	36	516.12
210	Peas dried (split)	Matar(shukna)/dal	-	39					0.47	0.19	3.4	-	7.5	-
211	Peas fried	Matar bhaja	-	18	-	-	-	-	0.47	0.21	3.5	-	-	-
212	Red gram /rahar (split)	Arohor dal	-	132	-	-	-	-	0.45	0.51	2.9	0.54	103	-
213	Soyabean	Garikalai	-	426	-	-	-	-	0.73	0.76	3.2	-	100	-
214	Horse gram	Kulthi kalai	1	71	-	-	-	-	0.42	0.2	1.5	-	-	-
215	Moth beans	Mut/kheri	2	9	-	-	-	-	0.45	0.09	1.5	-	-	-
216	Rajmah	Rajmah	-	-	-	-	-	-	-	-	-	-	-	-
300	Leafy vegetables	Shak pata												
301	Agathi	Bauk ful shak	169	45000	15440	-	-	-	0.21	0.09	1.2	-	-	-
302	Spleen amaranth	Data shak	26.32	4904	4450	5.17	-	188.35	0.26	0.18	-	-	-	16.4
303	Amaranth leaves (tender)	Naute shak	-	20160	8340	-	-	-	0.03	0.3	1.2	-	149	-
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	22.55	4310	1256.53	-	80.22	83.69	0.1	0.13	-	-	-	10.37
305	Amaranth (spiney)	Kanta naute	33	3564	-	-	-	-	-	0.01	-	-	-	-
306	Bathua leaves	Bathua/ beto shak	35	1740	1656.08	-	39.05	-	0.01	0.14	0.6	-	-	-
307	Beet leaves	Beet shak	70	5862	-	-	-	-	0.26	0.56	3.3	-	-	-
308	Bottle gourd leaves	Lau shak	22.2	3050	2370.64	-	8.23	526.7	-	-	-	-	-	3.31
309	Cabbage	Badha kopi	124	120	-	-	-	-	0.06	0.09	0.4	-	23	-
310	Carrot leaves	Gazor shak	79	5700	-	-	-	-	0.04	0.37	2.1	-	-	-
311	Cauliflower leaves	Ful kopi shak	-	35	-	-	-	-	-	-	-	-	-	-
312	Celery leaves	Randhuni shak	62	3990	-	-	-	-	-	0.11	1.2	-	-	-
313	Chukai leaves	Chukai shak	-	9	117.35	234.42	-	31.19	0.1	-	-	-	-	-
314	Coriander leaves	Dhane shak	76.56	6830	1470.54	-	64.99	15.1	2.07	0.83	1.03	3.86	-	-
315	Cow pea leaves	Borboti pata	4	6072	-	-	-	-	0.05	0.18	0.6	-	-	-
316	Drumstick leaves	Shazna shak	220	6780	-	-	-	-	0.06	0.05	0.8	-	-	-
317	Fenugreek leaves	Methi shak	52	2340	-	-	-	-	0.04	0.31	0.8	-	-	-
318	Folwal leaves	Potol pata	-	-	-	-	-	-	-	-	-	-	-	-
319	Gram leaves	Choia shak	61	978	-	-	-	-	0.09	0.1	-	-	-	-
320	Helencha leaves	Helencha	0	13700	-	-	-	-	0.01	0.16	-	-	-	-
321	Indian spinach	Pui shak	55.59	8170	1775.1	-	72.38	489.81	0.02	0.36	-	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
322	Jute (leaves)	Pat shak	54.43	9140	-	-	-	-	0	0.35	-	0.97	-	16.4
323	Kheshari leaves	Khesharee shak	41	3000	2176.3	-	-	-	0.01	0.03	-	-	-	-
324	Swamp morning-glory	Kalmi shak	41.83	5660	2383.68	-	74.83	50.89	0.14	0.4	-	-	-	2.43
325	Lettuce	Letuce/salad pata	10	990	-	-	-	-	0.09	0.13	0.5	-	-	-
326	Mesta leaves	Mesta pata	20	2898	-	-	-	-	0.07	0.39	-	-	-	-
327	Mustard leaves	Sharisha shak	33	2622	-	-	-	-	0.03	-	-	-	-	-
328	Neem leaves (green)	Nim pata (kochi)	104	2760	-	-	-	-	0.06	-	-	-	-	-
329	Neem leaves yellow (ripe)	Nim pata (paka))	218	1998	-	-	-	-	0.04	-	-	-	-	-
330	Potato leaves	Gool aloo shak	-	-	-	-	-	-	-	-	-	-	-	-
331	Spearmint/mint leaves	Pudina pata	57.03	7610	-	-	-	-	1.7	0.06	0.04	-	114	-
332	Pumpkin leaves	Mishti kumra shak	61	1940	-	-	-	-	0.12	0.24	-	-	-	-
333	Punornova leaves	Punornova shak	27	-	-	-	-	-	-	-	-	-	-	-
334	Radish leaves	Mula pata	68.85	4220	-	-	-	-	0.04	0.09	0.8	-	-	1.88
335	Safflower leaves	Kushum shak	15	3540	-	-	-	-	0.04	0.1	-	-	-	-
336	Soyabean leaves	Gourikalai pata	-	25	-	-	-	-	-	0.16	-	-	-	-
337	Spinach	Palong shak	22.44	4350	2249.57	-	-	-	0.03	0.09	0.5	-	123	-
338	Spinach sour	Tak palong shak	15	9400	2800	-	-	-	0.1	0.09	-	-	-	-
339	Sweet potato leaves	Mishti aloo shak	27	7800	4465.64	-	-	88.65	0.07	0.24	-	-	-	-
340	Tamarind leaves (green)	Tetul pata (kochi)	3	2510	-	-	-	-	0.24	0.17	4.1	-	-	-
341	Tamarind leaves (dry)	Tetul pata (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
342	Taro/arum leaves (dried)	Kochu shak (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
343	Taro black arum leaves	Kalo kochu shak	63	12000	-	-	-	-	0.06	0.45	1.9	-	-	-
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	60.09	8350	7146.59	-	296.93	1723.09	0.22	0.26	1.1	-	-	11.46
345	Thankuni leaves	Thankuni pata	37.77	7470	-	-	-	-	0.19	0.28	0.13	2.01	-	3.41
346	Turnip leaves	Shalgom pata	180	9396	-	-	-	-	0.31	0.57	5.4	-	-	-
347	Celery stalks	Randhuni	6	520	-	-	-	-	0.12	0.05	0.3	-	-	-
348	Curry leaves	Barsanga/curry pata	4	7560	7110	-	-	-	0.08	0.21	2.3	-	93.9	-
349	Ipomoea stems	Kolmi danta	-	-	-	-	-	-	-	-	-	-	-	-
350	Kuppameni	Mukta jhuri	147	-	-	-	-	-	-	-	-	-	-	-
351	Susni sag	Susni sag	-	-	-	-	-	-	-	-	-	-	-	-
352	Bitter gourd*	Karola pata*	107.9	10470	-	-	-	-	-	-	-	-	-	3.74

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
353	Not known*	Sabarang*	12.92	5970	467.28	-	37.6	-	-	-	-	-	-	
354	Roselle*	Amila pata*	16.08	4410	1606.83	-	20.22	145.59	-	-	-	-	-	15.9
355	Not known*	Lemon pata*	18.86	3030	860.22	-	129.35	54.49	-	-	-	-	-	-
356	Indian ivy-rue*	Baruna shak*	38.04	6110	1465.49	-	77.51	-	-	-	-	-	-	-
357	Not known*	Ojan shak*	15.11	4610	1102.88	212.59	153.87	-	-	-	-	-	-	-
358	Not known*	Ghanda batali*	7.36	6990	1708.97	-	55.46	-	-	-	0.24	-	-	-
359	Not known*	Oral balai*	22.94	4450	1110.74	-	207.81	276.66	-	-	-	-	-	-
360	Purslane*	Bat slai*	3.24	2240	-	-	-	-	-	-	0.15	10.07	-	-
361	Yellow saraca*	Maytraba*	92.6	13180	1486.42	-	-	-	21.68	-	1.5	-	-	-
362	Mollugo*	Dimey pata*	7.03	796	-	-	-	-	-	-	-	-	-	-
363	Wild coriander*	Maisa pagoh*	6.27	1292	-	-	-	-	-	-	-	-	-	-
364	Kassava*	Simei alu pata*	27.30	19730	-	-	-	-	-	-	-	-	-	-
365	Not known*	Kongulo aga/taokharong bochouk*	17.88	1827	-	-	-	-	-	-	-	-	-	-
366	Not known*	Sineiye sak*	8.33	1851	-	-	-	-	-	-	-	-	-	-
367	Blue commelina/ venus bath*	Bat baitta sak*	20.04	4178	-	-	-	-	-	-	-	-	-	-
368	Edible fern*	Moikhumu bochouk/dheki sak*	4.13	1043	-	-	-	-	-	-	0.10	4.76	-	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	15.10	4069	-	-	-	-	-	-	-	-	-	-
370	Not known*	Taolingashku*	24.45	3834	-	-	-	-	-	-	1.36	29.49	-	-
400	**Roots & tubers**	**Muli ...lo khabar**												
401	Beet root	Beet	15	-	-	-	-	-	0.03	0.06	0.4	-	-	-
402	Carrot	Gajor	11.17	8560	1689.43	604.58	0	2123.56	0.09	0.1	0.04	0.73	15	9.28
403	Garlic	Rashon	13	-	-	-	-	-	0.06	0.23	0.4	-	-	-
404	Ground potato	Mete aloo	-	565	-	-	-	-	0.19	-	-	-	-	-
405	Ole kopi	Ole kopi	53	21	-	-	-	-	0.01	0.03	-	-	-	-
406	Onion	Peyaj	11	-	-	-	-	-	0.08	0.01	0.5	-	-	-
407	Potato	Gole aloo	8.8	24	-	-	-	-	0.03	0.03	1.2	-	7	16.36
408	Radish	Mula	34	-	-	-	-	-	0.43	0.02	0.5	-	-	-
409	Sweet potato (red)	Misti aloo	23.92	250	-	-	-	-	0.06	2.02	0.7	-	-	20.25
410	Taro/arum	Kachu	6	24	-	-	-	-	0.16	0.11	-	-	-	-
411	Taro/arum tubers	Kachu mukhee/chora	-	-	-	-	-	-	0.04	-	-	-	-	-
412	Turnip	Shalgom	15	-	-	-	-	-	0.03	0.02	0.5	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
413	Yam (elephant)	Ole kachu	-	-	-	-	-	-	0.06	0.07	0.7	-	-	-
414	Yam (wild)	Bonn aloo	1	565	-	-	-	-	0.19	0.47	1.2	-	-	-
415	Moor sanga	Palasa	-	-	-	-	-	-	-	-	-	-	-	-
416	Water lily (red)	Lal shapla	-	-	-	-	-	-	-	-	-	-	-	-
500	Non- [illegible]bles	Sho[illegible]												
501	Amaranth (data) stem	Data	10	255	-	-	-		0.01	0.18	-	-	-	-
502	Egg plant	Begun/brinjal	6.66	74	-	-	-		0.12	0.08	0.9	-	34	10.88
503	Bean	Shim	2	188	85.65	-	27.62	46.04	0.05	0.01	-	-	-	-
504	Bean (broad)	Makhon shim	9	110	-	-	-	-	0.08	-	0.8	-	-	-
505	Bean (french)	Forashee shim	24	132	-	-	-	-	0.08	0.06	0.3	45.5	-	-
506	Bean (immature)	Shim (kochi)	9	187	-	-	-	-	0.1	0.05	0.7	-	-	-
507	Bean (red)	Lal shim	12	453	-	-	-	-	0.06	0.02	-	-	-	-
508	Cabbage	Badha kopi	3	1200	-	-	-	-	0.06	0.05	0.4	-	23	-
509	Cauliflower	Ful kopi	91	30	-	-	-	-	0.03	0.03	1	-	-	-
510	Green chilli	Kacha marich	101	1010	-	-	-	-	5.47	0.96	0.39	-	29	13.72
511	Cow pea	Borboti	0	564	-	-	-	-	0.14	0.03	0.9	-	-	-
512	Cucumber	Shosha	5	-	-	-	-	-	0.16	0.02	0.2	-	14.7	-
513	Drumstick/horse raddish	Sazna data	45	750	-	-	-	-	0.04	0.02	0.2	-	-	-
514	Drumstick flower	Sazna ful	-	-	-	-	-	-	-	-	-	-	-	-
515	Fig(red)	Dumur (lal)	-	140	-	-	-	-	-	-	-	-	-	-
516	Folwal	Potol	44.18	153	-	-	-	-	0.3	0.03	-	-	-	-
517	Gourd (ash)	Chal kumra	1	-	-	-	-	-	0.06	0.01	0.4	-	-	-
518	Gourd (bitter)	Korola	136.39	1790	-	-	-	-	0.04	0.02	0.5	-	-	8.27
519	Gourd (bottle)	Lau	4	-	-	-	-	-	0.01	0.02	0.2	-	-	-
520	Gourd (ridge)	Jhinga	3	33	-	-	-	-	0.11	0.03	0.2	-	-	-
521	Gourd (small bitter)	Uchche	96	126	-	-	-	-	0.07	0.06	0.4	-	-	-
522	Gourd (snake)	Chichinga	-	96	-	-	-	-	0.04	0.06	0.3	-	15.5	-
523	Gourd (sweet) pumpkin	Misti kumra	12.12	3810	51.41	378.39	-	29.91	0.07	0.06	0.5	-	13	15.85
524	Gram (red,unripe)	Arohor (kacha)	25	469	-	-	-	-	0.32	0.33	3	-	-	-
525	Jackfruit (immature)	Aanchor/kacha	14	-	-	-	-	-	0.05	0.04	0.2	-	-	-
526	Kakrol	Kakrol	119.06	270	163.01	-	-	19.43	0.08	0.06	-	-	-	5.25

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
527	Kolmee	Kolmee data	-	-	-	-	-	-	-	-	-	-	-	-
528	Lady's finger/okra	Dherosh	10.18	380	-	-	-	-	0.14	0.8	0.6	-	105.1	5.98
529	Mango (green/immature)	Kacha am	3	90	-	-	-	-	0.04	0.01	0.2	-	-	-
530	Marrow	Dhundul	5	85	-	-	-	-	0.03	0.01	0.4	-	-	-
531	Onion & garlic stalk	Peyaj o rashun dagapata	17	595	-	-	-	-	-	0.03	0.3	-	-	-
532	Papaya (green/immature)	Kacha pepe	13.74	-	-	-	-	-	0.4	0.02	0.1	-	-	7.72
533	Peas (green)	Motor shooti	5	405	-	-	-	-	0.01	0.12	0.8	-	-	-
534	Plantain	Kacha kola	4	30	-	-	-	-	0.09	0.06	0.3	-	16.4	-
535	Plantain flower	Kolar mocha	16	27	-	-	-	-	0.05	0.02	0.4	-	-	-
536	Plantain stem	Kolar thore	7	-	-	-	-	-	0.02	0.01	0.2	-	-	-
537	Pumpkin flower	Mishti kumra ful	-	-	-	-	-	-	-	-	-	-	-	-
538	Spinach stalks	Palong data	11	2630	-	-	-	-	0.04	0.15	-	-	-	-
539	Tomato (green)	Tomato (kacha)	31	192	-	-	-	-	2.32	0.57	0.16	4.23	-	-
540	Water lily stem (red)	Shapla (lal)	-	-	-	-	-	-	-	-	-	-	-	-
541	Water lily stem (white)	Shapla (shada)	-	-	-	-	-	-	-	-	-	-	-	-
542	Yam stem	Kochu data/lati	3	104	-	-	-	-	0.07	0.07	-	-	-	-
543	Colocasia stem	Kochu danta	3	104	-	-	-	-	0.07	0.07	0.1	-	-	-
544	Karonda (fresh)	Karamcha (kancha)	-	-	-	-	-	-	-	-	-	-	-	-
545	Karonda (dry)	Karamcha (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
546	Kovai	Telakochu	15	156	-	-	-	-	0.07	0.08	0.7	-	59	-
547	Lokooch	Dephal/dahua/dewa	-	-	-	-	-	-	-	-	-	-	-	-
548	Leeks	Piyaj (bilati)	11	18	-	-	-	-	0.23	-	-	-	-	-
549	Lotus stem (dry)	Padma data	3	-	-	-	-	-	0.82	1.21	1.9	-	-	-
550	Sundakai	Titbaigun	-	450	-	-	-	-	-	-	-	-	-	-
551	Sword beans	Kath shim	12	24	-	-	-	-	0.08	0.08	0.5	-	-	-
552	Chaltha	Chalta	-	-	-	-	-	-	-	-	-	-	-	-
553	Lotus seeds (green)	Padma bij	-	-	-	-	-	-	-	-	-	-	-	-
554	Mashroom	Mashroom	-	-	-	-	-	-	-	-	-	-	-	-
555	Sea weed (fresh)	Sea weed	-	-	-	-	-	-	-	-	-	-	-	-
556	Sea weed (dry)	Sea weed	-	-	-	-	-	-	-	-	-	-	-	-
557	Silk cotton flowers	Simul phul	-	-	-	-	-	-	-	-	-	-	-	-

