International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 11 | Nov - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Food Constituents & its Nutritive Aspects: Review Article

Dr.Chhaya D. Thakur, Dr. Ravindra P. Kulkarni, Dr. Vaishali D. Bhale, Ms. Ashwini G Joshi,

Abstract

Food constituents are substances that provide nourishment essential for the maintenance of life and for growth. Food constituents are classified into the major groups which include: fats, carbohydrates, proteins, vitamins, minerals, fiber & water.

Keywords

Food, Food constituents, proteins, fats, vitamins, nutrition's, sources

Introduction

Food is essential for the survival of living organisms. It provides us with energy to carry out daily activities and develop, grow and repair our body parts in case of any damage. Therefore understanding the importance of consuming the right kind of food becomes a necessity.

The substance is ingested by an organism and assimilated by the organism's cells to provide energy, maintain life, or stimulate growth. In order to process foods by converting raw materials into creative, desirable and attractive products that are both safe to consume and have year-round consistency, as well as water.

Food constituents are substances that provide nourishment essential for the maintenance of life and for growth. Food constituents are classified into the major groups which include: fats, carbohydrates, proteins, vitamins, minerals, fiber & water and also include fats and oils, flavours and additives.

Materials and methods: (Tabular representation)

Food Component	Functions or Roles	Sources
Fats	Store energy, protects and insulates the important organs	Butter, Nuts, Margarine, Oils, Avocadoes, Olives, Seafood
Carbohydrates	These are digested and broken down into glucose and provide energy to the body	rice, wheat, maize, barley, potato, sugarcane, beetroot, banana, etc.
Proteins	Help in metabolism, act as enzymes, and hormones	Nuts, Legumes, Dairy, Meat, Egg White, Seafood
Vitamins	help in converting food into energy, boost the immune system maintaining healthy bones, heal wounds, repair and damage of cells and	Fruits, Vegetables, Grains, Cereals Dairy, Soybean
minerals	Help for normal growth and proper functioning. Minerals such as iron, calcium, copper, iodine, sodium,	dairy products, canned fish with bones (salmon, sardines), green leafy vegetables, nuts and seeds.

	phosphorus, zinc etc. along with vitamins are required in small quantities by our body.	
fiber	help in food absorption and prevents constipation. Water constitutes 70% of our body and is required for all the biological processes in our body	Salad, fruits, vegetables, whole cereals and whole legumes and pulses
water	help in absorbing nutrients from the food and release waste from the body in the form of urine and sweat and Water constitutes 70% of our body which is required for all the biological processes in our body	Water, juices, fruits etc.
fats and oils	Contribute to an important part of our diet. They are a source of essential fatty acids and a concentrated source of energy in terms of human nutrition.	Butter, ghee, milk, fish, meat, etc., are sources of animal fat while nuts and vegetable oils like groundnut oil, sunflower oil, mustard oil and sesame oil are sources of vegetable fat.
flavours	uses flavors to enhance the taste and appeal of a wide range of products.	The primary tastes—sweet, sour, salty, bitter, and umami—form the foundation of flavour profiles.
Other additives	additives are used to change the texture, taste or color of foods or to extend their shelf life like they are used for Enzyme preparations, Preservatives, Colouring and Non-sugar sweeteners etc.	Food additives can be derived from plants, animals or minerals, or they can be chemically synthesized.

ADDITIONAL ROLES OF IMPORTANT CONSTITUENTS IN NUTRITIOIN

Carbohydrates, proteins, and fats in many ways are interrelated and intercom veritable in animal metabolism. Although dietary carbohydrate is an economical source of calories and provides rapidly available energy for a variety of physiologic functions, the body can fulfill its energy and carbon requirements from proteins and fats. It also can synthesize blood glucose, liver glycogen, the ribose sugar components of nucleic acids, and other important biological carbohydrates from proteins and fats.

On the other hand, carbohydrates from the foods consumed help the body use fat efficiently. They do this by supplying an organic acid formed as an intermediate in the oxidation of carbohydrates. This organic acid is required for the complete oxidation of fat to CO2 and water. When fat is not efficiently oxidized, ketone bodies can accumulate in the blood and produce the disease condition known as ketone.

Carbohydrates also exert a protein-sparing effect. When carbohydrates are depleted in the animal body and the animal needs additional energy, it gets this energy by oxidizing fats and proteins. In the case of proteins, this energy requirement is thus satisfied at the expense of the body's requirement for proteins and amino acids as components of body tissues enzymes antibodies, and other essential nitrogen containing substances. However, if carbohydrates are supplied, the body oxidizes them fats can exert a protein-sparing effect.

The role of carbohydrates such as cellulose and hemicellulose in providing fiber and bulk is essential to a healthy condition of the intestine. In addition, the microflora of the intestine is much influenced by the nature of

carbohydrates in the diet. When these carbohydrates are comparatively slow to dissolve, as in the case of starch and lactose, they remain in the intestinal tract for longer periods than the more highly soluble sugars. In this case, they serve as readily available nutrients for growth of microorganisms that synthesize several vitamins of the B complex. On the other hand, the slow rate of absorption of lactose from the intestine can cause diarrhea in some adults concerning excessive amounts of this sugar. Lactose also appears to increase calcium retention in children.

