Food groups

By
Dr. M.Y. Sreenivasa
Department of Microbiology, University of Mysore, Mysore

1. **Introduction**
2. **Cereals, grains and their products**
3. **Pulses and legumes**
4. **Milk, egg and meat products**
5. **Fruits and vegetables**
6. **Fats, oils and sugar**

All of us eat different types of food every day. They may be rice, dal, vegetables, milk, curd and fruit. We already know that all of these food items provide us nutrients, required by our body for energy, body building, repair of tissues and protection from diseases. Now you must be wondering what are food groups. Based on the functions that are performed by various types of food items available, they can be broadly divided into three groups as presented in table 1

	Function	**Nutrient**	**Food**
1.	Energy giving food	carbohydrates and fats	cereals, fats, sugar
2.	Body building food	proteins	pulses, milk, meat, chicken
3.	Regulatory and protective foods	vitamins and minerals	fruits and vegetables

There are several types of food items and each type cannot be studied individually. Therefore, they have been categorized into different food groups. This grouping has been done on the basis of the nutrient content of each food. Let's learn about various food groups (Table 2)

Table 2. The five food group system

Food Groups	**Food**	**Major nutrients present**
Cereals, grains and their products	rice, wheat, *ragi, bajra,* maize etc	carbohydrates, proteins, vitamin B, iron, fibre
Pulses and legumes		carbohydrates, protein, vitamins
Milk, egg and meat products		proteins, fat, vitamins, calcium

Similarly fruits and vegetables give vitamins and minerals while milk, egg and meat products are comparable in terms of their nutrient content. Therefore, if we substitute one food for the other in the same group, we will get almost the same nutrients. So it will be beneficial if we learn more about each food group.

Cereals, grains and their products

Cereals are the edible grains or seeds of the grass family. These are the earliest cultivated plants and have been part of the human diet since prehistoric times. They are relatively easy to grow, store, transport and they have a high nutritive value. There are many different types of cereal grains, each having unique properties. The seven principal cereals grown in the world are wheat, rice, maize, barley, sorghum, oats and rye. Cereals are the World's basic staple food and provide much of the energy and protein for many populations. The grain harvested from cereals provides about three quarters of our food energy. Cereals and cereal products are an important source of energy, carbohydrates, protein and fibre. They also contain a range of micronutrients such as vitamin E, some of the B vitamins, sodium, magnesium and zinc. Food values of some important cereals are presented in Table-3.

Table-3: Nutritional values of major cereals in 100g

Food crop	Energy (Kcal)	Protein (g)	Lipid (g)
Wheat	1420	12.0	2.0
Rice	1296	8.0	2.0
Maize	1471	10.0	4.0
Sorghum	1455	10.0	5.0

In addition to this, fibre plays a crucial role in preventing several lifestyle diseases. We should eat cereals in the unrefined form to get sufficient amount of fibre. Cereals are also rich in vitamin B complex. This gets lost when cereals are refined, e.g. *maida* and polished rice. So our diet should have whole wheat flour instead of *maida* and home pounded or parboiled rice instead of polished rice. *Daliya* and brown rice should also be included in our meals. You also know that most of us always eat cereals along with pulses, curd, milk, meat and vegetables. For example, *dal*-rice, *khichri, sambar, idli, dosa, dal-bati* and *biryani*. Can you guess why? Yes, because when cereals are combined with pulses or vegetables, the nutritive quality of our meal improves.

II) Pulses and legumes

Pulses, a subgroup of legumes, are plant foods from the Leguminasae family (commonly known as the pea family). The edible seeds of pulses are eaten by humans and animals. FAO calls pulses only legumes with dry, edible seeds, with low fat content, are classified as pulses. FAO does not consider pulses legume species used as vegetables (e.g., green peas, green beans), for oil extraction (e.g., soybean, groundnut) and for sowing purposes (e.g., clover, alfalfa).
Pulses and legumes like black grams (*urad),* Kidney Beans *(rajmah)* and bengal gram, green gram *dal* are the major source of protein in Indian diets especially for vegetarians. They have a appreciable amount of vitamin B, calcium and iron. You have already learnt that protein quality of pulses can be improved by combining them with cereals.