Table 6B-2: Vitamins anrd antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
558	Water lily flower	Shapla phul	-	-	-	-	-	-	-	-	-	-	-	-
559	Pea eggplant*	Mistti begun*	6.99	3620			-		0.57	-	0.66	3.81	-	-
560	Solanum*	Tak begun*	16.66	4580	142.66	824.05	-	31.46	2.09	2.2	0.13	5.19	-	-
561	Sigon data*	Sigon data*	2.63	950	-	-	-	-	-	-	-	-	-	-
562	Yam*	Pan/jhum alu*	19.25	480	-	-	-	-	11.85	-	0.62	3.1	-	-
563	Banchalta*	Banchalta*	31.16	15170	55.47	12.97	-	14.97	-	-	-	-	-	-
564	Fekong*	Fekong*	3.24	130	-	-	-	-	0.37	-	2.55	1.73	-	-
565	Not known*	Gachh oal*	-	-	-	-	-	-	-	-	-	-	-	6.64
566	Not known*	Idurer kaan*	-	-	-	-	-	-	-	-	-	-	-	25.55
567	Red silk/ cotton tree*	Shimul ful*	-	-	-	-	-	-	-	-	-	-	-	-
568	Not known*	Seng e tur / seng e / thorai*	2.19	997	26.46	-	-	-	1.94	-	-	-	-	-
569	Not known*	Betagi*	19.97	815	57.59	-	-	17.42	-	-	-	-	-	24.2
570	Not known*	Seon sak / gandri*	7.51	6770	-	-	-	-	-	-	-	-	-	-
571	Berry bamboo*	Bas koral*	2.26	747	6.61	-	-	14.65	-	-	-	-	-	-
572	Not known*	Maira bokong*	5.12	3978	-	-	-	-	-	-	0.06	3.24	-	-
573	Not known*	Laigrao bokong*	3.22	3237	-	-	-	-	-	-	-	-	-	-
600	**Oil seeds**	**Toilo bi**												
601	Cashew nuts	Hizlee badam / kaju badam	-	60	-	-	-	-	0.63	0.19	1.2	-	-	-
602	Chilgoza (nut)	Chilgoza	-	-	-	-	-	-	0.32	0.3	0.36	-	-	-
603	Coconut (dry)	Narikale (shukna)	7	-	-	-	-	-	0.08	0.01	3	-	16.5	-
604	Coconut (immature)	Narikale (kacha)	1	-	-	-	-	-	0.05	0.1	0.8	-	12.5	-
605	Ground nut/ pea nut	China badam	-	37	-	-	-	-	0.9	0.13	19.9	-	20	-
606	Ground nut/ pea nut (fried)	China badam (bhaza)	-	-	-	-	-	-	0.39	0.13	22.1	-	-	-
607	Linseed	Tishi	-	30	-	-	-	-	0.23	0.07	1	-	-	-
608	Mustard	Sharisha	-	162	-	-	-	-	0.65	0.26	4	-	-	-
609	Nuts	Badam	-	-	-	-	-	-	0.24	0.57	-	-	-	-
610	Oils mustrd etc	Toilo	-	-	-	-	-	-	-	-	-	-	-	-
611	Pistachio	Pesta	-	144	-	-	-	-	0.67	0.28	2.3	-	-	-
612	Sunflower seeds	Surzomukhir bij	1	-	-	-	-	-	0.86	0.2	4.5	-	-	-
613	Sesame	Til	-	69	-	-	-	-	0.01	0.34	-	-	-	-
614	Walnut	Akhrot	-	6	-	-	-	-	0.45	0.4	1	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
615	Niger seeds	Ram til	-	-	-	-	-	-	0.07	0.97	8.4	-	-	-
616	Piyal seeds	Piyal	5	-	-	-	-	-	0.69	0.53	1.5	-	-	-
617	Safflower seeds	Kusum bij	-	-	-	-	-	-	-	-	-	-	-	-
618	Jangli badam	Jangli badam	5	-	-	-	-	-	0.06	0.08	1.1	-	-	-
619	Oysternut	Oysternut	-	-	-	-	-	-	-	-	-	-	-	-
620	Roselle seed	Roselle bij	-	-	-	-	-	-	-	-	-	-	-	-
621	Tamarind seed karnel(roasted)	Tetul bijer shash	-	-	-	-	-	-	-	-	-	-	-	-
622	Okra (whole seed)	Dheros	-	-	-	-	-	-	-	-	-	-	-	-
623	Okra (kernal)	Dheros	-	-	-	-	-	-	-	-	-	-	-	-
700	**Spices & condiments**	**Mosholla**												
701	Cardamom	Alachi	-	-	-	-	-	-	0.22	0.17	0.8	-	-	-
702	Chilli, red (dry)	Shukna morich	50	345	-	-	-	-	0.93	0.43	9.5	-	-	-
703	Cloves (dry)	Lobongo (shukna)	-	253	-	-	-	-	0.98	0.13	-	-	-	-
704	Coriander seed	Dhonia	-	942	-	-	-	-	0.22	0.35	1.1	-	32	-
705	Cumin seed	Zira	3	522	-	-	-	-	0.55	0.36	2.6	-	-	-
706	Fenugreek	Methi	-	96	-	-	-	-	0.34	0.29	1.1	-	84	-
707	Ginger	Ada	6	40	-	-	-	-	0.06	0.03	0.6	-	-	-
708	Lemon/lime peel	Lebur khosha	-	110	-	-	-	-	-	-	-	-	-	-
709	Mace	Joyotree	-	3027	-	-	-	-	0.25	0.42	1.4	-	-	-
710	Mixed spices	Mishti mosholla	-	522	-	-	-	-	0.55	-	-	-	-	-
711	Mixed spices (hot)	Garam mosholla	-	-	-	-	-	-	0.22	-	-	-	-	-
712	Nutmeg	Zaiful	-	-	-	-	-	-	0.33	0.01	1.4	-	-	-
713	Omum	Zaoan	-	71	-	-	-	-	0.21	0.28	2.1	-	-	-
714	Pepper (black)	Gole morich	-	-	-	-	-	-	0.9	0.14	1.4	-	-	-
715	Turmeric	Holud	-	30	-	-	-	-	0.03	-	2.3	-	18	-
716	Arisithippili	Pipul	-	-	-	-	-	-	-	-	-	-	-	-
717	Asafoetida	Hing	-	4	-	-	-	-	-	0.04	0.3	-	-	-
718	Mango powder	Amchoor	-	-	-	-	-	-	-	-	-	-	-	-
719	Nutmeg (rind)	Jai phal	-	-	-	-	-	-	-	-	-	-	-	-
800	**Fruits**	**Phol**												
801	Ambada (hog plum)	Amra	92	270	-	-	-	-	0.28	0.04	0.3	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
802	Amla	Amloki	434.05	9	-	-	-	-	0.02	0.08	0.2	-	-	8.2
803	Apple	Apel	4	-	-	-	-	-	0.12	0.03	-	-	-	-
804	Apricot (boiled)	Khubanee (shiddho)	6	2160	-	-	-	-	0.04	0.13	0.6	-	-	-
805	Apricot (dried)	Khubanee (shukna)	2	600	-	-	-	-	0.22	-	2.3	-	-	-
806	Bakul flower	Bakul phul	-	-	-	-	-	-	-	-	-	-	-	-
807	Banana (ripe)	Paka kola	15.65	78	-	-	-	-	0.1	0.05	0.5	-	-	18.34
808	Bilimbi (ripe)	Kamranga	61	18	-	-	-	-	0.12	0.04	0.6	-	-	-
809	Blackberry (indian)	Kalo jam	60	120	-	-	-	-	0.09	0.24	-	-	-	-
810	Boroi (bitter plum)	Boroy	51	-	-	-	-	-	0.02	0.05	-	-	-	-
811	Bread fruit	Madar	21	9	-	-	-	-	0.04	0.07	-	-	-	-
812	Bullock's heart	Nona ata	5	67	-	-	-	-	-	0.07	0.6	-	-	-
813	Custard apple	Ata phol	38	-	-	-	-	-	0.07	0.14	-	-	-	-
814	Coconut water	Daber pani	5	-	-	-	-	-	0.11	0.02	0.1			-
815	Dates	Khezur (taza)	-	100	-	-	-	-	-	-	-	-	-	-
816	Dates (dry)	Khezur (shukna)	0	26	-	-	-	-	0.1	0.04	0.9	-	-	-
817	Fig (ripe)	Dumur (paka)	5	162	-	-	-	-	0.06	0.05	0.6	-	-	-
818	Guava	Peyara	210	100	-	-	-	-	0.21	0.09	0.4	-	-	-
819	Grapes	Angur	29	-	-	-	-	-	0.1	0.06	-	-	-	-
820	Jackfruit (ripe)	Paka kathal	11.08	710	28.86	124.67	-	-	0.11	0.15	0.4	-	-	26.42
821	Kheera	Kheera	3	-	-	-	-	-	0.01	0.03	-	-	-	-
822	Kodbele (immature)	Kodbel (kacha)	15	62	-	-	-	-	0.04	0.02	-	-	-	-
823	Kodbele (ripe)	Kodbel (paka)	13	61	-	-	-	-	0.8	0.03	-	-	-	-
824	Kusum fruit	Kushum phol	-	-	-	-	-	-	-	-	-	-	-	-
825	Lemon	Kagogee lebu	63	15	-	-	-	-	0.02	0.03	0.1	-	-	-
826	Lemon (sweet)	Mishti lebu	45	-	-	-	-	-	-	0.04	-	-	-	-
827	Lichis (deshi)	Lichu	7	70	-	-	-	-	0.02	0.06	0.4	-	-	-
828	Lime	Lebu	47	-	-	-	-	-	-	0.03	0.1	-	-	-
829	Lime (sweet)	Mushambee	50	465	-	-	-	-	-	-	-	-	-	-
830	Mahua (ripe)	Mohua phol	40	307	-	-	-	-	-	-	-	-	-	-
831	Mango ripe (deshi)	Paka am	10.88	2560	356.28	368.96	22.3	-	0.1	0.07	0.9	-	-	9.28
832	Melon (mix)	Bangee/futi	3.65	800	663.68	-	-	-	0.11	0.08	0.3	-	-	19.82

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
833	Neem (fruit)	Neem phol	-	-	-	-	-	-	-	-	-	-	-	-
834	Olive (wild)	Jalpai	39	190	-	-	-	-	0.03	0.01	-	-	-	-
835	Orange	Malta	84	150	-	-	-	-	0.15	0.01	-	-	-	-
836	Orange juice	Komolar rosh	64	150	-	-	-	-	0.06	0.02	0.4	-	-	-
837	Orange/mandarin	Komola	40	120	-	-	-	-	0.04	0.01	-	-	-	-
838	Palm, palmyra (green)	Kochi tal	4	-	-	-	-	-	-	0.01	-	-	-	-
839	Palm (ripe)	Paka tal	35.13	3570	140.86	51.21	67.16	-	-	-	-	-	-	-
840	Papaya (ripe)	Paka pepe	7.48	2330	425.77	23.22	21.18	-	0.08	0.03	0.2	-	-	26.83
841	Pears	Nashpatee	7	-	-	-	-	-	0.13	0	0.2	-	-	-
842	Phalsa	Folsha	22	419	-	-	-	-	0.1	-	0.3	-	-	-
843	Pineapple	Anarosh (joldugee)	27.82	710	-	-	-	-	0.11	0.04	0.1	-	-	-
844	Pineapple (wild variety)	Anarosh (deshi)	26	90	-	-	-	-	0.17	0.04	-	-	-	-
845	Pomegranate juice	Bedanar rosh	26	-	-	-	-	-	0.02	-	-	-	-	-
846	Pomegranate	Bedana (bichi shoho)	26	-	-	-	-	-	0.02	-	0.3	-	-	-
847	Pommelo (red)	Zambura (lal)	105	120	-	-	-	-	0.06	0.04	0.2	-	-	-
848	Rose apple	Jamrul	3	141	-	-	-	-	0.01	0.05	0.4	-	-	-
849	Tamarind (immature)	Tetul (kacha)	6	-	-	-	-	-	0.01	0.02	-	-	-	-
850	Tamarind (pulp)	Tetul (paka)	3	60	-	-	-	-	-	0.07	-	-	-	-
851	Tetul (bilati)	Bilati tetul	108	-	-	-	-	-	0.22	0.03	-	-	-	-
852	Tomato (ripe)	Paka tometo	27	3510	276.97	228.06	1307.95	-	0.15	0.75	0.06	1.52	30	-
853	Wood apple	Bel	15.67	150	-	-	-	-	0.03	0.02	0.8	-	-	120.95
854	Water melon	Tarmuz	3.84	4200	299.73	54.55	1257.53	-	0.02	0.04	0.1	-	-	9.48
855	Black berry (deshi)	Kalo jam	65.58	390	-	-	-	-	0.09	0.24	-	-	-	10.05
856	Cherries (red)	Cherry phal	7	470	140	-	-	-	0.08	0.08	0.3	-	-	-
857	Lichi (bastard)	Ash phal	31	-	-	-	-	-	0.02	0.06	0.4	-	-	-
858	Melon (musk)	Kharmuj	26	169	-	-	-	-	0.11	0.08	0.3	-	-	-
859	Peaches	Peach phal	6	-	-	-	-	-	0.02	0.03	0.5	-	-	-
860	Persimmon	Gav	33	2268	-	-	-	-	0.03	0.01	-	-	-	-
861	Plum	Alubokhara	5	166	-	-	-	-	0.04	0.1	0.3	-	-	-
862	Raisins	Kishmish	1	2.4	-	-	-	-	0.07	0.19	0.7	-	-	-
863	Strawberry	Strawberry	52	18	-	-	-	-	0.03	0.02	0.2	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
864	Gab	Gab	-	-	-	-	-	-	-	-	-	-	-	-
865	Monkey jack*	Deuwa*	11.68	4130	-	-	-		-	-	-	-	-	30.9
866	Burmese grape*	Lotkon*	12.05	120	-	-	-		-	-	-	-	-	13.57
867	Wild melon*	Sindera*	9.95	1840	9.89	-	-	45.91	-	-	-	0.67	-	-
868	Not known*	Roshko*	13.12	1190	8.9	126.7	-	-	-	-	-	-	-	-
869	Bead tree*	Kusumgulu*	6.08	260	388.43	-	12.96	115.5	-	1.42	0.02	0.84	-	-
900	**Fishes**	**Mach**												
901	Aire fish	Aire	11	-	-	-	-	-	-	-	0.5	-	-	-
902	Bacha fish	Bacha	13	-	-	-	-	-	-	-	0.6	-	-	-
903	Bata fish	Bata (choto)	-	-	-	-	-	-	-	-	-	-	-	-
904	Bele fish / tank goby (deboned)	Bele	3	-	-	-	-	-	-	-	0.3	-	-	-
905	Bombay duck (dry)	Loittya (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
906	Botya loach/hora loach	Betrongi mach	11	-	-	-	-	-	-	-	-	-	-	-
907	Boga labeo (fresh)	Bhangan(taza)	12	-	-	-	-	-	-	-	-	-	-	-
908	Boga labeo (dry)	Bhangan (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
909	Boga labeo (powdered)	Bhangan (bata)	-	-	-	-	-	-	-	-	0.6	-	-	-
910	Barramundi/bhetki (fresh)	Bhetki (taza)	10	-	-	-	-	-	-	-	0.7	-	-	-
911	Barramundi/bhetki (dry)	Bhetki (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
912	Boal/wallago/helicopter cat fish	Boal	8	20	-	-	-	-	-	-	1	-	-	-
913	Blackfish/kalbasu	Kalibaush	11	-	-	-	-	-	-	-	0.6	-	-	-
914	Boicha fish/dwarf red gourami	Boicha	-	-	-	-	-	-	-	-	-	-	-	-
915	Bream/barred mackerel (sea, fresh)	Champa (taza)	2	-	-	-	-	-	-	-	-	-	-	-
916	Bream/barred mackerel (sea, dry)	Champa (shutki)	4.4	-	-	-	-	-	-	-	-	-	-	-
917	Butter fish/pabo catfish (bony)	Pabda	-	-	-	-	-	-	-	-	-	-	-	-
918	Carp/catla	Katol	-	-				-	-	-	0.8	-	-	-
919	Cat fish/tor mahseer	Moha shole	-	-	-	-	-	-	-	-	-	-	-	-
920	Chela/large razorbelly minnow (fresh)	Chela (taza)	-	-	-	-	-	-	-	-	-	-	-	-
921	Chela/large razorbelly minnow (dry)	Chela (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
922	Climbing/walking fish (deboned)	Koi	32	-	-	-	-	-	-	-	0.8	-	-	-
923	Sartorina crab	Kakra	-	-	-	-	-	-	-	-	3.1	-	-	-
924	Dragon fish/yellowtail catfish	Pangash	7	-	-	-	-	-	-	-	0.6	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
925	Spiny eel fish (bony)	Bain (bony)	3	130	-	-	-	-	-	-	0.9	-	-	-
926	Fesha fish/gangetic hairfin anchovy (fresh)	Fesha (taza)	-	-	-	-	-	-	-	-	-	-	-	-
927	Fesha fish/gangetic hairfin anchovy (dry)	Fesha (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
928	Fishmeal (dry)	Gura (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
929	Flat fish/clown knife fish	Chitol	-	-	-	-	-	-	-	-	-	-	-	-
930	Folui/bronze feather back (deboned)	Foli/meni (deboned)	6	-	-	-	-	-	0.12	0.08	0.8	-	-	-
931	Fry /swamp barb/puti (v. Small fresh)) (deboned)	Puti (taza)	15	-	-	-	-	-	-	-	0.3	-	-	-
931.a	Fry/swamp barb/puti (dry,deboned)	Chapa/ puti (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
932	Gahira fish/garua	Gahira mach/gagra/ghaura	22	-	-	-	-	-	0.05	0.07	-	-	-	-
933	Mixed small fish	Gura mach	-	-	-	-	-	-	-	-	-	-	-	-
934	Hilsa shad	Ilish	24	-	-	-	-	-	-	-	2.8	-	-	-
935	Hilsa shad(salted)	Nona Ilish	-	-	-	-	-	-	-	-	-	-	-	-
936	Stripled gourami (deboned)	Khalisha	-	-	-	-	-	-	-	-	-	-	-	-
937	Spotted snake head/lata fish	Lota	-	-	-	-	-	-	-	-	1	-	-	-
938	Walking cat fish	Magur	11	20	-	-	-	-	-	-	-	-	-	-
939	Walking cat fish(dried)	Magur(shukna)	-	20	-	-	-	-	-	-	-	-	-	-
940	Sunfish/mola/pale carplet (bony)	Mola	-	-	-	-	-	-	-	-	-	-	-	-
941	Mrigal carp	Mrigale/nilotika	-	-	-	-	-	-	-	-	0.7	-	-	-
942	Mullet	Aine	-	-	-	-	-	-	-	-	2.6	-	-	-
943	Parshee fish (dried)	Parshee (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
944	Parshee fish (fresh)	Parshee (taza)	6	-	-	-	-	-	-	-	0.8	-	-	-
945	Pata fish/ovale sole (dried)	Pata mach (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
946	Pomfret (black, bony,taza)	Chanda (kalo)	-	-	-	-	-	-	-	-	-	-	-	-
946.a	Pomfret (black,dry)	Chanda (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
947	Pomfret (white)	Rupchanda (shada)	-	-	-	-	-	-	-	0.15	2.6	-	-	-
948	Pomfret (small)	Chanda (choto)	-	-	-	-	-	-	-	-	-	-	-	-
949	Small prawns whole (dried)	Goora chingree (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
950	Prawn (dry)	Chingree shutkee	-	-	-	-	-	-	-	-	-	-	-	-
951	Pumplate (sea fish)	Pumplate	-	-	-	-	-	-	-	-	-	-	-	-
952	Ribbon fish	Rupa patia	-	-	-	-	-	-	-	-	2.8	-	-	-
953	Ribbon fish (dried)	Rupa patia (shukna)	-	-	-	-	-	-	-	-	-	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
954	Carp/rohu	Ruhi/ruee	22	-	-	-	-	-	0.05	0.07	0.7	-	-	-
955	Salmon/silond cat fish	Dhain boro shilong	19	-	-	-	-	-	-	-	-	-	-	-
956	Sarputi/barb olive	Shorpunti/sorna punti	14	-	-	-	-	-	-	-	-	-	-	-
957	Scorpion fish/stinging cat fish (deboned)	Shingi/jiol	9	-	-	-	-	-	-	-	0.8	-	-	-
958	Shark/milk shark	Hangor	-	-	-	-	-	-	-	-	2.5	-	-	-
959	Shrimp	Chingree	-	5	-	-	-	-	0.01	0.01	-	-	-	-
960	Silver fish	Bashpata	-	-	-	-	-	-	-	-	-	-	-	-
961	Snake head murrel/sole (deboned)	Shole	9	-	-	-	-	-	-	-	0.5	-	-	-
962	Tapse /paradise thread fin(dried)	Taposhee (shukna)	19	-	-	-	-	-	-	-	-	-	-	-
963	Tengra/striped dwarf cat fish (fresh,deboned)	Tengra (taza)	18	-	-	-	-	-	-	-	-	-	-	-
964	Tengra/striped dwarf cat fish (dry)	Tengra (shukna)	18	-	-	-	-	-	-	-	-	-	-	-
965	White fish/stripled gourami (dry)	Khoira (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
966	White fish/stripled gourami (fresh)	Khoira (taza)	-	-	-	-	-	-	-	-	0.5	-	-	-
967	Tilapia/mozambique telapia	Tilapia	-	-	-	-	-	-	-	-	-	-	-	-
968	Pama croaker/poa fish	Poa mach	-	-	-	-	-	-	-	-	-	-	-	-
969	Ganges river sprat (sweet water,fresh, bony)	Kachki mach (taza)	-	-	-	-	-	-	-	-	-	-	-	-
970	Ganges river sprat (sweet water,dry)	Kechki (sweet water, shukna)	-	-	-	-	-	-	-	-	-	-	-	-
971	Yellow tail mullet (marine, dry)	Kechki (marine,shukna))	-	-	-	-	-	-	-	-	-	-	-	-
972	Silver carp	Silver carp	-	-	-	-	-	-	-	-	-	-	-	-
973	Spotted snake head	Taki	-	-	-	-	-	-	-	-	-	-	-	-
974	Chapila/ indian river shad (fresh,bony)	Chapila (taza)	-	-	-	-	-	-	-	-	-	-	-	-
975	Chapila/ indian river shad (dry,bony)	Chapila (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
976	Golden/red snapper	Ranga choikha	-	-	-	-	-	-	-	-	-	-	-	-
977	White grunter	Sada datina	-	-	-	-	-	-	-	-	-	-	-	-
978	Hard tail torpedo trevally	Kauwa	-	-	-	-	-	-	-	-	-	-	-	-
979	Tripple tail	Samundra koi	-	-	-	-	-	-	-	-	-	-	-	-
980	Mottlet nandus/mud perch (deboned)	Meni/bheda/roina	-	-	-	-	-	-	-	-	-	-	-	-
981	Skipjack	Tuna	-	-	-	-	-	-	-	-	-	-	-	-
982	Boggut labeo	Ghainna	-	-	-	-	-	-	-	-	-	-	-	-
983	Rita	Rita	-	-	-	-	-	-	-	-	-	-	-	-
984	Small head hair tail/ribbon fish (dry)	Churi (shukna)	-	-	-	-	-	-	-	-	-	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
985	Russell's smooth-back herring (dry)	Fatra (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
986	Indian potasi (bony)	Batashi (taza)	-	-	-	-	-	-	-	-	-	-	-	-
987	Cotio (bony)	Dhela (taza)	-	-	-	-	-	-	-	-	-	-	-	-
988	Peppered loach/guntea loach (bony)	Gutum (taza)	-	-	-	-	-	-	-	-	-	-	-	-
989	Jamuna ailia (fresh, bony)	Kajuli (taza)	-	-	-	-	-	-	-	-	-	-	-	-
990	Freshwater gar fish/needle fish (fresh, bony)	Kakya/kakila (taza)	-	-	-	-	-	-	-	-	-	-	-	-
991	Large razor belly minnow (fresh, bony)	Katari (taza)	-	-	-	-	-	-	-	-	-	-	-	-
992	Giant snake head	Gajar/gajal (taza)	-	-	-	-	-	-	-	-	-	-	-	-
993	Giant river/fresh water prawn(fresh, deboned)	Boro/golda chingri (taza)	-	-	-	-	-	-	-	-	-	-	-	-
994	Reba (fresh, deboned)	Tatkani (taza)	-	-	-	-	-	-	-	-	-	-	-	-
995	Yellow shrimp (fresh, deboned)	Chingri (marine/kucho/nona) (taza)	-	-	-	-	-	-	-	-	-	-	-	-
996	Yellow shrimp (fresh, bony)	Chingri (marine/kucho/nona) (taza)	-	-	-	-	-	-	-	-	-	-	-	-
997	Yellow shrimp	Chingri(marine/kucho/nona) (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
998	Kucha	Kuicha (taza)	-	-	-	-	-	-	-	-	-	-	-	-
1000	**Meat**	**Mangshaw**												
1001	Beef	Gorur mangshaw	2	-	-	-	-	-	0.15	0.04	6.4	-	-	-
1002	Beef (buffalo)	Mohisher mangshaw	-	1	-	-	-	-	-	-	-	-	7.8	-
1003	Chicken (deshi)	Murgir mangshaw (deshi)		145	-	-	-	-	-	0.14	-	-	6.8	-
1004	Duck	Hasher mangshaw	-	-	-	-	-	-	-	-	-	-	-	-
1005	Goat	Khashir mangshaw	-	-	-	-	-	-	-	-	-	-	4.5	-
1006	Liver (goat)	Khashir koliza	-	3030	-	-	-	-	-	-	-	-	176.2	-
1007	Liver (mutton)	Verar koliza	20	1830	-	-	-	-	0.36	1.7	17.6	-	188	-
1008	Mutton (lamb)	Verar mangshaw	-	6	-	-	-	-	0.18	0.14	6.8	-	5.8	-
1009	Pigeon	Kobutorer mangshaw	-	-	-	-	-	-	-	-	-	-	-	-
1010	Pork*	Shukorer mangshaw		-	-	-	-	-	0.54	0.09	2.8	-	-	-
1011	Snails (small)	Shamuk (choto)	-	-	-	-	-	-	-	-	-	-	-	-
1012	Snails (large)	Shamuk (baro)	-	-	-	-	-	-	-	-	-	-	-	-
1013	Turtle	Kochchop/jagol	-	-	-	-	-	-	-	-	-	-	-	-
1014	Chicken (farm)	Murgir mangshaw (farm)		-	-	-	-	-	-	-	-	-	-	-
1015	Yeast dried (brewer's)	Yeast	-	-	-	-	-	-	-	-	-	-	-	-
1016	Yeast dried (food)	Yeast	-	-	-	-	-	-	-	-	-	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1100	**Eggs**	**Dim**												
1101	Duck egg	Hasher dim	-	540	-	-	-	-	0.12	0.26	0.2	-	80	-
1102	Hen egg (deshi)	Murgir dim (deshi)	-	600	-	-	-	-	0.1	0.4	0.1	-	78.3	-
1103	Hen egg (farm)	Murgir dim (farm)	-	-	-	-	-	-	-	-	-	-	-	-
1104	Turtle egg	Kocchoper dim	-	-	-	-	-	-	-	-	-	-	-	-
1200	**Milk & milk products**	**Dugdho-dugdha jatio khabar**												
1201	Buffalo milk solids	Mohisher dudher sana	-	-	-	-	-	-	-	-	-	-	-	-
1202	Butter milk	Ghole	-	-	-	-	-	-	-	-	-	-	-	-
1203	Cheese	Panir	-	160	-	-	-	-	-	-	-	-	-	-
1204	Cow milk solids	Gorur dudher sana	3	-	-	-	-	-	0.07	0.02	-	-	-	-
1205	Curd	Doi	1	-	-	-	-	-	0.05	0.16	0.1	-	12.5	-
1206	Human/breast milk	Mayer dudh	3	30	-	-	-	-	0.02	0.02	-	-	-	-
1207	Milk (condensed)	Kheer	3	32	-	-	-	-	0.12	0.35	-	-	-	-
1208	Powdered milk (skim, cow)	Makhon tola gura dudh	5	-	-	-	-	-	0.45	1.64	1	-	-	-
1209	Powdered milk (whole, cow)	Gura dudh	4	205	-	-	-	-	0.31	1.36	0.8	-	-	-
1210	Skim milk (liquid)	Makhon tola dudh (tar)	1	-	-	-	-	-	-	-	0.1	-	-	-
1211	Whole milk (buffalo)	Mohisher dudh	1	30	-	-	-	-	0.04	0.3	0.1	-	5.6	-
1212	Whole milk (cow)	Gorur dudh	2	20	-	-	-	-	0.05	0.19	0.1	-	8.5	-
1213	Whole milk (goat)	Sagoler dudh	1	20	-	-	-	-	0.05	0.04	0.3	-	1.3	-
1214	Yogurt (buffalo)	Khoya (mohisher dudh)	-	-	-	-	-	-	-	-	-	-	-	-
1215	Yogurt (buffalo, skim)	Khoya (makhon tola)	-	-	-	-	-	-	-	-	-	-	-	-
1216	Yogurt (cow)	Khoya (gorur dudh)	6	-	-	-	-	-	0.23	0.41	0.4	-	-	-
1300	**Fats & edible oils**	**Toilo**												
1301	Butter (us imported)	Makhon	-	190	-	-	-	-	-	-	-	-	-	-
1302	Cooking oil (groundnut, gingelly,musturd)	Toilo	-	-	-	-	-	-	-	-	-	-	-	-
1303	Fish liver oil	Mach koliza toilo	-	-	-	-	-	-	-	-	-	-	-	-
1304	Ghee (buffalo)	Ghee (mohisher)	-	-	-	-	-	-	-	-	-	-	-	-
1305	Ghee (cow)	Ghee (gorur)	-	-	-	-	-	-	-	-	-	-	-	-
1306	Ghee (vegetable)	Bonoshpati	-	-	-	-	-	-	-	-	-	-	-	-
1400	**Miscellaneous**	**Bibidha**												
1401	Areca/betel nut	Shuparee	-	3	-	-	-	-	-	-	-	-	-	-