The role of protein in supplying chemical building materials for the synthesis of body tissues and other constituents of life and in providing those essential amino acids that the body cannot itself synthesize have been mentioned.

The nutritional value of "The allowances, expressed as average daily intakes over time, are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on variety of common foods I order to provide other nutrients for which human requirements have been less well defined. See text for detailed discussion of allowances and of nutrients not tabulated.

Weights and heights of reference adults are actual medians for the U.S. population of the designated age, as reported by National Health and Nutrition Examination Survey II. The use of these figures does not imply that the height-to-weight ratios are ideal.

Because there is less information on which to base allowances, these figures are not given in the main table of RDA and are provided here in the form of ranges of recommended intakes.

Since the toxic levels for many trace elements may be only several times usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

Recommended Dietary Allowances, Revised 1989. Designed for the maintenance of good.

Different proteins depend on their different amino acid compositions. A complete protein is one that contains all of the essential amino acids in amounts and proportions to maintain life and support growth when used as the sole source of protein. Such a protein is said to have high biological value. Many animal proteins such as those found in meat, poultry, fish, milk, and eggs generally are of high biological value. An exception is gelatin, which contains limited amounts of isoleucine, threonine, and methionine, and no tryptophan. Plant proteins generally are not as high in biological value as animal proteins because of amino acid limitations. Thus, for example, most varieties of wheat, rice, and corn lack lysine; corn also lacks tryptophan; legumes are of somewhat higher protein quality but have limited amounts of methionine.

Incomplete proteins can be supplemented with the missing essential amino acids either in the form of synthetic compounds or as protein concentrates from natural sources. Blends of plant and animal products also can overcome essential amino acid limitations and produce nutritional adequacy, but complementary components should best be given at the same feeding since the body has very limited protein storage capacity and all amino acids are needed for daily protein synthesis. Much protein supplementation is now being practiced to improve world food resources.

The amount of protein required daily, which beyond early childhood may range from about 40 to 60 g depends on the body demand –the demand being greatest during growth, pregnancy, and lactation.

One of the severest needs for protein on a world population basis is in infant after weaning and in young children. Protein shortage or protein malnutrition can be dramatically reversed by proper diet. However, in instances where adequate protein and proper diet are withheld too long, recovery may not be complete due to irreversible damage and possible mental retardation.

In addition to supplying calories for energy, fats supply polyunsaturated fatty acids, at least one of which, linoleic acid, is an essential fatty acid. As in the case of the essential amino acids, linoleic acid is called an essential fatty acid because animals cannot adequately synthesize it and so it must be supplied by the diet as such. In rats and in human infants, absence of linoleic acid interferes with normal growth rates and results in skin disorder. Two other polyunsaturated fatty acids, linoleic acid and arachidonic acid, formerly were listed also as essential fatty acids. However, since the body can convert linoleic acid to arachidonic acid and since linoleic acid can only partially replace linoleic acid, we now regard only linoleic acid as an essential fatty acid. Good sources of linoleic acid include grain and seed oils, fats from nuts, and fats from poultry. Linoleic and other unsaturated fatty acids when

present in high proportion of dietary fats can lower blood cholesterol levels under certain dietary conditions; more will be said about this in the last section of this chapter.

Vitamins are organic chemicals, other than essential amino acids and fatty acids, that must be supplied to an animal in small amounts to maintain health. An exception to this is vitamin D, the only major vitamin the human body is known to be capable of manufacturing. Under certain circumstances, however, vitamin D may not be synthesized in adequate amounts and then it too must be supplied by diet or as a dietary supplement if life and health are to be sustained. Vitamins function in enzymes systems which facilitate the metabolism of proteins, carbohydrates, and fats, but there is growing evidence that their roles in maintaining health extend yet further.
The vitamins are conveniently divided into two major groups, those that are fat soluble and those that are water soluble. Fat-soluble vitamins are A, D, E, and K. Their absorption by the body depends on the normal absorption of fat from the diet. Water-soluble vitamins include vitamin C and the several members of the vitamin B complex.

Vitamins A, D, E, and K are fat soluble and so are to be found associated with the fat fractions of natural foods. Additionally, phospholipids, which are organic esters of fatty acids and also contain phosphoric acid and usually a nitrogenous base, are partially soluble in fats. Lecithin, cephalic, and other phospholipids (Emulsifier) are found in brain, nerve, liver, kidney, heart, blood, and other tissues in addition to their presence in egg yolk. Because of their strong affinity for water, they facilitate the passage of fats in and out of the cells and play a role in fat absorption from the intestine and the transport of fats from the liver. Fat also physically insulates the body from rapid changes in temperature and helps cushion organs from sudden injury. Excess dietary fat is stored in the body's adipose (fatty) tissue, as are fats formed from the metabolism of excess carbohydrates and proteins. These stored fats can be drawn upon as a reserve source of energy. In excessive amounts they contribute to obesity.

