

Introduction To Food Science and Engineering

Recommended Dietary Allowance (RDA)

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Recommended Dietary Allowance

- **Recommended Dietary Allowance (RDA):** The recommended dietary allowance (RDA) refers to the recommended daily levels of nutrients required to meet the needs of nearly all healthy individuals in a particular age and gender group.
- **Balance Diet:** A balanced diet is one that gives body the nutrients it needs to function correctly.

Hence, a balanced diet supplies all the required nutrients to the body so that-

1. the body gets sufficient **energy (calorie)** to work effectively.
2. the body structure is properly **built up and maintained** and
3. the body is **protected from diseases**.

Importance of Balance Diet

Importance of balance diet: A balance diet is necessary to keep a body healthy, disease free, and workable.

A balance diet is important, because:

1. A balance diet supplies body (organs and tissues) the required nutrition to **work effectively**.
2. It builds up and **maintains the body structure properly**.
3. It helps the body to **protect from diseases**.
4. With poor diet body will be **prone to diseases, infection, fatigue, and poor performance**.
5. Children with a poor diet run the risk of **poor growth and development** and **poor academic performance**.
6. Besides, excessive rich diet causes **Obesity and Diabetes**.

Basal Metabolic Rate

Basal Metabolic Rate (BMR): Basal Metabolic Rate is the energy required to sustain the body at complete rest.

- BMR varies with age and gender.
- BMR value for an average man is about 1600 k.cal.
- BMR value for an average woman is about 1500 k.cal.
- Generally, Men need more calories than women.
- People who work hard need more energy than people who do not work
- Diseased or ill person and pregnant women need more calories than healthy and non-pregnant women.

How to Fix or Calculate RDA

Calories (Unit of energy): The number of calories in a food is a measurement of the amount of energy stored in that food. RDA is fixed based on the calories requirement of a body ensuring the balanced diet.

Human body uses calories from the food for walking, thinking, breathing and other important functions.

An average person needs to eat about 2,000 k.calories every day to maintain normal body weight. However, a person's daily calorie intake can vary depending on their

1. age,
2. gender, and
3. physical activity level.

RDA for Different Age Groups

Table. Average calories intake on the basis of age group (USDA guidelines).

Sl. No.	Age group	Daily calorie intake
1	Children age 2 to 4	1,000 to 1,400 k.calories
2	Sedentary women age 14 to 30	1,800 to 2,000 k.calories
3	Active women ages 14 to 30	2,400 k.calories
4	Sedentary men ages 14 to 30	2,000 to 2,600 k.calories
5	Active men ages 14 to 30	2,800 to 3,000 k.calories
6	Sedentary men and women over 30	1,800 to 2,200 k.calories
7	Active men and women over 30	2,200 to 3,000 k.calories

Food Exchange List

An exchange list is a grouping of foods based on similarities in energy content as well as carbohydrate, protein and fat.

Food	Serving size	g/serving	Portion size (uncooked)	kcal
Rice	8-12	30	1/3 cup	100
Wheat	1-3	30	1/3 cup	100
Potato	1-4	50	1 medium	50
Lentil	1-2	30	1/3 cup	100
Leafy vegetables	1-2	125	1 bunch	50
Vegetables	2-3	150	1.5 cup	50
Fruits	1-3	80	1	50
Fish/meat/poultry	1-2	80	2 pieces	100
Egg	1	60	1	100
Milk	1-3	150	1 cup	100
Sugar	1-5	5 (1tsp)	5 tsp	100
Cooking oil	3-6	5 g	2 tsp	100
Spices*	1	20 g	4 tsp	50

Note: Each serving of grain, fish, meat and oil provide 100 kcal; fruits and vegetables provide 50 kcal. * Spices include, onion, garlic, ginger, turmeric and chilli, [Source: BIRDEM](#)

Desirable Diet for Bangladesh

Food	RDA 2350 kcal (in 2007)		Desirable RDA 2430 kcal (in 2013)	
	Desirable intake (g)	% of total energy	Desirable intake (g)	% of total energy
Total cereal	375	55	400	56
Rice	350	51	350	49
Wheat & other cereals	25	4	50	7
Pulses	60	8.8	50	6.5
Animal foods	180	7.0	260	10.5
Fish	55	2.1	60	3
Poultry & meat	35	1.4	40	2
Egg	15	0.6	30	2
Milk & milk products	75	2.9	130	3.5
Fruits	100	4.2	100	3
Vegetables	Leafy		100	2
	Non-leafy	200	3.6	200
Potato	60	2.5	100	4
Cooking oil	40	15.3	30	11
Sugar/gur/molasses	18	3.2	20	3
Spices	20	0.4	20	2
Total	1053	100	1280	100

Source: Dietary Guidelines for Bangladesh, BIRDEM, DHAKA, JUNE-2013

Food Manu Calculation

Manu Planning: How to calculate dietary manu?