Table 6B-2: Vitamins and antinutrient composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Vitamin-C	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene	Thiamine (B1)	Riboflavin (B2)	Vitamin-B3	Vitamin-B6	Total Folic acid	Phytic Acid
			mg	µg	µg	µg	µg	µg	mg	mg	mg	mg	µg	mg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1402	Betel leaves	Pan pata	5	5760	-	-	-	-	0.07	0.03	0.7	-	-	-
1403	Biscuit (salted)	Nonta biskut	-	-	-	-	-	-	-	-	-	-	-	-
1404	Biscuit (sweet)	Mishti biskut	-	-	-	-	-	-	-	-	-	-	-	-
1405	Bread (brown)	Ruti (badamee)	-	-	-	-	-	-	0.21	-	-	-	-	-
1406	Bread (loaf)	Pauruti	-	-	-	-	-	-	0.21	-	-	-	-	-
1407	Bread (white)	Ruti (shada)	0	-	-	-	-	-	0.07	-	-	-	-	-
1408	Coconut milk	Narikeler dudh	3	-	-	-	-	-	0.08	0.04	0.6	-	-	-
1409	Date juice	Khejur rash	-	-	-	-	-	-	-	-	-	-	-	-
1410	Honey	Modhu	4	-	-	-	-	-	-	0.04	-	-	-	-
1411	Jackfruit seed	Kathaler bichi	11	10	-	-	-	-	0.25	0.11	-	-	-	-
1412	Lotus seed (dry)	Khoyare	-	-	-	-	-	-	-	-	-	-	-	-
1413	Lotus seed (ripe)	Poddo gota (shukna)	-	-	-	-	-	-	-	-	-	-	-	-
1414	Lotus seed (green)	Poddo gota (poripokko sobuj)	-	-	-	-	-	-	-	-	-	-	-	-
1415	Mahua flower	Mohua ful	7	23	-	-	-	-	0.03	0.88	-	-	-	-
1416	Makhana	Makhana	-	-	-	-	-	-	-	-	-	-	-	-
1417	Molasses	Akher gur	-	168	-	-	-	-	-	-	-	-	-	-
1418	Molasses (date)	Khejur gur	-	-	-	-	-	-	-	-	-	-	-	-
1419	Oil cakes (ground nut)	Khoil (china badamer)	-	-	-	-	-	-	-	-	-	-	-	-
1420	Pappadom	Papor	0	-	-	-	-	-	-	-	-	-	-	-
1421	Pickles	Amchur	41	-	-	-	-	-	-	-	-	-	-	-
1422	Poppy seed	Posto dana	-	-	-	-	-	-	-	-	-	-	-	-
1423	Pumpkin/sweet gourd seed	Kumrar bichi	1	38	-	-	-	-	0.3	0.16	-	-	-	-
1424	Sago	Shabu	-	-	-	-	-	-	0.01	-	-	-	-	-
1425	Sugar	Chini	-	-	-	-	-	-	-	-	-	-	-	-
1426	Sugar candy	Misri	-	-	-	-	-	-	-	-	-	-	-	-
1427	Sugarcane juice	Akher rosh	0	-	-	-	-	-	0.04	-	-	-	-	-
1428	Tamarind seed (dried)	Tetuler bichir sas	-	-	-	-	-	-	-	-	-	-	-	-
1429	Toddy (fermented)	Tari	-	-	-	-	-	-	-	0.04	-	-	-	-
1430	Water chestnut	Pani fol	15	-	-	-	-	-	0.18	0.05	-	-	-	-
1431	Water chestnut (dry)	Pani phal (shukna)	-	-	-	-	-	-	-	-	-	-	-	-

In tables (6B-1 – 6B-3), data those are not analyzed by our research team, are pulled from:

a. HKI 1988. Tables of Nutrient Composition of Bangladeshi Foods, Helen Keller International (HKI), INFS/WFP, Dhaka, Bangladesh
b. Gopalan C, Sastri R, Balasubramanian, SC, 2004. Nutritive value of Indian foods, National Institute of Nutrition, Indian Council of Medical Research; Hyderbad: India.
c. Unpublished thesis papers of students of INFS, University of Dhaka and Jahangirnagar University. (Reference; 50-60)

Detail information on sources of pulled data is given In Explanatory Note and in Reference (50-60).

Table 6B-3: Mineral composition of food items

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
100	Cereals	Shasswo [illegible] khabar									
101	Barley(whole)	Jaab	1190	1200	3	1030	26	21	-	-	215
102	Maize/corn (immature)	Bhutta (kochi)	-	-	1.1	-	9	40	51.7	151	121
103	Maize / corn (mature)	Bhutta (paka)	430.21	400.9	1.31	552.97	17	176.76	13.79	248.4	281.99
104	Millet (french)	Cheena/bhuiro	-	-	5	-	14	-	-	-	-
105	Millet(pearl)	Bajra	1060	3100	13.3	1150	42	137	-	307	296
106	Rice(fried paddy)	Khoi	-	-	6.6	-	23	-	-	-	-
107	Rice husk/bran	Chaler kura	-	-	35	-	67	-	-	-	1410
108	Rice parboiled(husked)	Shiddho chal(dheki chata)	240	1400	2.8	1100	10	157	-	-	280
109	Rice parboild (brri-29)(milled)	Sidhoy chal(cole chata)	510	310.3	0.99	612.45	12.75	42.72	10.97	109.89	125.96
110	Rice sunned (husked)	Atop chal(dheki chata)	-	-	3.2	-	10	-	-	-	190
111	Rice sunned (milled)	Atap chal(cole chata)	490.13	740.5	0.91	592.27	11.67	43.29	5.43	108.62	140.67
112	Rice(flattened)	Chira	370	-	20	-	20	101	10.9	154	238
113	Rice(puffed)	Moori	-	-	6.6	-	23	-	-	-	150
114	Semolina	Suzi	-	-	1.6	-	16	-	-	-	-
115	Sorghum	Jowar	460	1600	5.8	780	25	171	7.3	131	222
116	Vermicelli	Shemai	1000	3700	2	680	22	133	8.1	129	220
117	Wheat (whole)	Gaam	680	2700	4.9	2290	41	138	17.1	284	306
118	Wheat flour (coarse)	Atta	510	2200	11.5	2290	48	132	20	315	355
119	Wheat flour (refined)	Maida	210	600	2.5	620	23	54	9.3	130	121
120	Ragi	Madua	470	2300	3.9	5490	344	137	11	408	283
121	Wheat germ	Wheat germ	-	-	6	-	40	-	-	-	846
122	Oatmeal	Jai phal	-	-	3.8	-	50	-	-	-	380
200	Pulses & legumes	Dal [illegible] khabar									
201	Bean (field,dry)	Shimer bichi	-	-	2.7	-	60	-	-	-	433
202	Bengal gram (whole)	Chola	1180	6100	10.2	1210	202	119	37.3	808	321
203	Bengal gram (split)	Cholar dal	1340	1700	9.1	1050	56	130	73.2	720	331
204	Bengal gram (fried)	Chola bhaja	-	-	9.5	-	58	-	-	-	340
205	Black gram (split)	Mashkalai dal	930	3000	9.1	960	154	130	39.8	800	385
206	Green gram (whole)	Mug (asta)	390	3000	7.3	2470	124	127	28	843	326
207	Green gram (split)	Mug dal	390	2800	8.5	1020	75	122	27.2	1150	405

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
208	Khesari dal	Khesari dal	770	-	6.3	-	90	92	37.7	644	317
209	Lentils (deshi)	Mashur dal	1620.91	4166	6.13	987.8	66.12	104.2	33.15	561.18	313.26
210	Peas dried (split)	Matar(shukna)/dal	1290	2300	5.1	-	75	-	-	-	-
211	Peas fried	Matar bhaja	1320	-	6.4	-	81	-	-	-	-
212	Red gram /rahar (split)	Arohor dal	1200	900	5.8	690	73	90	28.5	1104	304
213	Soyabean	Garikalai	1380	4400	11.5	2350	240	238	-	-	690
214	Horse gram	Kulthi kalai	1810	2800	6.77	1570	287	156	11.5	762	311
215	Moth beans	Mut/kheri	850	-	9.5	-	202	225	29.5	1096	230
216	Rajmah	Rajmah	1450	4500	5.1	1600	260	184	-	-	410
300	**Leafy vegetables**	**Shak pata**									
301	Agathi	Bauk ful shak	-	-	3.9	-	1130	-	-	-	80
302	Spleen amaranth	Data shak	87.55	977.3	28.9	4206	104.89	25.74	78.53	261.78	34.9
303	Amaranth leaves (tender)	Naute shak	80	180	3.49	360	397	122	230	341	83
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	444.03	1129	2.37	4995	241	27.94	83.26	277.52	41.63
305	Amaranth (spiney)	Kanta naute	-	-	22.9	-	800	-	-	-	50
306	Bathua leaves	Bathua/ beto shak	-	-	4.2	-	150	-	-	-	80
307	Beet leaves	Beet shak	-	-	16.2	-	380	-	-	-	30
308	Bottle gourd leaves	Lau shak	157.71	659.5	2.11	243.7	85.66	18.49	35.84	222.22	26.89
309	Cabbage	Badha kopi	20	300	0.8	180	39	31	-	-	44
310	Carrot leaves	Gazor shak	-	-	8.8	-	340	-	-	-	110
311	Cauliflower leaves	Ful kopi shak	-		40		626				107
312	Celery leaves	Randhuni shak	300	-	6.3	-	230	52	35.5	210	140
313	Chukai leaves	Chukai shak	-	-	-	-	56	-	-	-	-
314	Coriander leaves	Dhane shak	1233.48	1586	4.98	462.6	113.33	28.19	121.15	396.48	30.29
315	Cow pea leaves	Borboti pata	-	-	20.1	-	290	-	-	-	58
316	Drumstick leaves	Shazna shak	70	160	7	370	440	42	-	259	70
317	Fenugreek leaves	Methi shak	100	360	16.5	230	395	33	76.1	31	51
318	Folwal leaves	Potol pata	-	-	-	-	531	-	-	-	-
319	Gram leaves	Chola shak	-	-	23.8	-	340	-	-	-	-
320	Helencha leaves	Helencha	-	-	-	-	31	-	-	-	-

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
321	Indian spinach	Pui shak	49.29	431.3	0.99	739.4	55.14	19.1	104.74	110.91	18.48
322	Jute leaves	Pat shak	20.99	1469	9.72	1619	132.98	41.83	59.97	224.89	59.97
323	Kheshari leaves	Khesharee shak	-	-	7.3	-	160	-	-	-	100
324	Swamp morning-glory	Kalmi shak	2010.74	767.5	1.09	414.4	34.08	16.42	107.44	207.21	36.45
325	Lettuce	Letuce/salad pata	80	-	2.4	-	50	30	58	33	28
326	Mesta leaves	Mesta pata	-	-	5	-	172	-	-	-	-
327	Mustard leaves	Sharisha shak	-	-	16.3	-	155	-	-	-	26
328	Neem leaves (green)	Nim pata (kochi)	600	-	25.3	-	130	127	72.2	254	190
329	Neem leaves yellow (ripe)	Nim pata (paka))	-	-	17.1	-	510	-	-	-	80
330	Potato leaves	Gool aloo shak	-	-	-	-	120	-	-	-	50
331	Spearmint/mint leaves	Pudina pata	183.97	1761	3.97	289.1	110.12	33.25	78.84	354.8	36.14
332	Pumpkin leaves	Mishti kumra shak	-	-	-	-	40	-	-	-	112
333	Punornova leaves	Punornova shak	-	-	18.4	-	667	-	-	-	-
334	Radish leaves	Mula pata	89.34	457.9	0.9	89.34	83.92	14.13	83.75	223.34	22.33
335	Safflower leaves	Kushum shak	220	-	5.7	-	185	51	126.4	181	35
336	Soyabean leaves	Gourikalai pata	-	-	8	-	180	-	-	-	190
337	Spinach	Palong shak	60.24	512	1.57	1431	77	22.36	248.49	173.19	24.47
338	Spinach sour	Tak palong shak	-	-	8.7	-	79	-	-	-	-
339	Sweet potato leaves	Mishti aloo shak	-	-	10	-	360	-	-	-	60
340	Tamarind leaves (green)	Tetul pata (kochi)	20	260	5.2	120	101	26	-	-	140
341	Tamarind leaves (dry)	Tetul pata (shukna)	-	-	-	-	1485	-	-	-	-
342	Taro/arum leaves (dried)	Kochu shak (shukna)	-	-	-	-	1546	-	-	-	308
343	Taro black arum leaves	Kalo kochu shak	180	-	38.7	-	460	32	-	-	125
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	226.74	684.5	10.47	1155	124	26.1	53.48	374.33	42.78
345	Thankuni leaves	Thankuni pata	508.17	2432	3.7	2250	140	50.09	199.64	508.17	45.37
346	Turnip leaves	Shalgom pata	-	-	28.4	-	710	-	-	-	-
347	Celery stalks	Randhuni	-	-	4.8	-	30	-	-	-	38
348	Curry leaves	Barsanga/curry pata	100	200	0.93	150	830	44	-	-	57
349	Ipomoea stems	Koimi danta	-	-	0.8	-	80	-	-	-	30
350	Kuppameni	Mukta jhuri	-	-	17.3	-	667	-	-	-	99

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
351	Susni sag	Susni sag	-	-	-	-	53	-	-	-	91
352	Bitter gourd*	Karola pata*	66.45	865.95	1.35	99.92	170.94	22.9	66.61	258.12	22.9
353	Not known*	Sabarang*	1159.09	522.62	2.82	1659.09	49.34	-	0.4	268.18	52.27
354	Roselle*	Amila pata*	1026.61	513.31	3.95	2737.64	30.57	0.49	0.31	144.5	38.02
355	Not known*	Lemon pata*	1396.57	1554.67	3.85	4295.13	35.84	-	0.45	376.81	44.79
356	Indian ivy-rue*	Baruna shak*	312.53	312.45	4.38	12946.4	84.82	-	0.67	348.21	44.79
357	Not known*	Ojan shak*	351.26	461.03	2.63	2678.38	26.23	-	0.46	338.08	50.58
358	Not known*	Ghanda batali*	305.02	135.59	3.42	4779.66	64.51	0.07	0.51	298.31	40.85
359	Not known*	Orai balai*	253.69	1818.19	3.55	175.48	54.41	0.13	0.88	600.42	43.65
360	Purslane*	Bat slai*	215.77	414.94	2.72	2356.86	20.28	8.3	0.5	285.47	24.34
361	Yellow saraca*	Maytraba*	251.57	1006.29	1.43	1299.79	39.83	2.64	0.71	469.6	109.94
362	Mollugo*	Dimey pata*	-	-	-	-	-	-	-	-	-
363	Wild coriander*	Maisa pagoh*	-	-	-	-	-	-	-	-	-
364	Kassava*	Simei alu pata*	-	-	-	-	-	-	-	-	-
365	Not known*	Kongulo aga/ taokharong bochouk*	-	-	-	-	-	-	-	-	-
366	Not known*	Sineiye sak*	-	-	-	-	-	-	-	-	-
367	Blue commelina/Venus bath*	Bat baitta sak*	-	-	-	-	-	-	-	-	-
368	Edible fern*	Moikhumu bochouk/ dheki sak*	-	-	-	-	-	-	-	-	-
369	Lawn marshpenny wort*	Sakumu bakla/thankuni*	-	-	-	-	-	-	-	-	-
370	Not known*	Taolingashku*	-	-	-	-	-	-	-	-	-
400	**Roots & tubers**	**Mull [illegible] khabar**									
401	Beet root	Beet	290	910	1	190	15	9	59.8	43	55
402	Carrot	Gajor	53.72	327.39	0.64	3.82	0.23	5.03	68.26	87.46	292
403	Garlic	Rashon	630	1930	1.3	860	30	71	-	-	310
404	Ground potato	Mete aloo	-	-	1	-	20	-	-	-	-
405	Ole kopi	Ole kopi	-	-	0.4	-	25	-	-	-	-
406	Onion	Peyaj	180	410	0.7	180	47	16	4	127	55
407	Potato	Gole aloo	290	790	0.4	10.43	9.38	41.96	10.42	403.61	43.3
408	Radish	Mula	400	-	0.5	-	10	-	33	138	22