III) Milk, egg and meat products

Milk: Milk is a pale liquid produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals before they are able to digest other types of food. The nutritional value of milk is so well known that people all around the world include it as a staple part of their diet. Adding milk to your daily diet can also help you to achieve a well-balanced diet. It is an ideal source of nutrients such as vitamin A, B12, D calcium, carbohydrates, phosphorous, selenium, magnesium, protein, zinc and riboflavin.

It is an extremely beneficial drink for the health of the human body. Some of the advantages of drinking this life-giving nectar are as follows:

- **Calcium:** Milk is the best source of calcium that we can supply to our body. Calcium protects the body from major chronic ailments such as cancer, bone loss, arthritic conditions, migraine headaches, pre-menstrual syndrome, and obesity in children.

  Although most of the focus of calcium is on bones, it has also been shown to reduce cardiovascular disease and the chances of strokes.

  As mentioned above, milk is rich in calcium, which is essential for growth and the proper development of strong bone structure. Bone disorders such as osteoporosis can be prevented with a significant daily intake of milk.

  Encouraging children and youngsters to drink milk will give them excellent dental health, as it protects the enamel surface against acidic substances.

  Fluids are an integral part of the human body, and the body needs to be frequently replenished with liquids as they are used up within the body.

Eggs: Eggs are led by female animals of many different species including birds, reptiles, amphibians, mammals and fish and have been eaten by humans for thousands of years. The most popular choice for egg consumption are chicken eggs. Other popular choices for egg consumption are duck and quail
Egg yolks and whole eggs store significant amounts of protein and choline,and are widely used in cookery. Due to their protein content, the United States Department of Agriculture categorizes eggs as Meats within the Food Guide Pyramid.

Chicken eggs, the most commonly eaten eggs, provide 155 calories (kcal) of food energy and 12.6 g of protein in a 100 gram serving. Eggs (boiled) supply several vitamins and minerals as significant amounts of the Daily Value (DV), including vitamin A (19% DV), riboflavin (42% DV), pantothenic acid (28% DV), vitamin B12 (46% DV), choline (60% DV), phosphorus (25% DV), zinc (11% DV) and vitamin D (15% DV) (table per 100 gram serving of a hard-boiled egg). A yolk contains more than two-thirds of the recommended daily intake of 300 mg of cholesterol.

Poultry meat (Chicken): Chicken is the most common type of poultry in the world. Poultry is the second most widely eaten type of meat in the world, accounting for about 30% of total meat production worldwide compared to pork at 38%.

Meat: Meat is animal flesh that is eaten as food. Humans have hunted and killed animals for meat since prehistoric times. The advent of civilization allowed the domestication of animals such as chickens, sheep, pigs and cattle, and eventually their use in meat production on an industrial scale. Meat is mainly composed of water, protein, and fat. It is edible raw, but is normally eaten after it has been cooked and seasoned or processed in a variety of ways. Unprocessed meat will spoil or rot within hours or days as a result of infection with and decomposition by bacteria and fungi.

Most often, meat refers to skeletal muscle and associated fat and other tissues, but it may also describe other edible tissues such as organ meats. Meat is sometimes also used in a more restrictive sense – the flesh of mammalian species (pigs, cattle, lambs, etc.) raised and prepared for human consumption, to the exclusion of fish, other seafood, poultry or other animals.

Fish: Fish is a vital source of food for people. It is man's most important single source of high-quality protein, providing ~16% of the animal protein consumed by the world's population, according to the Food and Agriculture Organisation (FAO) of the United Nations. Fish provides a good source of high quality protein and contains many vitamins and minerals. It may be classed as whitefish, oily fish, or shellfish.

It is a particularly important protein source in regions where livestock is relatively scarce—fish supplies <10% of animal protein consumed in North America and Europe, but 17% in Africa, 26% in Asia and 22% in China.

Research over the past few decades has shown that the nutrients and minerals in fish, and particularly the omega-3 fatty acids found in pelagic fishes, are heart-friendly and can make improvements in brain development and reproduction. This has highlighted the role for fish in the functionality of the human body.