➤ Consider An Adult man having the following age and calorie requirement

- Age : 19-29 years
- Activity level : Moderate
- Present energy requirements: 2430 kcal/day
- Weight : 60 kg

Determine the quantity (g) of carbohydrate, fat and protein on the basis of energy requirement.

➤ Let us consider,

- 70% of the kcal from carbohydrate
- 20% of the kcal from fat, and
- 10% of the kcal from protein

➤ So, for 2430 kcal, the division of nutrients translate as follows:

- Carbohydrate : $70\% \times 2430 \text{ kcal} = 1701 \text{ kcal}$; $1701 \text{ kcal} / 4 \text{ kcal/g} = 425 \text{ g}$
- Fat : $20\% \times 2430 \text{ kcal} = 486 \text{ kcal}$; $486 \text{ kcal} / 9 \text{ kcal/g} = 54 \text{ g}$
- Protein : $10\% \times 2430 \text{ kcal} = 243 \text{ kcal}$; $243 \text{ kcal} / 4 \text{ kcal/g} = 61 \text{ g}$

➤ So, the man needs 425 g of carbohydrate, 54 g of fat and 61 g of protein.

Manu Plan

Age : 28 years		Gender : Female		Calorie requirement (Kcal): 2430	
Height : 162 cm		PAL : 1.5		Carbohydrate : 70% 1701 kcal)	
Weight : 60 kg		BMR (kcal/kg/day): 27		Protein : 10% (243 kcal)	
		Total=(60X27)=1620 Kcal		Fat : 20% (486 kcal)	
A. Breakfast : 7 am		A. Lunch : 1 pm		A. Dinner : 8 pm	
B. Snacks : 11am		B. Snacks : 4 pm		B. Bed time: 11pm	
Food name	Qty (g)	Food name	Qty (g)	Food name	Qty (g)
A. Wheat flour (Coarse)	60	A. Rice (parboiled)	150	A. Rice (parboiled)	120
Bengal gram (split)	15	Potato	50	Gourd (bottle)	125
Gourd (snake)	125	Lady's finger	125	Amaranth (Red leaf)	100
Spices	5	Climbing fish	30	Chicken (farm)	40
Oil mustard	10	Indian spinach	100	Spices	10
		Spices	10	Oil Mustard	10
		Oil mustard	10		
B. Banana, (ripe)	100	B. Molasses	10	B. Whole milk (Cow)	130
Rice (flattened)	50	Watermelon	100		
Molasses	10	Rice (puffed)	30		
<p>BMR: Basal Metabolic Rate. It is the amount of energy a man expends each day when at rest.</p> <p>PAL: Physical Activity Level</p>					

Body Mass Index

Body Mass Index (BMI):

The BMI is a measurement of a body weight based on the height of the body.

The BMI is defined as the body mass divided by the square of the body height, and is universally expressed in units of kg/m², resulting from mass in kilograms and height in metres.

Although BMI does not actually "measure" the percentage of body fat, it is a useful tool to estimate a healthy body weight based on the height.

Due to its ease of measurement and calculation, it is the most widely used diagnostic indicator to identify a person's optimal weight depending on his height.

Your BMI "number" will inform you if you are of **underweight**, **normal weight**, **overweight**, or **obese**.

Formula for calculation of BMI,

$$BMI = \frac{\text{Mass (Weight) Kg}}{\text{Height } M^2}$$

Table of Body Mass Index

BMI Table for Adults (WHO recommended body weight based on BMI values for adults-used for both men and women, age 18 or older)

Category	BMI Range (kg/m ²)	
	From	To
Very severely underweight		15 or less
Severely underweight	16	18.5
Underweight	18.5	25
Normal (healthy weight)	25	30
Obese Class I (moderately obese)	30	35
Obese Class II (severely obese)	35	40
Obese III (very severely obese)	40 or above	

Thanks