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromlcerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
409	Sweet potato (red)	Misti aloo	100	170	0.25	12.31	47.09	33.59	10.85	304	38.2
410	Taro/arum	Kachu	-	-	1.7	-	40	-	-	-	-
411	Taro/arum tubers	Kachu mukhee/chora	-	-	-	-	22	-	-	-	-
412	Turnip	Shalgom	-	-	0.4	-	24	-	-	-	40
413	Yam (elephant)	Ole kachu	-	-	0.6	-	50	-	-	-	34
414	Yam (wild)	Bonn aloo	160	-	1	-	20	34	11	450	74
415	Moor sanga	Palasa	-	-	-	-	25	-	-	-	21
416	Water lily (red)	Lal shapla	-	-	-	-	65	-	-	-	217
500	Non- [illegible] bles	[illegible]									
501	Amaranth (data) stem	Data	-	-	1.8	-	260	-	-	-	30
502	Egg plant	Begun/brinjal	184.09	197.24	0.29	65.75	21	11.51	32.87	157.79	19.72
503	Bean	Shim	100	400	2.6	120	28	17	55.4	74	160
504	Bean (broad)	Makhon shim	170	-	1.4	-	50	33	43.5	39	64
505	Bean (french)	Forashee shim	60	420	1.7	120	50	38	4.3	120	28
506	Bean (immature)	Shim (kochi)	-	-	1.7	-	210	-	-	-	-
507	Bean (red)	Lal shim	-	-	1.5	-	54	-	-	-	-
508	Cabbage	Badha kopi	-	-	0.8	-	31	-	-	-	44
509	Cauliflower	Ful kopi	130	400	1.5	100	41	18	53	138	57
510	Green chilli	Kacha marich	1832.06	1190.84	4.49	183.21	12.21	27.94	76.34	274.81	38.17
511	Cow pea	Borboti	870	4600	5.9	1340	33	210	23.2	1131	59
512	Cucumber	Shosha	90	230	1.5	140	14	14	10.2	50	25
513	Drumstick/horse raddish	Sazna data	10	160	5.3	50	21	28	-	259	110
514	Drumstick flower	Sazna ful	-	-	-	-	51	-	-	-	90
515	Fig(red)	Dumur (lal)	-	-	-	-	187	-	-	-	39
516	Folwal	Potol	70.39	239.44	0.31	84.51	17.32	15	28.17	147.89	17.61
517	Gourd (ash)	Chal kumra	-	-	0.8	-	30	-	-	-	20
518	Gourd (bitter)	Korola	182.04	388.35	0.4	254.85	10.92	14.32	36.41	182.04	19.72
519	Gourd (bottle)	Lau	30	220	0.7	60	26	26	1.8	87	10
520	Gourd (ridge)	Jhinga	80	380	0.5	70	16	32	2.9	50	26

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
521	Gourd (small bitter)	Uchche	-	-	2	-	23	-	-	-	38
522	Gourd (snake)	Chichinga	270	310	0.3	140	26	28	25.4	34	20
523	Gourd (sweet) pumpkin	Misti kumra	40.03	306.87	0.4	13	13.74	3.54	26.68	120.08	13.34
524	Gram (red,unripe)	Arohor (kacha)	400	-	1.1	-	57	58	93	463	164
525	Jackfruit (immature)	Aanchor/kacha	-	-	1.7	-	30	-	35	328	40
526	Kakrol	Kakrol	2401.66	476.19	0.54	62.11	9.83	19.57	51.76	186.34	25.88
527	Kolmee	Kolmee data	-	-	0.8	-	80	-	-	-	30
528	Lady's finger/okra	Dherosh	103.93	430.59	0.28	29.7	86	19.67	37.12	178.17	27.84
529	Mango (green/immature)	Kacha am	30	70	5.4	70	10	16	43	83	19
530	Marrow	Dhundul	220	-	0.6	-	19	13	27.3	94	30
531	Onion & garlic stalk	Peyaj o rashun dagapata	450	2290	7.5	740	50	104	2.2	109	50
532	Papaya (green/immature)	Kacha pepe	24.59	258.14	0.42	9.83	17.76	13.09	43.02	129.07	15.37
533	Peas (green)	Motor shooti	-	-	1.5	-	26	-	-		139
534	Plantain	Kacha kola	30	50	0.6	300	11	13	15	193	29
535	Plantain flower	Kolar mocha	100	-	1.6	-	32	54	20.1	185	42
536	Plantain stem	Kolar thore	-	-	1.1	-	10	-	-	-	10
537	Pumpkin flower	Mishti kumra ful	-	-	1.2	-	120	-	-	-	60
538	Spinach stalks	Palong data	-	-	-	-	76	-	-	-	20
539	Tomato (green)	Tomato (kacha)	190	-	1.8	-	20	15	45.8	114	36
540	Water lily stem (red)	Shapla (lal)	-	-	-	-	65	-	-	-	217
541	Water lily stem (white)	Shapla (shada)	-	-	-	-	76	-	-	-	220
542	Yam stem	Kochu data/lati	-	-	0.5	-	60	-	-	-	-
543	Colocasia stem	Kochu danta	-	-	0.5	-	60	-	-	-	20
544	Karonda (fresh)	Karamcha (kancha)	-	-	-	-	21	-	-	-	28
545	Karonda (dry)	Karamcha (shukna)	-	-	39.1	-	160	-	-	-	60
546	Kovai	Telakochu	70	260	0.38	220	40	36	-	-	30
547	Lokooch	Dephal/dahua/dewa	-	-	-	-	67	-	-	-	25
548	Leeks	Piyaj (bilati)	-	-	2.3	-	50	-	-	-	70
549	Lotus stem (dry)	Padma data	1220	-	60.6	-	405	168	438	3007	128
550	Sundakai	Titbalgun	-	-	22.2	-	390	-	-	-	180

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromlcerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
551	Sword beans	Kath shim	-	-	2	-	60	-	29	1800	40
552	Chaltha	Chalta	-	-	-	-	16	-	-	-	26
553	Lotus seeds (green)	Padma bij	-	-	-	-	49	-	-	-	151
554	Mashroom	Mashroom	-	-	1.5	-	6	-	-	-	110
555	Sea weed (fresh)	Sea weed	-	-	7	-	134	-	-	-	10
556	Sea weed (dry)	Sea weed	-	-	-	-	1543	-	-	-	114
557	Silk cotton flowers	Simul phul	-	-	-	-	22	-	-	-	45
558	Water lily flower	Shapla phul	-	-	-	-	29	-	-	-	18
559	Pea eggplant*	Mistti begun*	305.35	122.14	0.21	549.62	26.81	0.65	0.4	277.86	63.05
560	Solanum*	Tak begun*	345.57	302.38	1.86	734.34	19.27	4.49	0.52	336.96	69.83
561	Sigon data*	Sigon data*	91.22	224.56	0.2	1340.35	1.64	0.49	0.2	147.32	19.48
562	Yam*	Pan/jhum alu*	1152.54	338.98	1.08	610.17	1.89	17.09	0.78	352.54	34.9
563	Banchalta*	Banchalta*	447.28	575.08	0.66	1853.04	15.98	0.64	0.47	287.54	40.72
564	Fekong*	Fekong*	89.53	131.3	0.54	1020.6	1.48	33	0.21	134.89	19.22
565	Not known*	Gachh oal*	-	-	-	-	-	-	-	-	-
566	Not known*	Idurer kaan*	-	-	-	-	-	-	-	-	-
567	Red silk/ cotton tree*	Shimul ful*	-	-	-	-	-	-	-	-	-
568	Not known*	Seng e tur/ seng e /thorai*	-	-	-	-	-	-	-	-	-
569	Not known*	Betagi*	-	-	-	-	-	-	-	-	-
570	Not known*	Seon sak / gandri*	-	-	-	-	-	-	-	-	-
571	Berry bamboo*	Bas koral*	-	-	-	-	-	-	-	-	-
572	Not known*	Maira bokong*	-	-	-	-	-	-	-	-	-
573	Not known*	Laigrao bokong*	-	-	-	-	-	-	-	-	-
600	**Oil seeds**	**Toilo**									
601	Cashew nuts	Hizlee badam / kaju badam	1660	5990	5	1420	50	349	-	-	450
602	Chilgoza (nut)	Chilgoza	-	-	3.6	-	91	-	-	-	494
603	Coconut (dry)	Narikale (shukna)	1000	5000	2.7	6240	40	-	-	-	210
604	Coconut (immature)	Narikale (kacha)	-	-	1.7	-	10	-	-	-	30
605	Ground nut/ pea nut	China badam	900	3900	2.8	1100	90	-	-	-	350
606	Ground nut/ pea nut (fried)	China badam (bhaza)	-	-	3.1	-	77	-	-	-	370

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
607	Linseed	Tishi	-	-	2.7	-	170	-	-	-	370
608	Mustard	Sharisha	830	4800	17.9	2560	490	-	-	-	700
609	Nuts	Badam	-	-	4.5	-	230	-	-	-	-
610	Oils mustrd etc	Toilo	-	-	0	-	0	-	-	-	-
611	Pistachio	Pesta	-	-	7.7	-	140	-	-	-	430
612	Sunflower seeds	Surzomukhir bij	1580	5200	5	1100	280	-	-	-	670
613	Sesame	Til	-	-	10.5	-	1450	-	-	-	-
614	Walnut	Akhrot	1670	2320	4.8	2620	100	302	-	-	380
615	Niger seeds	Ram til	-	-	56.7	-	300	-	-	-	224
616	Piyal seeds	Piyal	860	-	8.5	-	279	373	10.2	436	528
617	Safflower seeds	Kusum bij	1580	5200	4.6	1100	236	-	-	-	823
618	Jangli badam	Jangli badam	820	-	1.7	-	33	274	-	517	415
619	Oysternut	Oysternut	-	-	4.1	-	10	-	-	-	570
620	Roselle seed	Roselle bij	-	-	-	-	300	-	-	-	600
621	Tamarind seed karnel(roasted)	Tetul bijer shash	-	-	-	-	121	-	-	-	237
622	Okra (whole seed)	Dheros	-	-	-	-	-	-	-	-	-
623	Okra (kernal)	Dheros	-	-	-	-	-	-	-	-	-
700	**Spices & condiments**	**Mosholla**									
701	Cardamom	Alachi	470	2810	5	8920	130	173	-	-	160
702	Chilli, red (dry)	Shukna morich	-	-	2.3	-	160	-	14	530	370
703	Cloves (dry)	Lobongo (shukna)	1010	1470	4.9	4750	740	130	-	-	100
704	Coriander seed	Dhonia	1010	3260	17.9	1670	630	239	32	990	393
705	Cumin seed	Zira	710	2660	31	1020	1080	475	126	980	511
706	Fenugreek	Methi	710	3080	14.1	1030	160	124	19	530	370
707	Ginger	Ada	740	1930	2.6	5560	20	405	-	-	60
708	Lemon/lime peel	Lebur khosha	-	-	2.7	-	710	-	-	-	60
709	Mace	Joyotree	1560	1260	12.6	1540	180	213	-	-	100
710	Mixed spices	Mishti mosholla	-	-	31	-	1080	-	-	-	-
711	Mixed spices (hot)	Garam mosholla	-	-	5	-	130	-	-	-	-
712	Nutmeg	Zaiful	710	1220	4.6	1780	120	229	-	-	240

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
713	Omum	Zaoan	960	4520	27.7	3400	1525	141	-	-	443
714	Pepper (black)	Gole morich	1420	1310	16.8	4140	460	171	-	-	198
715	Turmeric	Holud	390	2720	18.6	8380	150	278	-	-	282
716	Arisithippli	Pipul	-	-	13.5	-	460	-	-	-	325
717	Asafoetida	Hing	430	830	39.4	1120	690	80	-	-	50
718	Mango powder	Amchoor	-	-	45.2	-	180	-	-	-	16
719	Nutmeg (rind)	Jai phal	-	-	2	-	40	-	-	-	10
800	[illegible]	Phal									
801	Ambada (hog plum)	Amra	-	-	3.9	-	55	-	-	-	11
802	Amla	Amloki	8146.85	734.27	0.12	104.9	25	8.08	69.93	174.83	13.11
803	Apple	Apel	100	60	1	140	20	7	28	75	14
804	Apricot (boiled)	Khubanee (shiddho)	110	-	2.2	-	20	-	-	430	25
805	Apricot (dried)	Khubanee (shukna)	-	-	4.6	-	110	-	-	-	70
806	Bakul flower	Bakul phul	-	-	-	-	212	-	-	-	-
807	Banana (ripe)	Paka kola	45.92	714.29	1.12	204.08	10	26.28	102.04	255.1	19.13
808	Bilimbi (ripe)	Kamranga	50	-	1.2	-	11	-	-	130	10
809	Blackberry (indian)	Kalo jam	-	-	4.3	-	22	-	-	-	20
810	Boroi (bitter plum)	Boroy	-	-	-	-	11	-	-	-	64
811	Bread fruit	Madar	-	-	0.5	-	40	-	-	-	30
812	Bullock's heart	Nona ata	-	-	0.6	-	10	-	-	-	10
813	Custard apple	Ata phol	-	-	1.5	-	17	-	-	-	-
814	Coconut water	Daber pani	-	-	0.1	-	15	-	-	-	10
815	Dates	Khezur (taza)	50	30	-	30	22	12	-	-	38
816	Dates (dry)	Khezur (shukna)	-	-	7.3	-	63	-	-	-	50
817	Fig (ripe)	Dumur (paka)	-	-	1.1	-	80	-	-	-	30
818	Guava	Peyara	140	160	1.4	140	10	24	5.5	91	28
819	Grapes	Angur	200	100	0.5	110	22	82	-	-	30
820	Jackfruit (ripe)	Paka kathal	30.5	566.45	0.92	261.44	12.64	26.8	87.15	305.01	10.89
821	Kheera	Kheera	-	-	-	-	18	-	-	-	-
822	Kodbele (immature)	Kodbel (kacha)	-	-	-	-	56	-	-	-	-

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
823	Kodbele (ripe)	Kodbel (paka)	-	-	0.6	-	59	-	-	-	-
824	Kusum fruit	Kushum phol	-	-	-	-	15	-	-	-	42
825	Lemon	Kagogee lebu	600	700	0.3	700	90	19	-	270	10
826	Lemon (sweet)	Mishti lebu	110	-	0.7	-	30	-	-	210	20
827	Lichis (deshi)	Lichu	251.63	522.88	1.01	88.35	20.83	5.15	119.21	134.8	15.77
828	Lime	Lebu	-	-	2.3	-	40	-	-	-	20
829	Lime (sweet)	Mushambee	170	-	0.7	-	40	-	-	490	30
830	Mahua (ripe)	Mohua phol	-	-	1.1	-	45	-	-	-	-
831	Mango ripe (deshi)	Paka am	173.23	543.31	1.31	577.43	16.08	152.34	27.9	98.48	7.74
832	Melon (mix)	Bangee/futi	61.87	62.71	0.25	177.97	22	10.2	28.6	27.54	14.64
833	Neem (fruit)	Neem phol	-	-	-	-	25	-	-	-	41
834	Olive (wild)	Jalpai	-	-	3.1	-	22	-	-	-	-
835	Orange	Malta	-	-	1	-	31	-	-	-	-
836	Orange juice	Komolar rosh	-	-	0.7	-	5	-	-	-	9
837	Orange/mandarin	Komola	580	-	0.3	-	22	9	4.5	9.3	20
838	Palm, palmyra (green)	Kochi tal	-	-	0.5	-	43	-	-	-	-
839	Palm (ripe)	Paka tal	4172.93	413.53	1.24	150.37	7.89	13.91	93.98	375.94	14.1
840	Papaya (ripe)	Paka pepe	1431.11	2933.33	0.15	186.67	25	6.62	11.85	133.33	11.02
841	Pears	Nashpatee	400	-	0.5	-	6	7	6.1	96	15
842	Phalsa	Folsha	120	-	3.1	-	129	72	4.4	351	39
843	Pineapple	Anarosh (joldugee)	240	601.48	1.6	671.16	24.82	12	41.81	122.22	6.82
844	Pineapple (wild variety)	Anarosh (deshi)	-	-	1.2	-	18	-	-	-	-
845	Pomegranate juice	Bedanar rosh	-	-	-	-	18	-	-	-	-
846	Pomegranate	Bedana (bichi shoho)	340	820	0.3	770	21	44	0.9	133	70
847	Pommelo (red)	Zambura (lal)	-	-	0.2	-	37	-	-	-	30
848	Rose apple	Jamrul	10	-	0.5	-	10	4	34.1	50	30
849	Tamarind (immature)	Tetul (kacha)	-	-	-	-	24	-	-	-	-
850	Tamarind (pulp)	Tetul (paka)	-	-	10.9	-	170	-	-	-	-
851	Tetul (bilati)	Bilati tetul	-	-	1	-	14	-	-	-	-
852	Tomato (ripe)	Paka tometo	190	410	0.4	260	48	9	12.9	146	20

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
853	Wood apple	Bel	2031.41	432.81	2.23	202.44	59	16.58	6.92	427.57	23.04
854	Water melon	Tarmuz	80.81	176.43	0.5	78.11	13.47	4.01	31.94	58.92	6.36
855	Black berry (deshi)	Kalo jam	116.42	1090.52	1.76	147.3	26.73	11.99	50.57	106.91	11.64
856	Cherries (red)	Cherry phal	80	330	0.57	80	24	27	-	320	25
857	Lichi (bastard)	Ash phal	300	-	0.7	-	10	10	124.9	159	35
858	Melon (musk)	Kharmuj	30	-	1.4	-	32	31	104.6	341	14
859	Peaches	Peach phal	60	-	2.4	-	15	21	2	453	41
860	Persimmon	Gav	-	-	0.3	-	15	-	-	-	10
861	Plum	Alubokhara	130	-	0.6	-	10	147	0.8	247	12
862	Raisins	Kishmish	-	-	7.7	-	87	-	-	-	80
863	Strawberry	Strawberry	-	-	1.8	-	30	-	-	-	30
864	Gab	Gab	-	-	-	-	58	-	-	-	27
865	Monkey jack*	Deuwa*	796.18	3980.89	5.25	549.36	66.68	23.69	79.17	348.33	22.69
866	Burmese grape*	Lotkon*	248.14	903.23	1.49	1091.81	52.11	11.29	7.21	198.51	17.12
867	Wild melon*	Sindera*	32.86	32.87	0.16	49.3	4.27	1.13	0.18	66.74	28.16
868	Not known*	Roshko*	128.58	0.13	0.26	154.04	8.19	5.96	0.39	256.74	39.53
869	Bead tree*	Kusumgulu*	344.05	403.89	1.78	299.18	0.17	2.69	0.31	109.2	14.66
900	Fishes	Mach									
901	Aire fish	Aire	60	-	0.7	-	380	-	-	-	180
902	Bacha fish	Bacha	110	-	0.7	-	520	-	-	-	180
903	Bata fish	Bata (choto)	170	-	1.1	-	790	-	-	-	200
904	Bele fish / tank goby (deboned)	Bele	-	680	0.22	-	34	17.34	172.94	145.68	257.9
905	Bombay duck (dry)	Loittya (shukna)	-	290	1.59	-	125.58	130.36	1014.7	56.58	709.8
906	Botya loach/hora loach	Betrongi mach	-	-	0.8	-	320	-	-	-	-
907	Boga labeo (fresh)	Bhangan(taza)	-	-	1.2	-	182	-	-	-	190
908	Boga labeo (dry)	Bhangan (shukna)	-	-	9.3	-	6235	-	-	-	207
909	Boga labeo (powdered)	Bhangan (bata)	-	-	1.1	-	580	-	-	-	310
910	Barramundi/bhetki (fresh)	Bhetki (taza)	110	40	0.14	-	268	5.62	80.16	241.36	187.47
911	Barramundi/bhetki (dry)	Bhetki (shukna)	-	-	15	-	939	-	-	-	347
912	Boal/wallago/helicopter	Boal	80	-	0.6	-	160	-	-	-	490