BIOABAILABILITY OF NUTRIENTS

As with protein, the contents of other nutrients in foods determined by chemical or physical analysis may be quite misleading in terms of the nutrient status of a food. Apart from amount, what is important is whether the nutrient is in a form that can be utilized in metabolism; that is, whether the nutrient is bioavailable. For example, adding small iron pellets to cereals would increase their iron content, but the iron would not be very available to people eating the cereal and, therefore, be of little value.
Many factors influence a nutrient's bioavailability, including the food's digestibility and the nutrient's absorbability from the intestinal tract, which are affected by nutrient binding to indigestible constituents and nutrient-nutrient interactions in food raw materials. Processing and cooking procedures also can influence nutrient bioavailability. Apart from the food itself, different animal species exhibit variations in bioavailability of specific nutrients form a particular food. The age, sex, physiological health, consumption of drugs, general nutritional status, combination of foods eaten together, and clear factors all influence the ability of an individual to make use of a particular nutrient.
Bioavailability of carbohydrates, proteins, fats, vitamins, and minerals may be increased or decreased since all nutrients are reactive and generally present in varying ……. In food system. There are many example of how food composition, processing, and for age affect nutrient bioavailability. One example is the essential mineral iron. Under practical conditions its bioavailability from foods may be only 1-10% of its total level determined by chemical analysis. The recommended dietary allowances for nutrients in the United States and other countries attempt to take bioavailability into account. However, the many factors influencing nutrient bioavailability and the difficulties inherent in meaningful evaluation procedures leave much research in this area still to be done.

Dietary Guidelines and Recommendations

In addition to the Diet and Health report cited above, several other groups have issued dietary goas in order to arrive at a national nutrition policy which promotes better health. Dietary goals and guidelines have been issued and discussed by a number of health authorities including the Surgeon General's Office, the U.S. Department of Agriculture and the Department of Health and Human Services, the National Academy of Science Board on Food and Nutrition, The National Cancer Institute, and others. Although there have been areas of disagreement, most reports recommend the following: avoidance of overweight; consumption of a variety of foods; reduction of total fat to less than 30% of calories and reduction in the amount of saturated fat and cholesterol consumed; moderation in the consumption of salt and alcohol; and increased consumption of fresh fruits and vegetable and other fiber-containing foods.

The general population in the United States has begun to alter their diet in response to some of these recommendations. The food industry has developed many new products in an attempt to respond to these needs. For example, a large number of reduced products have been introduced in recent years.

Discussion

Why is a Balanced Diet Important?

Food and its components play a major role in our lives. Whether it's a baby, young children, adolescent, or a complete grown-up man, the human body grows at a rapid rate until a particular age. The components of food are required for fueling the growth and maintaining the body after the growth is stopped. Human body cells need to grow and develop just like we do. It is actually the body parts, including cells, tissues, bones, and muscles that grow, and we, from the outer layer, see ourselves as growing. Protein is the building block for our body, and thus, it is a vital inclusion for growth and maintaining a healthy living. Protein with the combination of fats, minerals, and other ingredients provides the best nutrients to our body. The growing phase of our body needs some extra amount of nutrients when compared to the latter part.

It is said that the feeling of food depends on the person's ability to tolerate, illness, or the need for restriction. This is the reason; some people find it challenging when they are re-learning to eat after a stroke or surgery.

Results & Conclusion

We often take eating as granted until something major is faced through health problems. The loss of ability to eat is similar to losing a life. This is the reason, maintaining the constituents of food are crucial to living a healthy life. Now, it is not always possible to measure and intake the constituents, and thus, as a rule of thumb, it's good to follow a healthy and balanced diet.

Maintaining a good link between weight and nutrition can help people reduce the symptoms of chronic diseases and an overall decline in health. Before it's too late, consider taking steps to improve your dietary rules by introducing a well-consulted balanced diet.

References

Belitz, H.-D., Grosch, W and Schieberle, P.(2009) Food Chemistry 4th edn, SpringerPublications. DeMan, J.M. (1999). Principles of FoodChemistry 3rd edn, Aspean Publication. Damodaran, S., Parkin, K.L. and Fennema, O.R.(2007) Fennema's Food Chemistry 4th edn, CRCPress.

http://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/articles-by-topic/food-chemistry.html

http://www.youtube.com/watch?v=m4rNNcHh6FA

https://www.who.int/news-room/fact-sheets/detail/food-additives#:~:text=Food%20additives%20can%20be%20derived,categories%20based%20on%20their%20function.

https://www.who.int/news-room/fact-sheets/detail/food-additives#:~:text=Food%20additives%20can%20be%20derived,categories%20based%20on%20their%20function.

https://habib-ahmad.wixsite.com/foodscience/post/nutritive-aspects-of-food-constituents

https://www.cfs.gov.hk/english/multimedia/multimedia_pub/multimedia_pub_fsf_110_02.html#:~:text=Fats%20and%20oils%20contribute%20to,and%20desirable%20functions%20during%20cooking.