Sea foods: Seafood is any form of sea life regarded as food by humans. Seafood prominently includes fish and shellfish. Shellfish include various species of molluscs, crustaceans, and echinoderms. Historically, sea mammals such as whales and dolphins have been consumed as food, though that happens to a lesser extent in modern times.

The harvesting of wild seafood is usually known as fishing or hunting, and the cultivation and farming of seafood is known as aquaculture, or fish farming in the case of fish. Seafood is often distinguished from meat, although it is still animal and is excluded in a strict vegetarian diet. Seafood is an important source of protein in many diets around the world, especially in coastal areas. In these ways, seafoods are indirectly used to produce further food for human consumption.

IV) Fruits and vegetables

Fruits: Fruits are the sweet, fleshy, edible part of a plant. It generally contains seeds. Fruits are usually eaten raw, although some varieties can be cooked. They come in a wide variety of colours, shapes and flavours. Common types of fruits that are readily available include:

- Apples and pears
- Citrus – oranges, grapefruits, mandarins and limes
- Stone fruit – nectarines, apricots, peaches and plums
- Tropical and exotic – bananas and mangoes
- Berries – strawberries, raspberries, blueberries, kiwifruit and passionfruit
- Melons – watermelons, rockmelons and honeydew melons
- Tomatoes and avocados.

Vegetables: In everyday usage, a vegetable is any part of a plant that is consumed by humans as food as part of a savory meal. The term vegetable is somewhat arbitrary, and largely defined through culinary and cultural tradition. It normally excludes other food derived from plants such as fruits, nuts and cereal grains, but includes seeds such as pulses.

Vegetables can be eaten either raw or cooked and play an important role in human nutrition, being mostly low in fat and carbohydrates, but high in vitamins, minerals and fiber. Many nutritionists encourage people to consume plenty of fruit and vegetables, five or more portions a day often being recommended.

Vegetables are available in many varieties and can be classified into biological groups or 'families', including:

- Leafy green – lettuce, spinach and silver beet
- Cruciferous – cabbage, cauliflower, Brussels sprouts and broccoli
- Marrow – pumpkin, cucumber and zucchini
- Root – potato, sweet potato and yam
- Edible plant stem – celery and asparagus
- Allium – onion, garlic and shallot.

The nutritional content of vegetables varies considerably; some contain useful amounts of protein though generally they contain little fat and varying proportions of vitamins such as vitamin A, vitamin K and vitamin B6, pro-vitamins, dietary minerals and carbohydrates. Vegetables contain a great variety of other phytochemicals (bioactive non-nutrient plant compounds), some of which have been claimed to have antioxidant, antibacterial, antifungal, antiviral and anti-carcinogenic properties.

Fruits and vegetables contain many vitamins and minerals that are good for your health. These include vitamins A (beta-carotene), C and E, magnesium, zinc, phosphorous and folic acid. Folic

acid may reduce blood levels of homocysteine, a substance that may be a risk factor for coronary heart disease.

Fruits and vegetables are low in fat, salt and sugar. They are a good source of dietary fibre. As part of a well-balanced, regular diet and a healthy, active lifestyle, a high intake of fruit and vegetables can help you to:

- Reduce obesity and maintain a healthy weight
- Lower your cholesterol
- Lower your blood pressure.

V) Fats, oils and sugar

Butter, ghee, oils like mustard oil, groundnut oil, coconut oil and soya oil are the common types of fats consumed in India. Fats are a concentrated source of energy. Some amount of fat is needed in daily diet because they supply essential fatty acids. Besides this, some vitamins like A, D, E and K are fat soluble and important for our body.

Sugar, jaggery and honey are sweetening agents and provide carbohydrates to the body. Do you know that jaggery is better than sugar? Jaggery contains iron which is important for formation of Red Blood Cells (RBC) in our body. We should try to avoid excessive consumption of sugar or jaggery in our daily diet. Extra sugar eaten by us gets converted into fat and gets accumulated in the body and makes us obese.

Conclusion: Foods are grouped together because they provide similar amounts of the key nutrients of that food group. For example, the key nutrients of the milk, yogurt, cheese and calcium and protein, while the fruit group is a good source of vitamins, especially vitamin C. To meet the nutrient requirements essential for good health, you need to eat a variety from each of the five food groups daily, in the recommended amounts.

-------*-------