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerais				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
913	Blackfish/kalbasu	Kalibaush	-	-	0.8	-	320	-	-	-	310
914	Boicha fish/dwarf red gourami	Boicha	-	-	0	-	175	-	-	-	-
915	Bream/barred mackerel (sea, fresh)	Champa (taza)	-	-	-	-	92	-	-	-	-
916	Bream/barred mackerel (sea, dry)	Champa (shutki)	-	-	-	-	148	-	-	-	-
917	Butter fish/pabo catfish (bony)	Pabda	90	1650	0.41	-	193	16.75	345.74	30.77	283.07
918	Carp/catla	Katol	120	-	0.9	-	530	-	50	151	235
919	Cat fish/tor mahseer	Moha shole	120	-	3.8	-	130	-	-	-	280
920	Chela/large razorbelly minnow (fresh)	Chela (taza)	-	-	2	-	590	-	-	-	340
921	Chela/large razorbelly minnow (dry)	Chela (shukna)	510	-	-	-	3590	-	-	-	2342
922	Climbing/walking fish (deboned)	Koi	160	1390	0.52	-	177	22.16	40.02	184.53	489.16
923	Sartorina crab	Kakra	-	-	21.2	-	1370	-	-	-	150
924	Dragon fish/yellowtail catfish	Pangash	151.7	646.23	1.28	38.62	91	6.05	103.47	169.21	49.9
925	Spiny eel fish (bony)	Bain (bony)	60	610	0.37	-	340.2	12.06	12.33	112.08	160.83
926	Fesha fish/gangetic hairfin anchovy (fresh)	Fesha (taza)	-	690	0.34	-	380	19.77	54.49	106.13	229.74
927	Fesha fish/gangetic hairfin anchovy (dry)	Fesha (shukna)	-	-	18	-	887	-	-	-	-
928	Fishmeal (dry)	Gura (shukna)	-	-	22.6	-	97	-	-	-	-
929	Flat fish/clown knife fish	Chitol	170	-	3	-	180	-	34	119	250
930	Folui/bronze feather back (deboned)	Foli/meni (deboned)	-	580	0.63	-	112	30.2	40.44	154.15	266.49
931	Fry/swamp barb/puti (v. Small fresh,deboned)	Puti (taza)	-	1380	0.71	-	61.08	27.05	25.25	97.61	258.12
931.a	Fry/swamp barb/puti (dry,deboned)	Chapa/ puti (shukna)	-	350	1.3	-	446.21	51.22	799.43	300.55	1005
932	Gahira fish/garua	Gahira mach/ gagra/ghaura	-	-	1	-	650	-	-	-	-
933	Mixed small fish	Gura mach	-	-	0	-	175	-	-	-	-
934	Hilsa shad	Ilish	140	-	2.1	-	180	-	52	183	280
935	Hilsa shad(salted)	Nona Ilish	-	420	2.5	-	207	20.19	1022.8	146.44	508.1
936	Stripled gourami (deboned)	Khalisha	-	930	1.04	-	108	29.28	27.32	182.51	354.81
937	Spotted snake head/lata fish	Lota	-	-	1.3	-	610	-	-	-	530
938	Walking cat fish	Magur	-	-	0.7	-	210	-	58	147	290
939	Walking cat fish(dried)	Magur(shukna)	-	-	22.1	-	1804	-	-	-	-
940	Sunfish/mola/pale carplet (bony)	Mola	2508.31	3431.63	1.34	60.57	165	11.95	110.07	139.79	13.17
941	Mrigal carp	M[illegible]lotika	120	-	1.1	-	350	-	-	-	280

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
942	Mullet	Aine	-	-	4.4	-	357	-	-	-	175
943	Parshee fish (dried)	Parshee (shukna)	-	-	17.4	-	2231	-	-	-	396
944	Parshee fish (fresh)	Parshee (taza)	140	-	2.1	-	1050	-	-	-	490
945	Pata fish/ovale sole (dried)	Pata mach (shukna)	-	-	51.7	-	988	-	-	-	-
946	Pomfret (black, bony,taza)	Chanda (kalo)	-	2140	1.36	-	132	75.54	62.72	154.22	736.08
946.a	Pomfret (black,dry)	Chanda (shukna)	-	2130	5.02	-	564.23	49.36	721.14	436.01	2128.7
947	Pomfret (white)	Rupchanda (shada)	-	-	0.9	-	200	-	-	-	290
948	Pomfret (small)	Chanda (choto)	-	-	7	-	175	-	-	-	-
949	Small prawns whole (dried)	Goora chingree (shukna)	-	-	49.6	-	3847	-	-	-	-
950	Prawn (dry)	Chingree shutkee	-	-	-	-	4384	-	-	-	1160
951	Pumplate (sea fish)	Pumplate	-	-	1.8	-	240	-	-	-	-
952	Ribbon fish	Rupa patla	-	-	13.9	-	214	-	-	-	218
953	Ribbon fish (dried)	Rupa patla (shukna)	-	-	43.7	-	890	-	-	-	700
954	Carp/rohu	Ruhi/ruee	1853.66	1110.73	1.38	30	455	11.82	133.94	238.49	58.1
955	Salmon/silond cat fish	Dhain boro shilong	-	-	1	-	360	-	-	-	-
956	Sarputi/barb olive	Shorpunti/sorna punti	80	-	0.5	-	220	-	-	-	120
957	Scorpion fish/stinging cat fish (deboned)	Shingi/jiol	150	230	0.67	-	208	17.81	34.23	183.37	134.43
958	Shark/milk shark	Hangor	-	-	1.4	-	357	-	-	-	262
959	Shrimp	Chingree	-	-	5.3	-	323	-	-	-	278
960	Silver fish	Bashpata	-	-	-	-	175	-	-	-	225
961	Snake head murrel/sole (deboned)	Shole	110	1080	0.35	-	18.24	20.63	21.87	178.67	136.12
962	Tapse (paradise thread fin (dried)	Tapashee (shukna)	1200	-	41.2	-	1597	-	-	-	595
963	Tengra/striped dwarf cat fish (fresh,deboned)	Tengra (taza)	-	580	0.34	-	36	11.75	11.59	86.62	161.47
964	Tengra/striped dwarf cat fish (dry)	Tengra (shukna)	-	470	1.87	-	310	112.44	943.02	65.87	1458.4
965	White fish/stripled gourami (dry)	Khoira (shukna)	-	-	-	-	-	-	-	-	-
966	White fish/stripled gourami (fresh)	Khoira (taza)	-	-	0.7	-	590	-	-	-	220
967	Tilapia/mozambique telapia	Tilapia	1566 .58	1403.19	1.31	44.39	0.56	12.85	128.45	245.97	7.16
968	Pama croaker/pama fish	Poa mach	2584.27	1188.31	1.58	72.19	0.57	12.42	139.89	270.81	7.49
969	Ganges river sprat (sweet water,fresh, bony)	Kachki mach (taza)	1838.38	310.8	1.06	82.05	185	9.71	67.69	92.6	10.54
970	Ganges river sprat (sweet water,dry)	Kechki (sweet water, shukna)	-	980	3.44	-	276	103.15	1287.6	35.85	1398.9

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
971	Yellow tail mullet (marine, dry)	Kechki (marine,shukna))	-	1620	1.87	-	432.79	124.78	381.38	60.85	2803.7
972	Silver carp	Silver carp	1679.46	903.66	1.16	28.89	0.49	11.05	104.82	186.35	6.03
973	Spotted snake head	Taki	1804.88	757.16	1.17	33.94	157	10.01	88.58	165.93	5.48
974	Chapila/ Indian river shad (fresh,bony)	Chapila (taza)	-	2210	1.12	-	25.52	25.01	39.28	149.68	342.1
975	Chapila/ Indian river shad (dry,bony)	Chapila (shukna)	-	260	3.69	-	570.49	104.42	1408	925.05	1798.3
976	Golden/red snapper	Ranga chokha	-	70	0.33	-	23	15.52	36.09	144.75	131.45
977	White grunter	Sada datina	-	40	0.26	-	13.56	10.85	42.17	202.38	118.01
978	Hard tail torpedo trevally	Kauwa	-	190	0.29	-	47.07	24.3	107.92	257.96	190.96
979	Tripple tail	Samundra koi	-	60	0.23	-	5.67	15.85	67.26	142.78	129.87
980	Mottled nandus/mud perch (deboned)	Meni/bheda/roina	-	510	0.31	-	32.98	13.8	12.29	60.6	140.42
981	Skipjack	Tuna	-	300	1.49	-	2.48	11.28	131.04	415.15	313.97
982	Boggut labeo	Ghainna	-	80	0.3	-	0.34	3.93	52.64	159.83	144.44
983	Rita	Rita	-	330	-	-	0.74	3.45	122.88	-	152.59
984	Small head hair tail/ribbon fish (dry)	Churi (shukna)	-	70	0.57	-	227.13	42.38	810.97	89.93	576.1
985	Russell's smooth-back herring (dry)	Fatra (shukna)	-	410	1.42	-	269.73	73.81	1053.6	125.63	944.5
986	Indian potasi (bony)	Batashi (taza)	-	3610	0.68	-	42.93	25.85	222.27	46.61	402.77
987	Cotio (bony)	Dhela (taza)	-	1540	0.56	-	42.92	17.1	21.05	56.93	265.61
988	Peppered loach/guntea loach (bony)	Gutum (taza)	-	1630	1.14	-	115.71	33.69	46.83	236.54	441.83
989	Jamuna ailia (fresh,bony)	Kajuli (taza)	-	1180	0.6	-	255.55	26.98	33.95	145.13	309.92
990	Freshwater gar fish/needle fish (fresh,bony)	Kakya/kakila (taza)	-	1710	0.35	-	25.52	33.42	71.95	214.1	353.69
991	Large razor belly minnow (fresh,bony)	Katari (taza)	-	1500	0.28	-	35.06	13.14	20.61	53.31	177.61
992	Giant snake head	Gajar/gajal (taza)	-	1090	0.38	-	46.1	25.74	31.75	194.47	233.59
993	Giant river/fresh water prawn(fresh,deboned)	Boro/golda chingri (taza)	1400	500	1.78	-	39.73	27.24	35.72	56.86	157.69
994	Reba (fresh,deboned)	Tatkani (taza)	-	1390	0.84	-	70.39	25.35	43.34	119.89	211.74
995	Yellow shrimp (fresh,deboned)	Chingri (marine/kucho/nona,taza)	-	1720	0.7	-	24.77	25.88	124.89	138.28	157.81
996	Yellow shrimp (fresh,bony)	Chingri(marine/kucho/ nona,taza)	-	920	0.71	-	22.83	35.44	39.93	90.98	161.02
997	Yellow shrimp	Chingri(marine/kucho, shukna)	-	500	1.57	-	575.14	214.16	698.5	680.32	839.7
998	Kucha	Kuicha (taza)	-	-	-	-	185	-	-	-	119
1000	**Meat**	**Mangshaw**									
1001	Beef	Gorur mangshaw	2776.7	1839.81	13.9	143.93	7	10.69	92.04	145.12	35.3

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
1002	Beef (buffalo)	Mohisher mangshaw	-	-	-	-	3	-	-	-	189
1003	Chicken (deshi)	Murgir mangshaw (deshi)	2436.55	1572.2	1.48	62.18	18	12.27	131.9	234.5	72
1004	Duck	Hasher mangshaw	-	-	-	-	4	-	-	-	235
1005	Goat	Khashir mangshaw	-	-	-	-	12	-	-	-	193
1006	Liver (goat)	Khashir koliza	-	-	-	-	17	-	73	160	279
1007	Liver (mutton)	Verar koliza	-	-	6.3	-	10	-	-	-	380
1008	Mutton (lamb)	Verar mangshaw	-	-	2.5	-	150	-	33	270	150
1009	Pigeon	Kobutorer mangshaw	-	-	-	-	12	-	-	-	290
1010	Pork*	Shukorer mangshaw	5738.22	2380.67	3.41	156.02	19	17.37	168.85	179.07	61.6
1011	Snails (small)	Shamuk (choto)	-	-	-	-	1321	-	-	-	147
1012	Snails (large)	Shamuk (baro)	-	-	-	-	870	-	-	-	116
1013	Turtle	Kochchop/jagol	-	-	-	-	7	-	-	-	162
1014	Chicken (farm)	Murgir mangshaw (farm)	2126.58	1292.25	1.58	53.92	2.4	12.02	117.53	200.93	6.55
1015	Yeast dried (brewer's)	Yeast	-	-	-	-	440	-	-	-	149
1016	Yeast dried (food)	Yeast	-	-	-	-	180	-	-	-	2090
1100	**Eggs**	**Dim**									
1101	Duck egg	Hasher dim	3411.18	1405.57	2.16	87.17	39	10.66	133.96	85.14	142
1102	Hen egg (deshi)	Murgir dim (deshi)	2383.42	2034.18	1.65	56.22	34	10.57	134.75	96.8	64.1
1103	Hen egg (farm)	Murgir dim (farm)	1980.58	1171.45	1.54	59.71	4.3	10.07	126.33	90.06	5.25
1104	Turtle egg	Kocchoper dim	-	-	-	-	93	-	-	-	299
1200	**Milk & milk products**	**Dugdho-dugdha jatio khabar**									
1201	Buffalo milk solids	Mohisher dudher sana	-	-	-	-	480	-	-	-	277
1202	Butter milk	Ghole	-	-	0.8	-	30	-	-	-	30
1203	Cheese	Panir	-	-	2.1	-	790	-	-	-	520
1204	Cow milk solids	Gorur dudher sana	-	-	-	-	208	-	-	-	138
1205	Curd	Doi	-	-	0.2	-	149	-	32	130	93
1206	Human/breast milk	Mayer dudh	-	-	0.1	-	28	-	-	-	11
1207	Milk (condensed)	Kheer	-	-	-	-	388	-	-	-	-
1208	Powdered milk (skim, cow)	Makhon tola gura dudh	-	-	1.4	-	1370	-	-	-	1000
1209	Powdered milk (whole, cow)	Gura dudh	-	-	0.6	-	950	-	-	-	713
1210	Skim milk (liquid)	Makhon tola dudh (tar)	-	-	0.2	-	120	-	-	-	90

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
1211	Whole milk (buffalo)	Mohisher dudh	-	-	0.2	-	210	-	19	90	130
1212	Whole milk (cow)	Gorur dudh	-	-	0.2	-	120	-	73	140	90
1213	Whole milk (goat)	Sagoler dudh	-	-	0.3	-	170	-	11	110	120
1214	Yogurt (buffalo)	Khoya (mohisher dudh)	-	-	5.8	-	650	-	-	-	420
1215	Yogurt (buffalo, skim)	Khoya (makhon tola)	-	-	2.7	-	990	-	-	-	650
1216	Yogurt (cow)	Khoya (gorur dudh)	-	-	-	-	956	-	-	-	613
1300	**Fats & edible oils**	**Tollo**									
1301	Butter (us imported)	Makhon	-	-	-	-	-	-	-	-	-
1302	Cooking oil (groundnut, gingelly,musturd)	Tollo	-	-	-	-	-	-	-	-	-
1303	Fish liver oil	Mach koliza tollo	-	-	-	-	-	-	-	-	-
1304	Ghee (buffalo)	Ghee (mohisher)	-	-	-	-	-	-	-	-	-
1305	Ghee (cow)	Ghee (gorur)	-	-	-	-	-	-	-	-	-
1306	Ghee (vegetable)	Bonoshpati	-	-	-	-	-	-	-	-	-
1400	**Miscellaneous**	**Bibidha**									
1401	Areca/betel nut	Shuparee	-	-	1.5	-	50	-	-	-	130
1402	Betel leaves	Pan pata	2320	3440	7	4470	230	447	-	-	40
1403	Biscuit (salted)	Nonta biskut	-	-	-	-	-	-	-	-	-
1404	Biscuit (sweet)	Mishti biskut	-	-	-	-	-	-	-	-	-
1405	Bread (brown)	Ruti (badamee)	-	-	2.2	-	18	-	-	-	-
1406	Bread (loaf)	Pauruti	-	-	2.2	-	18	-	-	-	-
1407	Bread (white)	Ruti (shada)	-	-	1.1	-	11	-	-	-	-
1408	Coconut milk	Narikeler dudh	-	-	1.6	-	5	-	-	-	140
1409	Date juice	Khejur rash	-	-	4.1	-	40	-	-	-	-
1410	Honey	Modhu	-	-	0.9	-	5	-	-	-	16
1411	Jackfruit seed	Kathaler bichi	-	-	1.5	-	50	-	-	-	97
1412	Lotus seed (dry)	Khoyare	-	-	11.1	-	130	-	-	-	-
1413	Lotus seed (ripe)	Poddo gota (shukna)	-	-	2.3	-	36	-	-	-	294
1414	Lotus seed (green)	Poddo gota (poripokko sobuj)	-	-	-	-	49	-	-	-	151
1415	Mahua flower	Mohua ful	-	-	15	-	140	-	-	-	-
1416	Makhana	Makhana	-	-	1.4	-	20	-	-	-	90

Table 6B-3: Mineral composition of food items (Cont.)

Food Code	English Name	Bengali/Local Name	Microminerals				Macromicerals				
			Copper	Zinc	Iron	Manganese	Calcium	Magnesium	Sodium	Potassium	Phosphorus
			µg	µg	mg	µg	mg	mg	mg	mg	mg
1	2	3	4	5	6	7	8	9	10	11	12
1417	Molasses	Akher gur	-	-	0	-	12	-	-	-	40
1418	Molasses (date)	Khejur gur	-	-	0	-	363	-	-	-	62
1419	Oil cakes (ground nut)	Kholi (china badamer)	-	-	-	-	213	-	-	-	548
1420	Pappadom	Papor	-	-	17.2	-	80	-	-	-	-
1421	Pickles	Amchur	-	-	45.2	-	180	-	-	-	-
1422	Poppy seed	Posto dana	-	-	0	-	1584	-	-	-	432
1423	Pumpkin/sweet gourd seed	Kumrar bichi	-	-	5.5	-	50	-	-	-	830
1424	Sago	Shabu	-	-	1.3	-	10	-	-	-	10
1425	Sugar	Chini	-	-	-	-	12	-	-	-	1
1426	Sugar candy	Misri	-	-	0	-	12	-	-	-	-
1427	Sugarcane juice	Akher rosh	-	-	0.1	-	10	-	-	-	10
1428	Tamarind seed (dried)	Tetuler bichir sas	-	-	-	-	121	-	-	-	237
1429	Toddy (fermented)	Tari	-	-	0.3	-	150	-	-	-	-
1430	Water chestnut	Pani foi	1310	1560	0.8	850	10	72	-	-	-
1431	Water chestnut (dry)	Pani phal (shukna)	-	-	2.4	-	70	-	-	-	440

In tables (6B-1 – 6B-3), data those are not analyzed by our research team, are pulled from:

a. HKI 1988. Tables of Nutrient Composition of Bangladeshi Foods, Helen Keller International (HKI), INFS/WFP, Dhaka, Bangladesh
b. Gopalan C, Sastri R, Balasubramanian, SC, 2004. Nutritive value of Indian foods, National Institute of Nutrition, Indian Council of Medical Research; Hyderbad: India.
c. Unpublished thesis papers of students of INFS, University of Dhaka and Jahangirnagar University. (Reference; 50-60)

Detail information on sources of pulled data is given in Explanatory Note and in Reference (50-60).

6.3: Tables of carotene profile, fatty acid, bioactive compound and phenol contents

Table 6C: Carotene profile of some selected food items

Food Code	English Name	Bengali/Local Name	Total Carotenoids	β-carotene	Leutin	Lycopene	Alpha-carotene
			µg	µg	µg	µg	µg
1	2	3	4	5	6	7	8
300	**Leafy vegetables**	**Shak**					
301	Agathi	Bauk ful shak	45000	15440	-	-	-
302	Spleen amaranth	Data shak	4904	4450	5.17	-	188.35
303	Amaranth leaves (tender)	Naute shak	20160	8340	-	-	-
304	Joseph's coat/ amaranth (red leaf var.)	Lalshak	4310	1256.53	-	80.22	83.69
306	Bathua leaves	Bathua/ beto shak	1740	1656.08	-	39.05	-
308	Bottle gourd leaves	Lau shak	3050	2370.64	-	8.23	526.7
313	Chukai leaves	Chukai shak	9	117.35	234.42	-	31.19
314	Coriander leaves	Dhane shak	6830	1470.54	-	64.99	15.1
321	Indian spinach	Pui shak	8170	1775.1	-	72.38	489.81
323	Kheshari leaves	Khesharee shak	3000	2176.3	-	-	-
324	Swamp morning-glory	Kalmi shak	5660	2383.68	-	74.83	50.89
337	Spinach	Palong shak	4350	2249.57	-	-	-
338	Spinach sour	Tak palong shak	9400	2800	-	-	-
339	Sweet potato leaves	Mishti aloo shak	7800	4465.64	-	-	88.65
344	Coco-yam/taro green arum leaves	Sobuj kochu shak	8350	7146.59	-	296.93	1723.09
348	Curry leaves	Barsanga/curry pata	7560	7110	-	-	-
353	Not known*	Sabarang*	5970	467.28	-	37.6	-
354	Roselle*	Amila pata*	4410	1606.83	-	20.22	145.59
355	Not known*	Lemon pata*	3030	860.22	-	129.35	54.49
356	Indian ivy-rue*	Baruna shak*	6110	1465.49	-	77.51	-
357	Not known*	Ojan shak*	4610	1102.88	212.59	153.87	-
358	Not known*	Ghanda batali*	6990	1708.97	-	55.46	-
359	Not known*	Oral balal*	4450	1110.74	-	207.81	276.66
361	Yellow saraca*	Madhuba*	13180	1486.42	-	-	-
400	**Roots & tubers**	**Mull[illegible]o khabar**					
402	Carrot	Gajor	8560	1689.43	604.58	0	2123.56

Table 6C: Carotene profile of some selected food items (Cont.)

Food Code	English Name	Bengali/Local Name	Total Carotenoids	β-carotene	Lutin	Lycopene	Alpha-carotene
			µg	µg	µg	µg	µg
1	2	3	4	5	6	7	8
500	**Non-[illegible]bles**	**S[illegible]**					
503	Bean	Shim	188	85.65	-	27.62	46.04
523	Gourd (sweet) pumpkin	Misti kumra	3810	51.41	378.39	-	29.91
526	Kakrol	Kakrol	270	163.01	-	-	19.43
560	Solanum*	Tak begun*	4580	142.66	824.05	-	31.46
563	Banchalta*	Banchalta*	15170	55.47	12.97	-	14.97
568	Not known*	Seng e tur / seng e / thoral*	997	26.46	-	-	-
569	Not known*	Betagi*	815	57.59	-	-	17.42
571	Berry bamboo*	Bas koral*	747	6.61	-	-	14.65
800	**Fruit**	**Phol**					
820	Jackfruit (ripe)	Paka kathal	710	28.86	124.67	-	-
831	Mango ripe (deshi)	Paka am	2560	356.28	368.96	22.3	-
832	Melon (mix)	Bangee/futi	800	663.68	-	-	-
839	Palm (ripe)	Paka tal	3570	140.86	51.21	67.16	-
840	Papaya (ripe)	Paka pepe	2330	425.77	23.22	21.18	-
852	Tomato (ripe)	Paka tometo	3510	276.97	228.06	1307.95	-
854	Water melon	Tarmuz	4200	299.73	54.55	1257.53	-
856	Cherries (red)	Cherry phal	470	140	-	-	-
867	Wild melon*	Sindera*	1840	9.89	-	-	45.91
868	Not known*	Roshko*	1190	8.9	126.7	-	-
869	Bead tree*	Kusumgulu*	260	388.43	-	12.96	115.5

Table 6D: Fatty acid composition of some selected food items

Food Code	English Name	Bengali/Local Name	Moisture	Total lipids	Cholesterol	8:00	10:00	12:00	14:00	16:00	16:01	18:00	18:01	18:02	18:03	20:01	20:04	22:00	22:01	22:06
			g	g	mg	% of total FA														
	Fish																			
1	Hilsha fish	Ilish mach	62.7	15.8	116.1	-	-	-	7.8	29	13.2	8.2	22.9	0.7	0.8	1.9	1.5	1	-	0.9
2	Dragon fish	Pangash	49.5	22.1	83.5	-	-	-	5.2	25.2	12.1	9.1	32.4	1.4	1.3	1.2	1.5	0.9	4.2	1.1
3	Tengra (fresh)	Tengra (taza)	77.7	5.8	36.4	-	-	-	3.2	31.6	6.8	9.9	31.6	3.4	1.5	2.8	-	-	-	-
4	Butter fish	Pabda	74.1	2.5	41.3	-	-	0.4	1.8	27.9	6	20.1	34.2	7.9	1.7	1.2	-	-	-	-
5	Scorpion fish	Singi	77.8	1	29.6	-	-	-	2.8	29.7	6.1	9.3	23.4	8.9	-	-	-	-	-	-
6	Shrimp	Chingri	76.5	2.3	168	-	-	0.2	1.9	27.4	5.9	11	31.3	8.8	-	-	-	-	-	-
7	Magur	Magur	75.7	2.4	31.2	-	-	1.9	4.4	23	9.2	13.1	26	5	0.9	2.1	4.1	-	-	-
8	Khalia payesha	-	64.3	19.3	48.5	-	-	-	6	36.3	17.4	4.6	10.4	1.4	2.1	1.7	2.5	-	-	-
9	Mola	Mola	78.9	2.1	25.2	-	0.1	0.5	6.4	24.8	8.5	9	15.2	4.1	9.7	4.6	2.3	1.4	-	-
10	Aire fish	Aire	81.2	1.1	21.1	-	0.5	0.4	1.9	22	3.7	9.5	17.5	5.4	2	0.5	11.6	5.6	-	-
11	Climbing fish (koi)	Koi	68.7	9.1	39.2	-	-	0.2	1.9	23.2	5.2	9.2	40.2	11.4	2.8	1.3	2.2	-	-	-
12	Puti	Puti	72.5	3.7	52.2	-	-	0.2	2.2	24	6	9.7	31.9	13.8	4.1	0.8	3.2	-	-	-
13	Rohu	Ruee	74.5	2.8	47.7	-	-	0.2	2.9	28.6	15.7	5.2	14.3	8.8	9.5	1.8	3.1	1.2	-	0.8
14	Katla	Katla	78.2	3.2	43.3	-	-	0.1	3.5	23.2	9.6	7.6	19.2	4.5	4.6	1.4	4.8	1.5	-	4.6
15	Shole	Shole	77.4	2	23.6	-	-	0.1	1.9	18	7.5	10.6	17.3	4.6	2.6	0.9	7.3	-	-	-
16	Tilapia	Tilapia	77.8	2.4	25.9	-	-	0.2	4.3	23.8	9.2	7.8	17.2	4.6	6	1.8	3.5	2.2	-	2.7
17	Sarputi	Sarputi	71.8	10.4	59.7	-	-	-	2.2	23.3	5.5	11.9	40.4	3.4	1.2	3.1	4.2	-	-	-
	Meat																			
18	Beef	Gorur mangshaw	75.5	2.73	121.61	-	0.25	0.25	2.98	18.34	3.64	15.81	31.76	5.4	1.3	-	4.13	-	-	-
19	Mutton / goat	Khashir mangshaw	71.3	4.1	98.72	0.2	-	-	1.54	17.18	2.45	36.07	31.53	3.59	1.74	-	-	-	-	-
20	Chiken (deshi)	Deshi murgi	71.7	1.44	78.5	-	0.36	-	1.49	20.42	5.42	20.79	28.92	13.56	1.2	-	3.13	-	-	-
	Fats & oils																			
21	Banaspati	-				-	-	-	0.45	22.39	-	12.52	48.4	16.24	-	-	-	-	-	-
22	Ghee	-				0.11	0.61	0.57	3.86	25.85	1.25	7	35.49	13.43	1.45	-	-	-	-	-
23	Butter oil	-				0.3	1.37	2.4	5.14	30.19	1.2	10.62	27.12	4.61	-	-	-	-	-	-
24	Palm oil	-				-	-	0.21	1.25	37.58	-	4.16	45.39	11.42	-	-	-	-	-	-
25	Soybean oil	-				-	-	-	0.09	10.8	-	3.95	22.13	56.31	6.72	-	-	-	-	-
26	Sesame oil	-				-	-	-	-	9.27	0.14	6.49	41.91	41.65	0.54	-	-	-	-	-
27	Mustard oil	-				-	-	-	-	3.98	-	1.52	44.78	18.47	10.75	5.69	-	-	14.8	-

Source: Hossain A, 1989. An M Phil thesis on 'Effects of different fatty acid on cholesterol metabolism in rats', Institute of Nutrition and Food Science, University of Dhaka, Dhaka, Bangladesh

Table 6E: Presence of Bioactive Compounds in some selected food items

Sl no	English Name	Bengali/Local Name	Scientific Name	Bioactive compounds			
				Alkaloids	Glycosides	Flavonoids	Phenolic compounds
1	Green chilli	Kacha marich	*Capsicum frutescens*	Capsaicin	Glucopyranoside	Myricetin	Ferulic acid
2	Green papaya	Kacha pepe	*Carica papaya*	Carpaine	Cyanogenic glycoside	Rutin	Gentisic acid
3	Tomato	Tometo	*Lycopersicon esculentum*	Tomatine	Esculeoside a	Naringenin	Caffeic acid
4	Bitter gourd	Korola	*Momordica charantia*	Momordicine	Charantin	Lutein	Gallic acid
5	Potato	Gole aloo	*Solanum tuberosum*	Solanine	Phytoalexin	Zeaxanthins	Catechin
6	Carrot	Gajor	*Daucus carota*	Ergine	Chryslin	Quercetin	Oleuropein
7	Eggplant	Brinjal/begun	*Solanum melongena*	Isoquinoline	Solasodine	Quercetin	Caffeic acid
8	Banana	Kola	*Musa paradisiaca*	Aziridine	Lignan	Lueucocyanidin	Tannic acid
9	Mango (ripe)	Paka am	*Mangifera indica*	Mucunine	Xanthone	Rutin	Homomangifirin
10	Kakrol	Kakrol	*Momordica cochininensis*	Momordicine	Saponin	Apigenin	Gallic acid
11	Sweet pumpkin	Misti kumra	*Cucurbita maxima*	Tropane	Dianthrone	Anthocyanins	Tannins
12	Lady's finger/okra	Dherosh	*Abelmoschus esculentus*	Mesembrine	Digoxin	Astragalin	Carnosic acid
13	Sweet potato (red)	Misti aloo	*Ipomoes batatas*	Vincristine	Cyanogenic	Quercetin	Thymol
14	Pineapple	Anarosh (joldugee)	*Ananas comosus*	Steroidal	Limonin	Quercetin	Ferulic acid
15	Water melon	Tarmuz	*Citrullus vulgaris*	Ergoline	Saponin	Citrulline	Tannic acid
16	Lichis	Lichu	*Nephelium litchi*	Xanthine	Oleanolic	Quercetin	Apigenin
17	Folwal	Potol	*Trichosanthes dioica*	Ramiflorines	Vitexin	Crisilineol	Tannins
18	Palm (ripe)	Paka tal	*Borassus flabellifer*	Achyranthine	Anthraquinone	Narcisin	Eugenol
19	Blackberry	Kalo jam	*Rubus fruiticosus*	Isoquinolline	Isoflavone	Quercetin	Tannins
20	Roselle	Amila pata	*Hibiscus sabdariffa*	Solanine	Quercetin	Gossyptin	Caffeic acid
21	Amla	Amloki	*Emblica officinalis*	Vincristine	Harpagoside	Ellagic acid	Ellagic acid
22	Jackfruit (ripe)	Paka kathal	*Artocarpus heterophyllus*	Indole	Auronol	Apigenin	Coumarin
23	Wood apple	Bel	*Limonia acidissima*	Aegelenine	Luteoline	Rutin	Honokiol
24	Spinach	Palong shak	*Spinacia oleracea*	Flindersine	Saponin	Zeaxanthins	Cinnamic acid
25	Spleen amaranth	Data shak	*Amaranthus dubius*	Sesquiterpene	Coumarin	Patuletin	Gallic acid
26	Coco-yam	Sobuj kochu shak	*Colocasia esculenta*	Berberine	Cyanogenic	Rutin	Catechin
27	Spearmint	Pudina pata	*Mentha viridis*	Febrifugine	Iridoid	Quercetin	Caffeic acid
28	Coriander leaves	Dhane shak	*Coriandrum sativum*	Conamine	Geraniol	Rhamnetin	Ursolic acid
29	Gourd (bottle)	Lau	*Lagenaria vulgaris*	Nicotinoid	Steroidal	Nasunin	Caffeic acid
30	Radish	Mula	*Raphanus sativus*	Mucunine	Flavonoid glycoside	Naringenin	Ellagic acid

Source: Khatun A. 2010. MS thesis on 'Studies on Antibacterial & Antifungal Activities of Green Chili, Green Papaya, Tomato & Bitter Gourd'. Department of Biochemistry and Molecular Biology, Jahangirnagar University and Institute of Nutrition and Food Science, University of Dhaka, Dhaka, Bangladesh.

Table 6F: Total phenol content of some selected fruits and vegetables

Sl no	English Name	Bengali/Local Name	Scientific Name	Moisture	Total phenol (mgGAE/100g)
1	2	3	4	5	6
01	Mango	Aam	*Mangifera indica*	84.2	3
02	Jackfruit	Kathal	*Artocarpus heterophyllus*	79.2	3
03	Lichis	Lichu	*Lichi sinensis*	84.1	10
04	Black berry	Kalo jam	*Syzygium cumini*	85.4	5
05	Pineapple	Anarosh	*Ananas comosus*	87.3	3
06	Carambola	Kamranga	*Averrhoa bilimbi*	93.5	5
07	Palmyra fruit	Tal shash	*Borassus flabellifer*	91.6	3
08	Safeda	Sapota	*Achrus sapota*	76.5	1
09	Rose apple	Golapjam	*Syzygium aqueum*	89.9	60
10	Wax-apple	Jamrul	*Eugenia javvanica*	91.4	1
11	Burmese grape	Latkan	*Baccaura sapida*	90.4	1
12	Karonda	Karamcha	*Carissa carandas*	88.5	10
13	Honeydew melon	Chinar/bangi	*Cucumis melo*	91.9	3
14	Lakuch	Deuwa	*Artocarpus lakoocha*	72	3
15	Hog pulm	Amra	*Spondias mombin*	-	3
16	Eggplant	Brinjal/begun (green)	*Solanum melongena*	93.22	271
17	Eggplant	Brinjal/begun (purple)	*Solanum melongena*	93	394
18	Cabbage	Badha kopi	*Brassica oleracea*	91.1	187
19	Cauliflower	Ful kopi	*Brassica oleracea, var. botrytis*	92	35
20	Radish	Mula	*Raphanus sativus*	96	108
21	Banana	Kacha kola	*Musa sapientum/paradisica*	86	2145
22	Coriander leaves	Dhane shak	*Coriandrum sativum*	86	835
23	Mint leaves	Pudina pata	*Mentha viridis*	89	1755
24	Amaranth (red leaf var.)	Lal shak	*Amaranthus gangeticus*	89	765
25	Amaranth viridis	Data shak	*Amaranthus viridis*	88.4	722
26	Ipomoea leaves	Kalmi shak	*Ipomoea aquatica*	85	2765
27	Spinach	Palong shak	*Spinacia oleracea*	95	258

Sources:

a. Hossain S, 2010. MS thesis on 'Antioxidant Capacity & Total Phenol Content of Common Vegetables of Bangladesh'. Institute of Nutrition and Food Science, University of Dhaka, Dhaka, Bangladesh.

b. Mamun S. 2010. MS thesis on 'Hydrophilic Anti-oxidant Activity and Total Phenol Content of Selected Fruits of Bangladesh'. Institute of Nutrition and Food Science, University of Dhaka, Dhaka, Bangladesh.

7.1 Desired body weight

Desired body weight is the body weight for a person which is required to be maximal healthful. It is mainly based on height, but modified by factors such as gender, age, sex, building and degree of muscular development. An ideal weight is necessary for proper functioning and maintenance of body. Neither underweight nor overweight is expected for healthy living. Body weight regulation depends on the energy balance of a person. Energy balance is a condition in which caloric value of food intake is equal to the total energy expenditure. A person is needed to be in energy balance to maintain his/her ideal body weight.

7.2 Importance of body weight regulation

Both underweight and overweight has several health risks and also social and economic impacts on people. The necessity of maintaining ideal body weight can be easily understood by reviewing the problems encountered with abnormal body weight. Some important outcomes related to under or overweight are as follows:

- Severely underweight individuals may have poor physical stamina. On the other hand overweight involves inconvenience and also decreases the working efficiency of the person.
- Most of the underweight individuals are micronutrient deficient which can affect the effectiveness of immune system. Overweight or obese persons are in a state of imbalanced nutrition.
- Both overweight and underweight persons risk a number of diseases. Chronic diseases such as heart disease, type 2 diabetes, hypertension, stroke, gall bladder disease, certain cancers and osteoarthritis are associated with overweight and tend to worsen as the degree of obesity increases. Underweight persons are more prone to have anemia, osteoporosis, type-1 diabetes and infertility.
- In normal state body regulates hunger and activity levels perfectly. Human body has its own regulatory system to operate all its function. Overweight or underweight state destructs the usual regulatory system of body. Hormonal and other systemic orientation between different organs and systems of body is lost in this imbalanced situation.
- Other consequences of obesity or underweight include psychological difficulties such as discrimination from others, a negative self image, depression, and decreased socialization.

7.3 Classification of overweight and obesity

Body mass index (BMI) is the criterion to diagnose obesity. On the basis of BMI, obesity is graded[51] as follows:

Health Risk Classification According to Body Mass Index (BMI)		
Classification	**BMI category (kg/m^2)**	**Risk of developing health problems**
Underweight	<18.5	Increased
Normal Weight	18.5 - 24.9	Least
Overweight	25.0 - 29.9	Increased
Obese class I	30.0 - 34.9	High
Obese class II	35.0 - 39.9	Very high
Obese class III	≥40.0	Extremely high

7.4 How to calculate desired body weight

In order to assess the fitness of the body, it is necessary to know what is the ideal body weight for a person at his/her specific height. There are several methods, which are employed to determine the ideal body weight. Some simple methods include:

Body Mass Index based formula

Body Mass Index (BMI) is widely used to identify lean, overweight or obese individuals. It is computed as weight in kilograms divided by height in meters squared (W/H^2), and has been found to be the relative weight index that shows the highest correlation with independent measures of body fat. The BMI range of 20-24.9 is generally considered normal. The joint FAO/WhO/UNU Expert Consultation on Energy and Protein Requirements computed the energy requirements of adults based on BMI~22 for men and BMI~21 for women. The weight for a given height equivalent to these BMI values may be read off directly from a BMI nomogram.

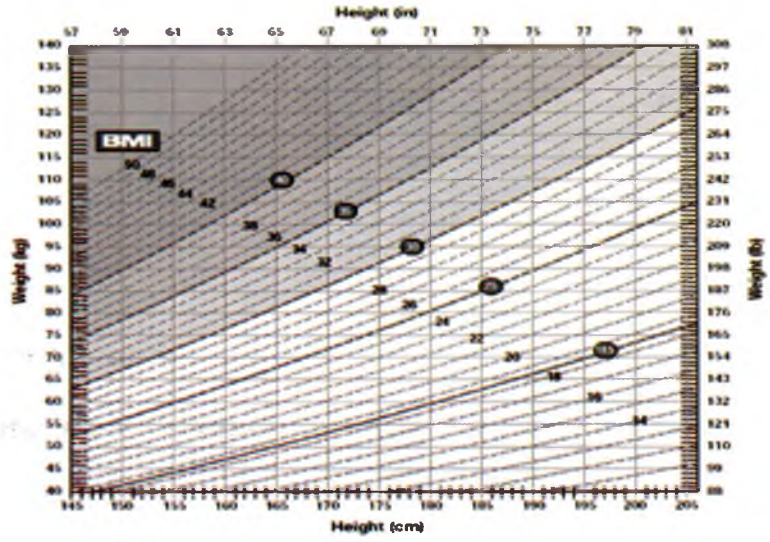


Figure 7.1: Nomogram for BMI

- During the absence of above mentioned nomogram, the following formulas have been found to give weights closely equivalent to BMI~22 for men and BMI~21 for women.
    - for men 5 feet (1.52m) tall, DBW~51 kg
    - for women 5 feet (1.52m) tall, DBW~ 48 kg
    - for both sexes, add 1.8 kg for every inch above 5 feet.

Sample calculation:

Male 5'6" tall: DBW=51+ (6×1.8)=61.8 kg
Female, 5'2" tall: DBW= 48+ (2×1.8) =51.6 kg

- **Derived formula based on BMI**

DBW (kg) = Desirable BMI×H (m^2)

Desirable BMI for men~22

Desirable BMI for women=20.8

Sample calculation:

Male, 5'5" (1.65m) tall, DBW (kg) =22 × $(1.65m)^2$

= 59.97=60 kg

- **Tannhauser's method**

Height is measured in centimeters. Deduct from this the factor 100 and the answer is the DBW in Kg.

So, DBW (kg) = Height in cm - 100

Sample calculation:

Height: 5'4"=64"= 64"×2.54cm

= 162.56cm- 100

= 62.56 kg

So, desired body weight range = 62.56 ± 10 % DBW

7.5 Guidelines for weight management

The first step towards the dietary treatment of obesity or underweight is to determine the amount of weight which is to be reduced or gained. Some strategies for weight management are as follows:

- To lose weight, it is necessary to decrease gradually the daily calorie intake starting with small amounts.
- Set the goal which is realistic.
- Learn the caloric values of home dishes and control their consumption or exercise substitute.
- Plan meals and snacks. Do not change meal or snacks pattern.
- Adapt dietary needs from the regularly prepared family dishes.
- Portion meals in a calorie-conscious manner. One quarter of plate should comprise a portion of lean protein such as fish or chicken breast; another quarter should comprise a portion of unrefined grain such as brown rice and one-half of the plate should be filled with a variety of colorful vegetables.
- Eating three meals a day plus snacks is essential in weight management.
- One should eat the majority of calories in the first half of the day, and should choose lighter dinners to coincide with evenings when he is less active.
- To double up fiber intake, choose whole-grain, high-fiber breads and cereals; choose whole-wheat pasta and rice instead of white; and include more dried beans in meals. Fiber helps fill up faster, which can cause to eat less and curb hunger.
- Diet plus exercise is the ideal combination of weight management. Increase in the energy output will be very effective in the long run. Exercise enhances the mobilization and breakdown of fat from the body's adipose deposits. It is also seen that feeling of intense hunger and other psychological stresses are minimal with physical activity in combination with mid dietary restriction.
- Fruits and vegetables are the great source of vitamins, minerals and fiber. They are naturally low in calories and fat. Eat at least 2-3 servings of fruit daily. Have a plenty of vegetables with lunch and dinner daily. Fruits and vegetables may also be taken as a snack.
- Include 6 to 8 glasses of water each day. It helps to keep one adequately hydrated and often helps prevent overeating.
- Divide meals in half portions so that another portion can be permitted.
- An underweight patient can not initially adjust to a higher caloric intake. Hence it is sensible to begin with present diet and to modify it gradually in quantity and quality until the desired level is reached.
- Small but frequent meals should be taken. At least six small meals are advised.
- No food should be forced eaten, if pushed on no result is achieved.

Once desirable weight is obtained, a maintenance diet is to be followed.

8.1 Balanced diet

Balanced diet is a diet which contains different types of food in such quantities and proportions that meet the need for calories, proteins, minerals, vitamins and other nutrients; and a small provision is made for extra nutrients to withstand short duration of illness. In addition, a balanced diet should provide around 60-70% of total calories from carbohydrate, 10-12% from protein and 20-25% of calories from fat.

Balanced diet

- meets nutritional requirement
- prevents degenerative diseases
- improves longevity
- prolongs productive life
- improves immunity
- increases endurance level
- develops optimum cognitive ability

Thus balanced diet enhances quality of life.

8.2 Food exchange list

The nine food group plan permits an individual to design a menu to achieve all nutrient intakes as specified by RDA. The nine food groups with their major nutrients are listed below:

Sl no	Food groups	Nutrients
1	***Cereal grains and products*** Rice, Wheat, Ragi, Bajra, Maize, Jowar, Barley, Rice flakes, Wheat flour.	Energy, Protein, Invisible fat, Vitamin-B_1, Vitamin-B_2, Folic acid, Iron, Fibre.
2	***Pulses and Legumes*** Bengalgram, Blackgram, Greengram, Redgram, Lentil (whole as well as dhals), Cowpea, Peas, Soyabean, Beans.	Energy, Protein, Invisible fat, Vitamin-B_1, Vitamin-B_2, Folic acid, Calcium, Iron, Fibre.
3	***Leafy Vegetables*** Amaranth, Spinach, Gogu,Drumstick leaves, Coriander leaves, Fenugreek leaves.	Carotenoids, Vitamin-B_2, Folic acid, Calcium, Iron, Riboflavin, Vitamin C and Fibre.
4	***Other Vegetables:*** Carrots, Brinjal, Ladies finger, Beans, Capsicum, Onion, Drumstick, Cabbage, Cauliflower.	Carotenoids, Folic acid, Calcium, Fibre.
5	***Fruits*** Fruits: Mango, Guava, Tomato, Papaya, Orange, Sweet lime, Amla, Watermelon.	Carotenoids, Vitamin-C, Fibre, Invisible fat, Vitamin-B_2, Folic acid, Iron.
6	***Milk*** Milk, Curd, Skimmed Milk, Cheese	Protein, Fat, Vitamin-B_2, Calcium, Riboflavin, Vitamin B_{12}
7	***Fish and flesh foods*** Chicken, Liver, Fish, Egg, Meat.	Protein, Fat, Vitamin-A, Calcium, Riboflavin, Vitamin B_{12}, Iron, Folic acid.
8	***Fats and oils*** Butter, Ghee, Hydrogenated fat, Cooking oils like Soybean, Mustard, Coconut.	Energy, Fat, Essential fatty acids, Vitamin-E.
9	***Sugar/Jaggery*** Jaggery and sugar	Energy

The daily food list should be comprised of all these food groups. The exchange lists are the basis of a meal planning. Food exchange lists are groups of foods in specified amounts, which have approximately equal caloric value and similar protein, fat and carbohydrate. Any food from the given exchange list can be substituted or exchanged for any other food in that list.

In all, there are eight exchange lists

1. ***Cereal exchange***
   - Servings per day: At least 6-10 exchanges may be included
   - What is one serving?

Food Item	Quantity
Parata	One medium
Cooked Rice	½ cup
Puffed rice	30g
Bread	1 slice (30g)

2. ***Pulse and legumes exchange***
   - Servings per day: At least two exchange
   - What is one serving?

Food Item	Quantity
Bengal gram	30g
Besan	30g
Lentils	1 cup (medium dense)

3. ***Leafy vegetables exchange***

- Servings per day: At least two exchange
- What is one serving?

Food Item	Quantity
Amaranth	½ cup
Cabbage	½ cup
Spinach	½ cup

4. ***Other vegetables exchange***

- Servings per day: At least two exchange
- What is one serving?

Food Item	Quantity
Carrot	105g
Potato	45g
Beans	90g

5. ***Flesh food exchange***

- Servings per day: At least two exchange
- What is one serving?

Food Item	Quantity
Beef	60g
Fish (small)	60g
Egg	2 whole

6. ***Fruit exchange***

- Servings per day: At least two exchanges may be selected, one fruit from the vitamin c or vitamin-A group and other from the other fruits being the ideal combination.
- What is one serving?

Food Item	Quantity
Amla	90g (20 medium)
Apple	75g (1 small)
Orange	90g (1 small)
Mango	90g (1 small)

7. ***Milk exchange***

- Servings per day: At least two exchange
- What is one serving?

Food Item	Quantity
Cow's milk	180ml
Curd	210g
Cheese	30g

8. ***Fat exchange***

- Servings per day: Generally 3-4 exchanges may be served.
- What is one serving?

Food Item	Quantity
Vegetable oil	11g
Almonds	15g
Butter	15g

Besides these eight exchanges, sugar is commonly used; one teaspoon or 5gm sugar contributes about 20kcal. 20-30g sugar daily is sufficient.

8.3 Diet chart by age group and physiological condition

Table 8.1: Diet chart for the children aged 5-9 years

Sl no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Vitamin A (µg RE)	Iron (mg)	Calcium (mg)
01.	Ruti / Bread	2 pc (Medium)	2 x 32	133	4.6	-	1.2	5.6
02.	Egg	1 pc	40	62	5.2	111.2	0.8	22.4
03.	Porridge (with milk)	1 Cup	160	158	3.4	21	0.4	89
04.	Fruits (Amra, Orange, Guava)	1 pc	60	39	0.7	80	2.3	33
05.	Rice	3 Cup	450	485	10	-	5.0	40.5
06.	Non-leafy veg. (Bean, Pumpkin)	1 Cup	180	60	0.8	788	2.0	45
07.	Pulse	2 Cup	300	171	13	45	2.4	35
08.	Leafy vegatables (Amaranth, Colocasia leaves)	½ Cup	90	35	3.8	1528	28.8	138
09.	Fish/ Meat	2-3 Pc	70	105	16.5	1.75	1.6	172
10.	Banana	1 pc (Large)	180	171	2.1	68.4	1.0	16.2
11.	Edible oil	3 tea spoon	15	130	-	-	-	-
12.	Whole milk	1 glass	250	163	8.4	-	0.1	305
		Total	-	1712	68.5	2715	45	901

Fish/meat can be replaced by 5-6 pc (50 gm) of liver once per week
Porridge- 1 cup = rice-15gm+milk-70ml+sugar-15gm

Table 8.2: Diet chart for the adolescent boys/ girls

Sl no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Vitamin A (µg RE)	Iron (mg)	Calcium (mg)
01.	Ruti / Bread	2 pc (Medium)	2 x 32	133	4.5	-	1.2	5.6
02.	Egg	1 pc	40	62	5.2	111.2	0.8	22.4
03.	Non-leafy veg. (Bean, Pumpkin)	2.5 Cup	450	151	12	1971	5.1	112.5
04.	Fruits (Ambda, Orange, Guava)	1 pc Medium / 1 Cup	60	39.6	0.7	80	2.3	33
05.	Cake/ Singara	1 pc Medium	50	150	3	-	0.5	15.5
06.	Rice	3.5 Cup	525	566	11.7	-	5.8	47.3
07.	Pulse	2 Cup(Medium dense)	300	171	13	45	2.4	35
08.	Leafy vegetables (Amaranth, Colocasia leaves)	1/2 Cup	90	35	3.8	1528	28.8	138
09.	Fish/ Meat	2-3 pc	80	120	18.8	2.0	1.9	197
10.	Biscuit/ Puffed rice	2 pc / 1Cup	15	75	1	-	0.2	3
11.	Banana/ Mango (ripe)	1 pc Medium	180	171	2.1	68.4	1.0	16.2
12.	Whole milk	1 glass	250	163	8.4	72	0.1	305
13.	Edible oil	5 tea spoon	25	218	-		-	-
		Total	-	1966	84.2	3877	50.1	930

Fish/meat can be replaced by 5-6 pc (50 g) of liver once per week

Table 8.3: Diet chart for adult male

Sl no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Vitamin A (µg RE)	Iron (mg)
01.	Ruti / Bread	4pc (Medium)	4 x 32	267	9	2.3	11.2
02.	Egg	1 pc	40	62	5.2	0.8	22.4
03.	Non-leafy veg. (Bean, Pumpkin)	3Cup	540	182	13	4	135
04.	Fruits (Amra, Orange, Guava)	1pc (Large) / 1 Cup	80	52	0.8	2.7	38.5
05.	Rice	5 Cup	750	808	16.7	8.3	67.5
06.	Leafy vegetables (Amaranth, Colocasla leaves)	½ Cup	90	35	1.9	9.0	188
07.	Pulse	2 Cup(Medium dense)	300	176	13	2.4	35
08.	Fish/Meat	3-4 pc	100	160	24	2.5	197
09.	Biscuit	2-3 pc	20	100	1.2	0.2	3.8
10.	Banana/ Mango (ripe)	1 pc (Medium)	180	171	2.1	1.0	16.2
11.	Edible oil	5 tea spoon	25	218	-	-	-
12.	Whole milk	1 glass	250	163	8.4	0.1	305
o		Total	-	2394 =2400	95.3	29.7	1019

Table 8.4: Diet chart for adult female

Sl no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Vitamin A (µg RE)	Iron (mg)
01.	Ruti/Bread	3 pc (Medium)	3 x 32	200	6.7	1.7	8.4
02.	Egg	1 pc	40	62	5.2	0.8	22.4
03.	Non-leafy veg. (Bean, Pumpkin)	3 Cup	540	182	13	4	135
04.	Fruits (Amra, Orange, Guava)	1 pc (large)/1 Cup	80	52	0.8	2.7	38.5
05.	Rice	4 Cup	600	646	13.3	6.6	54
06.	Leafy vegetables (Amaranth, Colocasia leaves)	½ Cup	90	35	3.8	28.8	138
07.	Pulse	2 Cup (Medium dense)	300	176	13	2.4	35
08.	Fish/ Meat	2-3 pc	80	120	18.8	1.9	197
09.	Biscuit	2-3 pc	20	100	1.2	0.2	3.8
10.	Banana/ Mango (ripe)	1 Cup / 1 pc (Medium)	180	171	2.1	1.0	16.2
11.	Edible oil	4 tea spoon	20	174	-	-	-
12.	Whole milk	1 glass	250	163	8.4	0.1	305
		Total	-	2081 =2100	86.3	50.2	953

Table 8.5: Diet chart for pregnant women

Sl no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Folic Acid (µg)	Iron (mg)	Calcium (mg)
01.	Ruti / Bread	3 pc (Medium)	3 x 32	200	6.7	13.2	1.7	8.4
02.	Egg	1 pc	40	62	5.2	26	0.8	22.4
03.	Non-leafy veg. (Bean, Pumpkin)	2.5 Cup	450	151	12	72	5.1	112.5
04.	Fruits (Amra, Orange, Guava)	1 pc (Medium)	60	39	0.7	-	2.3	33
05.	Porridge (with milk)	1 Cup	160	158	3.4	3.7	0.4	89
06.	Rice	5 Cup	750	808	16.7	22.5	8.3	67.5
07.	Pulse	2 Cup (dense)	300	247	18.1	335.3	5.3	39.2
08.	Leafy vegatables (Amaranth, Colocasia leaves)	½ Cup	90	35	3.8	-	28.8	138
09.	Fish/Meat	2-3 pc	80	120	18.8		1.9	197
10.	Biscuit	2 pc	15	75	1.0	0.9	0.2	3.0
11.	Banana/ Mango (ripe)	1 pc (Medium)	180	171	2.1	36	1.0	16.2
12.	Whole milk	1 glass	250	163	8.4		0.1	305
13.	Edible oil	5 tea spoon	25	218	-	-	-	-
		Total	-	2447	96	523	56	1031

Table 8.6: Diet chart for lactating mother

Serial no	Menu	Amount (Cooked)	Weight (g)	Calorie (kcal)	Protein (g)	Iron (mg)	Calcium (mg)
01.	Ruti / Bread	3 pc (Medium)	3 x 32	200	6.7	1.7	8.4
02.	Egg	1 pc	40	62	5.2	0.8	22.4
03.	Non-leafy veg. (Bean, Pumpkin)	2.5 Cup	450	151	12	5.1	112.5
04.	Fruits (Amra, Orange, Guava)	1 pc (Medium)	60	39	0.7	2.3	33
05.	Porridge (with milk)	1 Cup	160	158	3.4	0.4	89
06.	Rice	6 Cup	900	970	20	9.9	81
07.	Pulse	3 Cup (Medium dense)	450	264	19.3	5.7	42
08.	Leafy vegatables (Amaranth, Colocasia leaves)	½ Cup	90	35	3.8	28.8	138
09.	Fish/ Meat	2-3 pc	80	120	18.8	1.9	197
10.	Biscuit	2 pc	15	75	1.0	0.2	3.0
11.	Banana/Mango (ripe)	1 pc (Medium)	180	171	2.1	1.0	16.2
12.	Whole milk	1 glass	250	163	8.4	0.1	305
13.	Edible oil	5 tea spoon	25	218	-	-	-
		Total	-	2626	101.4	58	1047

Porridge- 1 cup = rice-15 g + milk-70 ml + sugar-15 g

9.1 Role of lifestyle and diet on health

The world is witnessing rapid changes in diet and body composition, with resultant important changes in health profiles. Wide changes in population size and its age composition; in disease patterns; and in dietary and physical-activity patterns are occurring around the world. Dietary and physical-activity changes are reflected in nutritional outcomes such as changes in average stature and body composition. This change is referred to as the nutrition transition. The Nutrition transition can be seen as part of the changes that shaped human health over the last half of the twentieth century- namely the demographic, economic, and technologic changes that many countries, particularly developing countries, experienced over that the century. A diet high in total fat, cholesterol, sugar and other refined carbohydrates, low in polyunsaturated fatty acids and fibers, and often with an increasingly sedentary life, is the characteristic of most rich societies and also of increasing portions of the population in poorer societies. These characteristics result in increased prevalence of obesity and degenerative diseases. Chronic non-communicable diseases are currently the main cause of both disability and death worldwide. This heterogeneous group of diseases, including, among others, cardiovascular conditions, cancers, chronic respiratory conditions and diabetes, affect people of all ages and social classes (WHO, 2002). Globally, of the 58 million deaths that occurred in 2005, approximately 35 million, or 60%, were due to chronic causes. Most of them were due to cardiovascular disorders and diabetes (32%), cancers (13%), and chronic respiratory diseases (7%)[52]. This burden is predicted to worsen in the coming years. Risky lifestyles play a great role in the incidence of many chronic diseases and whereas some lifestyle trends, such as consumption of poor diets, adoption of sedentary behavior and the resulting obesity, are adversely affecting population health[53].

Consuming a more tasteful and rich diet is a choice of most of the people. The challenge is to learn how to continue to improve the palatability and quality of diet, while discovering ways to accomplish this task in a more healthful manner.

Some important diet and lifestyle related diseases are-

- Cardiovascular disease
- Diabetes
- Renal disease
- Gout

9.2 Cardiovascular disease (CVD)

Cardiovascular disease (CVD) is a group of conditions that includes hypertension, chronic heart diseases (CHD), stroke, rheumatic heart disease or congestive heart failure (CHF).

CVD results from impeded blood flow to the network of blood vessels surrounding the heart and serving the myocardium. The major underlying cause of CHD is atherosclerosis which involves structural and compositional changes in the innermost or intimal layer of the arteries. This is a condition in which plaque hardens in the arteries and narrows them. This limits the flow of oxygen-rich blood to the organs and other parts of the body and can lead to serious problems including heart attack, stroke and death.

Most common effects of heart hisease

1. Blood pressure can rise and fall quite often. Neither high blood pressure nor low blood pressure is a good condition for health.
2. When an artery becomes so narrowed that the blood flow to the heart is completely blocked, then it can lead to a fatal heart attack.
3. When an artery that's linked to the brain is so clogged up with fat deposit that blood flow to the brain is severely impeded to the extent that blood cannot flow through, then it can results in a stroke.
4. Irregular and short breathing is a common effect of heart disease. It can result from irregular palpitations.
5. Chest pain (also known as angina) occurs when oxygen supply to the heart is limited or blocked due to artery blockages.
6. The person who suffers from a heart disease will usually be constantly tired, exhausted and feeling drained.
7. The constant feeling of stress, anxiety, worry or depression is also a possible effect of heart disease.
8. If the heart, which is the most important organ in the body, is not functioning properly or is under distress, the other linked organs like liver and kidney could get affected too.

Factors associated with heart disease

Some well-established risk factors for heart disease like increasing age, male gender and family history cannot be changed. But some other strongly associated risk factors are potentially reversible or can be modified:

- Cigarette smoking
- Increased levels of LDL cholesterol
- High triglycerides (caused by the building up of fats derived from foods eaten or made in the body from other energy sources)

- Low HDL cholesterol
- Being overweight
- High blood pressure
- Physical inactivity
- Diabetes
- Stress
- Drinking alcohol

Prevention and management

- Targets for control of lipid[51]:

Total cholesterol (mg/dl)	<170
HDL cholesterol (mg/dl)	>40
LDL Cholesterol (mg/dl)	<100
Serum Triglycerides (mg/dl)	<150

Adopting a heart-healthy diet can help reduce LDL cholesterol (the "bad" cholesterol), lower blood pressure, lower blood sugars, and reduce body weight. Adding heart-healthy foods is just as important as cutting back on others.

Here are some strategies to lower blood cholesterol and reduce risk of heart disease:

1. Fruit and vegetables are rich in many essential nutrients including vitamins C and E and carotenoids (which are all antioxidants). They may help to protect the heart by limiting the damaging effects of cholesterol on body tissues. Aim for at least five servings of fruit and vegetables a day.
2. Reducing the proportion of fat in diet, especially saturated fat, can help to reduce blood cholesterol levels. One should aim to limit total fat grams; eat a bare minimum of saturated fats (less than 7% of total calories each day) and avoid trans fats; when use added fat, use unsaturated fats (for example, fats found in vegetable oils such as canola, olive, and peanut oils).
3. When reducing total fat, it's important not to cut out the heart healthy fats from the diet including mono and poly-unsaturated fats and omega-3, mostly found in plant and fish oils.
4. Certain plant-derived compounds, called sterol or sterol esters, have been shown to reduce cholesterol levels.
5. Chicken, fish, and vegetable proteins are better than red meats (beef, pork, and lamb) which contain more saturated fat and cholesterol. They help lower levels of blood fats (triglycerides), fight atherosclerosis, and decrease blood pressure.
6. The American Heart Association recommends less than 300mg a day of dietary cholesterol for healthy people and less than 200mg if someone has heart disease.
7. Get energy by eating complex carbohydrates (whole wheat, brown or wild rice, whole-grain breads) and limit simple carbohydrates (regular soft drinks, sugar, sweets).
8. Skipping meals often leads to overeating. Eating five to six mini-meals may help keep cravings in check, help control blood sugars and regulate metabolism.
9. Dietary fibre, found in wholegrains, leafy vegetables, beans and pulses, can help to lower LDL cholesterol. Fibre rich foods should be included as part of an overall healthy balanced diet.
10. Regular physical activity helps to maintain normal body weight. A patient of cardiovascular disease should participate in regular physical activity as recommended by physician.
11. Ingestion of excessive amounts of sodium tends to increase markedly the blood pressure. Hence, sodium intake should be restricted between 200mg and 400mg depending on the severity of the disease.

9.3 Diabetes mellitus

Diabetes mellitus is a group of diseases characterized by high blood glucose concentrations resulting from defects in insulin secretion, insulin action, or both. Abnormalities in the metabolism of carbohydrate, protein, and fat are also present.

There are two different types of diabetes

- ***Type 1 diabetes*** also called insulin-dependent diabetes, occurs when the body fails to produce insulin. It usually affects young people, often in childhood, and is the least common of this two forms of diabetes.

- **Type 2 diabetes** develops slowly. Although the body continues to secrete insulin, often in large amounts, people who are on the path of type 2 diabetes don't respond efficiently. This is known as insulin resistance. It is much more common than type 1 diabetes, accounting for at least 75 per cent of cases. Type 2 diabetes often develops later in life. Being overweight and inactive increases the chances of developing type 2 diabete[54].

The various predisposing factors are- heredity, age, sex, obesity, stress, physical inactivity etc.

Prevention and management

Diabetes is a chronic disease which requires changes for a lifetime. The management of diabetes includes regular blood glucose monitoring, medications, physical activity, and diet modification.

Some strategies to maintain optimum blood glucose level are:

- 50-55% of total calorie should come from carbohydrate, 15-20% from protein and 20-25% from fats and oils. Saturated fat intake should be <7% of total calorie requirement.
- Simple carbohydrates can enter into bloodstreams almost immediately, so it's best to limit highly refined carbohydrates like white bread, table sugar, white rice, sugary cereals etc. complex carbohydrates like brown bread, oat meal, and whole cereals are encouraged.
- Nuts and seeds, lean meats, seafood, whole grains and beans have low glycemic index (GI) and high fibre. These are recommended to take as replacements of refined carbohydrates.
- Have three meals and two or three snacks each day and don't skip any meal. Eat regular small meals with 2-3 hours interval. Try to eat roughly the same amount of calories every day, rather than overeating one day or at one meal, and then skimping on the next.
- Eat a lot of non-starchy vegetables and fruits.
- The best fats are unsaturated fats, which come from plant and fish sources. Try to choose fats from these sources.
- Try to avoid chips, fried snacks, ice creams, soda and juice.
- Regular physical activity can improve blood sugar control, help manage weight and maintain heart health. The best form of exercise recommended to a diabetic is a stepwise increase of aerobic exercise.
- Fiber can slow down glucose uptake into blood. Fiber rich foods like whole grains, leafy vegetables, oat bran are hence encouraged for diabetic patients.
- Alcohol intake is strongly prohibited.
- Sodium intake should not be more than 6g/day.
- Appropriate management of stressful mental situation in life is important to ensure a disciplined and healthy lifestyle for diabetic patient.

9.4 Renal Disease

The diseases related to kidneys and urinary tracts include: nephritis, acute and chronic renal failure, renal and vesical calculi.

9.4.1 Nephritis

Nephritis can be classified into two classes: *Type 1 Nephritis and Type 2 Nephritis*

Type 1 Nephritis

This condition affects mostly children and young adults. The glomeruli are affected by a specific inflammatory process. The glomerular filtrate volume is reduced. The urine contains blood, albumin and casts, water, electrolyte, urea and other waste products are retained in the blood and tissues. The blood urea rise and plasma protein concentration falls.

Dietary management

- The calorie intake should be 10% less than that of a sedentary person. An intake of 1700kcal for adult males and 1500kcal for adult females may be adequate.
- The intake of proteins should be reduced to a minimum i.e. about 30g to keep the body in Nitrogen equilibrium. Excess of protein intake will give rise to increase in blood urea levels. Protein of high biological value should be preferred to other sources of protein.
- Fluid intake should be restricted. The fluid intake should be 1000ml plus the volume of water lost in urine which may vary from 400-600ml per day.
- As fat and protein is restricted, the bulk of the calorie requirements should be supplied in the form of carbohydrates.
- Diet should be low in sodium. Addition of sodium chloride is not permitted to the foods during or after cooking.

Type 2 nephritis

It is characterized by severe albuminuria. Oedema is present. There is increase in the permeability of glomerular basement membrane. There is no retention of urea and other nitrogenous waste products. Initially there is accumulation of body fluid seen as swelling of the eyelids and legs. The blood levels of plasma proteins drop and serum cholesterol level increases.

Dietary management

- For the effective replacement of serum albumin, the dietary proteins should be of high nutritive value, e.g., proteins of milk, eggs, meat and fish. The daily protein allowance is increased to 100-120 grams.
- Sufficient calories should be provided by diet.
- To prevent massive oedema, sodium levels in the diet must be low. Usually a 500mg sodium diet is satisfactory.
- The fluid intake should be equal to 1000ml plus the fluid lost in the urine excreted daily.

9.4.2 Renal failure

Chronic glomerulonephritis, nephrosclerosis are the principal diseases leading to renal failure. This may occur abruptly as in acute renal failure, but most often develops gradually because of progressive destruction of renal tissue by the disease (chronic renal failure). In this condition glomeruli and tubules are heavily damaged. In renal failure, accumulation of urea and other waste products takes place in blood and tissues.

Dietary management

- The diet in uremia should be low in protein depending on the urea content of blood. Patients on haemodialysis should be given good quality protein of one gram per kg body weight. Patients who are not being haemodialyzed show better nitrogen balance with 0.6g protein per kg body weight.
- In chronic uremia, hyperkalamia is found. For a non-dialyzed patient, potassium intake is limited to 1500-2000mg. A dialyzed patient may be given up to 2500mg potassium.
- The dietary sodium may be restricted depending on its level in urine and serum. Vegetables and fruits containing sodium less than 10mg% should be used.
- Phosphorus may be restricted to 600-750mg per day.
- A strict control of the fluid intake is necessary to prevent excess retention in the body. Patients not being dialyzed can take 400-600ml fluids per day, while dialyzed patients can take a little less than one litre per day.

9.4.3 Renal calculi

Renal calculi consist of mucopolysaccharides, urates, calcium oxalate, calcium phosphate and calcium carbonate. Urate and oxalate stones are more common. These may be found in the kidney itself, uretar, bladder or the urethra.

Dietary management

- Fluid intake should be increased as much as possible depending on the tolerance of the patient, since it helps dilute the urine which discourages the concentration of the constituents of the stone.
- Intake of calcium and phosphorus should be kept at a minimum, as excessive amount of these elements excreted in urine will predispose the patient to the formation of renal calculus. Calcium may be permitted to be consumed up to 400-600 mg per day. Phosphorus may be consumed about two grams per day.
- Foods containing oxalates, e.g., tea, cocoa should be completely avoided.
- The protein intake should be just adequate to meet the requirements. Protein rich foods containing purine bases i.e., meat, fish should be avoided or consumed only in very small amounts.

9.5 Gout

Gout is a hereditary disease which results from excessive uric acid in the bloodstream. It leaves needle-like crystal deposits in the joints causing redness, swelling and extreme pain.

Dietary management

It can be helpful to follow a low purine diet, avoiding foods that are high in purine and eating low purine foods moderately.

- As in gout, the joints in the legs are inflamed and cannot bear more weight, weight should be maintained at normal level. The calorie intake should be restricted to that required for sedentary persons.
- Foods consist of complex carbohydrates (like potatoes, rice, whole cereal products, pasta, etc.), fresh fruits, raw vegetables, soy are known to prevent the occurrence of episodic symptoms and to speed up the amelioration of already existent gout attacks.

- Low-fat dairy products (such as skim-milk and light yogurt) can normalize serum uric acid concentration and thus they are recommended to all people affected by gout.
- Drink plenty of water to help the body flush out the excess of uric acid. It is strongly recommended to drink at least 2 liters of water a day.
- The protein intake should be between 50-60g for an adult. The protein should be derived from cereals, eggs and milk. Red meats such as beef, mutton, lamb, pork, poultry, are high in purines. These foods should be avoided.
- Alcohols should be avoided or restricted as it can raise the level of uric acid in the blood in a number of ways and so trigger a gout attack.
- All sweetened soft drinks, juices and foods with added high-fructose and corn syrup should be avoided.
- Vitamin C supplementation may be helpful for gout patients.
- Regular exercise can help to maintain normal body weight, thus rendering benefit to gout patients.

9.4 List of foods rich in therapeutically important nutrients

Table 9.1: Cholesterol content of some foods

Foods	Cholesterol mg/100 g
Dairy Products	
Butter	280
Ghee	310
Cheese	160
Cream, processed	140
Milk, whole (fresh)	11
Milk powder (whole)	88
Poultry products	
Egg, duck, whole	884
Egg, Hen	498
Egg, yolk	1330
Egg, white	0
Flesh Foods	
Beef round (medium fat)	125
Duck	70
Lamb	70
Pigeon	110
Cow, liver	360
Lamb, liver	610
Chicken, Liver	564
Brain, Lamb	2000
Kidney, Cow	375
Lard and other animal fats	95
Fish	
Shrimps	150
Lobster	200

Source: Swaminathan M. Essentials of Food and nutrition. The Bangalore Printing and Publishing Co. 1985; 2nd edition[55].

Table 9.2: Dietary fibre content of some foods

Foods	Dietary Fibre g/100 g
Cereals and Cereal Products	
Oatmeal, cooked	1.3
Corn, boiled	4.74
Bran, Wheat	44
Bread, whole wheat	9.5
Millet (pearl)	11.3
Psyllium Husk	71
Legumes and nuts	
Bengal Gram (whole)	28.3
Gram (red, unripe)	22.6
Green Gram (whole)	16.7
Green peas	8.6
Almonds	8.4
Pea nut	11
Vegetables	
Carrot	3.7
Bottle Gourd Leaves	4.38
Jute Leaves	5.75
Fruits	
Dates (dry)	8.3
Wood Apple	6.96
Black Berry (native)	7.25
Guava	8.5
Raisins, dried	3.6
Apple (with skin)	3.4
Grapes	6.8

Source: The Philippine Food Composition Tables, 1997. Food and Nutrition Research Institute, Dept. of Science and Technology, Metro Manilla, Philippines[56].

Table 9.3: Potassium content of some foods

High Potassium containing foods		Low potassium containing foods	
Foods	**Potassium mg/100 g**	**Foods**	**Potassium mg/100 g**
Cow pea	1131	Lychee, raw	171
Green gram (split)	1150	Cucumber	50
Sword beans	1800	Melon (mix)	27
Khesari dal	644	Beet root	43
Black gram (split)	800	Pineapple, raw	115
Yellow shrimp	680	Grapefruit, raw	139
Lime (sweet)	490	Mango, raw	156
Wood apple	427	Blackberries, raw	162
Potato	403	Cauliflower, cooked	136
Jackfruit (immature)	328	Eggplant, cooked	117
Jackfruit (ripe)	305	Egg, whole, boiled	126
Amaranth (red leaf var.)	277	Milk, cow's, whole	143
Lemon	270	Lettuce	33
Banana, raw	358	Snake gourd	34
Guava, raw	417	Gourd (ridge)	50
Papaya, raw	257	Rose apple	50
Pomegranate, raw	259	Bean (broad)	39
Tomatoes, raw	237	Water melon	58
Cabbage, green	246	Apple	75
Cauliflower, raw	303	Mango (green)	83
Corn, raw	270	Carrot	87
Bitter melon, cooked	306	Gourd (bottle)	87
Coconut water	250	Pears	96
Beef, cooked	315	Radish	138
Chicken liver, fried	323	Curd	130
Beef liver, fried	348	Black berry (deshi)	106
Red kidney beans, dry, cooked	401		
Chickpeas, dry, cooked	278		
Almonds	728		
Cashew nuts	632		
Peanuts	726		
Pistachio nuts	1042		

Table 9.4: Sodium content of some foods

High Sodium containing foods		Low Sodium containing foods	
Foods	**Sodium mg/100 g**	**Foods**	**Sodium mg/100 g**
Nona ilish	1023	Pomegranate	0.9
Bombay duck (dry)(loittya)	1014	Gourd (bottle)	1.8
Chapila (dry)	1408	Peaches	2
Yellow shrimp (dry)	698	Gourd (ridge)	3
Spinach	248	Orange/mandarin	4.5
Amaranth leaves (tender)	230	Guava	5.5
Hen egg (deshi)	135	Pears	6.1
Butter fish/pabda fish (bony)	345	Wood apple	7
Rita	122	Cucumber	10.2
Lichis (deshi)	119	Potato	10.4
Beef, cooked	384	Sweet potato (red)	11
Egg, whole, boiled	278	Papaya (ripe)	12
Cheese, cheddar	621	Tomato (ripe)	13
Butter,salted	577	Plantain	15
Biscuit made with baking powder	936	Cow pea	23
Beets, cooked	304	Gourd (snake)	25.4
Soy sauce	5637	Gourd (sweet) pumpkin	27
Potato chips, salted	525	Mango ripe (deshi)	28
Pickles, mixed	855	Apple	28
Buttermilk	105	Green gram (whole)	28
Tomatoes, cooked	165	Folwal	28.1
Lamb, cooked	394	Melon (mix)	28.6
Beef sausage	1126	Water melon	32
Peanuts	320	Egg plant	33
Chicken	404	Radish	33
Mung beans	214	Bottle gourd leaves	36
Duck, cooked	221	Gourd (bitter)	36
		Lady's finger/okra	37
		Bengal gram (whole)	37
		Pineapple	42
		Kakrol	52
		Cauliflower	53

Source: USDA National Nutrient Database for Standard Reference Release 24. http://ndb.nal.usda.gov/ndb/foods/list[57]

10.1 Recommended Dietary Allowances (RDA)

Recommended dietary allowances are the estimated nutrient allowance that is adequate in 97% to 98% of the healthy population specific for life-stage, age and gender. RDA includes addition of safety factor to the requirement of the nutrient, in order to cover the variation among individuals; losses during cooking and the lack of precision inherent in the estimated requirement. The recommended level depends upon the bioavailability of nutrients from a given diet. The term bioavailability indicates what is absorbed and utilized by the body. The RDA is the nutrient intake goal for individuals (http://www.newagepublishers.com/samplechapter/001006.pdf).

For proper menu planning, as a first step, there is need to know Recommended Dietary Allowances for different age and physiological groups. In fact, RDAs are suggested averages/day. In practice, fluctuations in intake may occur depending on the food availability and demands of the body. But, the average requirements need to be satisfied over a period of time.

General considerations in deriving human nutrient requirements are

1. The minimum intake level of a nutrient is set for equilibrium (intake = output) in adults.
2. Nutrient requirement is based on nutrient retention level consistent with satisfactory growth in infants and children, satisfactory maternal and fetal growth during pregnancy and satisfactory output of breast milk during lactation.
3. Minimum requirements for all nutrients should be met.
4. The amount of each nutrient needed for an individual depends upon age, body weight and physiological status.
5. The RDA is derived from (i) the individual variability, and (ii) the nutrient bio-availability from the habitual diet.

10.2 Importance of RDA

The diet that one consumes must provide adequate calories, proteins and micronutrients to achieve maximum growth potential.

- RDA provides proper guidelines which help a person to set the amount and type of food required for maintaining good health.
- The RDA specifies amounts of nutrients which are neither excess nor less compared to the required amount. So one should follow the RDA for nutrients in his menu planning.

Table 10.1: Recommended dietary allowances for macronutrients

Group	Particulars	Energy	Protein	Visible Fat
		Kcal/day	g/day	g/day
Men	Sedentary work	2425	60	20
	Moderate work	2875		
	Heavy work	3800		
Women	Sedentary work	1875	50	20
	Moderate work	2225		
	Heavy work	2925		
	Pregnant women	+300	+15	30
	Lactating:			
	0-6 months	+550	+25	45
	6-12 months	+400	+18	
Infants	0-6 months	108/kg	2.05/kg	--
	6-12 months	98/kg	1.65/kg	
Children	1-3 years	1240	22	25
	4-6 years	1690	30	
	7-9 years	1950	41	
Adolescents	Boys(10-12 years)	2190	54	22
	Girls(10-12 years)	1970	57	
	Boys(13-15 years)	2450	70	22
	Girls(13-15 years)	2060	65	
	Boys(16-18 years)	2640	78	22
	Girls(16-18 years)	2060	63	

Source: Nutrient Requirements and Recommended Dietary Allowances for Indians', 2009. A Report of the Expert Group of the Indian Council of Medical Research. National Institute of Nutrition, Indian Council of Medical Research, Jamai-Osmania PO, Hyderabad – 500 604[58].

Table 10.2: Energy requirement per person per day (Based on desired body weight) in Bangladesh

Age group	Sex	Desired body weight (kg)	Energy expenditure per kg body weight	Energy required based on desired body wt.	
				Without 5% extra allowance	With 5% extra allowance
0-9+	Male	19.32±5.45	95	1835	1927
	Female	20.06±5.40		1906	2001
	Both	19.69±5.43		1871	1965
0-4+	Male	13.92±2.70	103	1433	1505
	Female	13.71±2.59		1412	1483
	Both	13.83±2.65		1424	1495
5-9+	Male	23.34±3.38	82.4	1923	2019
	Female	22.81±3.71		1880	1974
	Both	23.05±3.38		1899	1994

Table 10.3: Energy requirement per person per day (Based on desired body weight) in Bangladesh

Age group	Sex	BMR based on desired body wt.	Activity factor			Energy required on the basis of activity factor and BMR (based on desired body wt)		
			Light	Moderate	Vigorous	Light	Moderate	Vigorous
10-17+	Male	1441.62	1.44	1.84	2.56	2076	2653	3691
	Female	1304.35	1.47	1.80	2.36	2348	2348	3078
	Both	1362.78	1.46	1.81	2.55	1990	2467	3475
≥18	Male	1505.69	1.44	1.84	2.56	2168	2770	3855
	Female	1206.75	1.47	1.80	2.36	1774	2172	2848
	Both	1312.02	1.46	1.81	2.55	1916	2375	3346

Source: Determination of food availability and consumption patterns and setting up of nutritional standard in Bangladesh. Bangladesh Institute of Development Studies Maxwell Stamp, in collaboration with Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management, NFPCSP-FAO, 2008.

Table 10.4: Recommended mineral intake

Group	Particulars	Calcium	Iron	Zinc	Magnesium	Iodine	Selenium
		mg/day	mg/day	mg/day	mg/day	µg/day	µg/day
Infants	0-6 months	400	–	2.8	36	90	6
	7-12 months	400	9.3	4.1	54	90	10
Children	1-3 years	500	5.8	4.1	60	90	17
	4-6 years	600	6.3	4.8	76	90	22
	7-9 years	700	8.9	5.6	100	120(6-12 yrs)	21
Adolescents	Females (10-18 years)	1300	14.0(11-14yrs) 32.7(11-14yrs) 31.0(15-17yrs)	7.2	220	150 (13-18 yrs)	26
	Males (10-18 years)	1300	14.6(11-14yrs) 18.8(15-17yrs)	8.6	230	150 (13-18 yrs)	32
Adults	Females (19-50 years)	1000	29.4	4.9	220	150	26
	Females (51-65 years)	1300	11.3	4.9	220	150	26
	Males (19-65 years)	1000	13.7	7.0	260	150	34
Pregnant women	1st trimester	–	–	5.5	220	200	–
	2nd trimester	–	–	7.0	220	200	28
	3rd trimester	1200	–	10.0	220	200	30
Lactating Women	0-3 months	1000	15.0	9.5	270	200	35
	3-6 months	1000	15.0	8.8	270	200	35
	7-12 months	1000	15.0	7.2	270	200	42
Elderly	Females (65+ years)	1300	11.3	4.9	190	150	25
	Males (65+ years)	1300	13.7	7.0	224	150	33

*10%Bioavailability
** Moderate Bioavailability

Source: FAO/ WHO, 2004. Vitamin and mineral requirements in human nutrition, 2nd edition, World Health Organization, Food and Agricultural Organization of the United Nations[56]. http://www.who.int/nutrition/publications/micronutrients/9241546123/en/

Table 10.5: Recommended nutrient intake- water soluble vitamins

Group	Particulars	Vitamin C	Vitamin B_1	Vitamin B_2	Vitamin B_3	Vitamin-B_5	Vitamin B_6	Biotin	Vitamin B_{12}	Folate
		mg/day	mg/day	mg/day	mg NE/day	mg/day	mg/day	µg/day	µg/day	µg DFE/day
Infants	0-6months	25	0.2	0.3	2	1.7	0.1	5	0.4	80
	7-12months	30	0.3	0.4	4	1.8	0.3	6	0.7	80
Children	1-3years	30	0.5	0.5	6	2.0	0.5	8	0.9	150
	4-6years	30	0.6	0.6	8	3.0	0.6	12	1.2	200
	7-9years	35	0.9	0.9	12	4.0	1.0	20	1.8	300
Adolescents	Females (10-18years)	40	1.1	1.0	16	5.0	1.2	25	2.4	400
	Males (10-18years)	40	1.2	1.3	16	5.0	1.3	25	2.4	400
Adults	Females (19-50years)	45	1.1	1.1	14	5.0	1.3	30	2.4	400
	Females (51-65years)	45	1.1	1.1	14	5.0	1.5	30	2.4	400
	Males (19-65years)	45	1.2	1.3	16	5.0	1.3* 1.7**	30	2.4	400
Pregnant women		55	1.4	1.4	18	6.0	1.9	30	2.6	600
Lactating Women		70	1.5	1.6	17	7.0	2.0	35	2.8	500
Elderly	Females (65+years)	45	1.1	1.1	14	5.0	1.5	-	2.4	400
	Males (65+years)	45	1.2	1.3	16	5.0	1.7	-	2.4	400

*(19-50yrs)
** (50+yrs)

Table10.6: Recommended nutrient intake – Fat soluble vitamins

Group	Particulars	Vitamin-A	Vitamin-D	Vitamin-E	Vitamin-K
		µg RE/day	µg/day	mg α-TE/day	µg/day
Infants	0-6 months	375	5	2.7	5
	7-12 months	400	5	2.7	10
Children	1-3 years	400	5	5.0	15
	4-6 years	450	5	5.0	20
	7-9 years	500	5	7.0	25
Adolescents	Females (10-18 years)	600	5	7.5	35-55
	Males (10-18 years)	600	5	10.0	35-55
Adults	Females (19-50 years)	500	5	7.5	55
	Females (51-65 years)	500	10	7.5	55
	Males (19-65 years)	600	5 (19-50 years) 10 (51-65 years)	10	65
Pregnant women		800	5	–	55
Lactating Women		850	5	–	55
Elderly	Females (65+ years)	600	15	7.5	55
	Males (65+ years)	600	15	10.0	65

Source: FAO/ WHO, 2004. Vitamin and mineral requirements in human nutrition, 2nd edition, World Health Organization, Food and Agricultural Organization of the United Nations. http://www.who.int/nutrition/publications/micronutrients/9241546123/en/

Table 10.7: Individual's mean PAL by occupation and sex in Bangladesh

Occupation	Sex	Mean PAL
Farmer	Male	1.93
Agri/Day labour	Male	2.28
	Female	2.15
Industrial / Construction labour	Male	1.72
	Female	2.18
Transport labour	Male	1.49
Rickshaw/ Van driver	Male	2.48
Car driver	Male	1.46
Grocer	Male	1.71
	Female	2.22
Medium business	Male	1.65
Hawker	Male	1.93
	Female	2.48
Service	Male	1.62
	Female	1.42
Student	Male	1.79
	Female	1.45
Professional	Male	1.56
	Female	1.36
Craft man	Male	1.39
Housewife	Female	1.55
Fisherman	Male	2.80
Servant	Male	1.39
	Female	1.51
Unemployed (>10years)	Male	1.45
	Female	1.54
Old/ Retired	Male	1.89
	Female	1.41
Handicapped	Male	1.38
	Female	1.28
Others	Male	1.90
	Female	1.60

Source: Determination of food availability and consumption patterns and setting up of nutritional standard in Bangladesh. Bangladesh Institute of Development Studies Maxwell Stamp, in collaboration with Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management, NFPCSP-FAO, 2008.

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