

The Quality of the Food which we Eat

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Abstract

Everyone wants fresh, healthy and delicious food on their table, and fruits and vegetables are the basis of such a menu. Thanks to the strong presence of nutrition, there has been a growing concern in recent years about the quality of the food which we consume. Many wonder if the food we consume is healthy because various pesticides are used in agricultural food production. The food we eat should meet the body's needs for different nutrients. Simply said, this would mean that we have to eat many different types of food every day.

Keywords: Microbiology, Proteins, Vitamins, Health

Introduction

The dividing line between food science and food technology is often blurred because food technology uses and exploits the knowledge of food science [1]. The link between food science and technology is well illustrated in solving the foremost problem of feeding the world's rapidly increasing population. The problems inherent in deciding what foods meet the nutritional needs of people, the nutritional content of various foods, how to preserve and serve food with minimum nutritional loss, these form part of food science. But to use this information, it must be applied—foods must be grown, stored, processed, preserved and transported on a large scale and this is the area of food technology.

Food science embraces many sciences but a chemical approach to the subject is a natural and important one. Firstly, food materials are composed entirely of chemical compounds. Secondly, nearly all manufactured foods have "additives", which are chemical compounds. These may be added to improve colour, flavour, texture or other desirable qualities. Further, the changes that occur in food when it is processed, cooked, eaten and used by the body are chemical changes.

Microbiology

Our knowledge and study of foods will be incomplete without understanding the role of microorganisms in food production [1]. Microorganisms are minute living organisms, which vary in size from algae, which are just large enough to be seen by the naked eye (about 100 micron) to viruses, which are so small (about 0.1 micron) that these can be seen with an electron microscope only. The microorganisms that are usually found in food are moulds, yeasts and bacteria. These occur mainly in soil, air, water and sewage. These enter animal and plant foods at various stages of production and storage. These multiply in food, if conditions are favourable.

The food we eat is a very good media for growth of microorganisms. As a result of their growth they may bring about changes in the food. Some of the changes are desirable. In fact a variety of food products are added to our menu as a result of microbial activity. For example, curds are formed from milk by the action of lactic bacteria, bread is fermented with the help of yeast. But it is also true that moist foods kept in a warm place spoil due to action of microorganisms. The presence of some

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microorganisms or the toxin they produce in food is known to be harmful to the consumer. Therefore, it is important to know the kind of microorganisms present and their mode of action in foods for effective use of food.

All living things on this planet require nourishment to fuel and support vital operations [2]. For instance, plants get water, minerals and nitrogen from the soil and produce their own carbohydrate, protein, and fat. Meanwhile, animals consume other forms of life, such as plants and animals or their products, in order to survive. For humans, we consume animals and their products (for example, milk, eggs) and/or plants and their products (fruits, vegetables, cereal grains). Even eating some forms of microbes (or microorganisms) such as yeast and some bacteria can help us survive and promote vitality. Humans exist at the upper end of the food chain, meaning that a large variety of life-forms are food to us, but we are not regular food for other life-forms. Plants, on the other hand, maintain a position at the other end of the food chain as they are food for many life-forms, including insects, fish, and mammals.

Proteins

The structure of a protein molecule is dependent on the number and kind of amino acids present in it [1]. The sequence of amino acids and the manner in which these are linked indicates the structure of the protein.

Early experiments on protein quality were carried out with purified proteins. On the basis of these experiments, proteins were classified as complete, partially complete and incomplete proteins depending on their ability to maintain life and promote growth. Thus, animal proteins from milk, eggs and meat were all included in the list of complete proteins. Gliadin, one of the proteins from wheat was found able to maintain life, but lacked sufficient amounts of some amino acids necessary for growth. Therefore, it was reported to be partially incomplete protein. Zein one of the proteins from corn and gelatin are the examples of proteins, which are incapable of maintaining tissues or supporting growth. Therefore, these are totally incomplete proteins. However, later

experiments with diets made up of mixed protein from plants sources were found to maintain life and support growth of animals. In view of these findings and the fact that human dietaries are not made up of purified single proteins such as gliadin, zein or gelatin, the classification mentioned above is not relevant and therefore, it is no longer used as it has no practical utility.

Biological Value of Protein is a measure of its quality or ability to support life. If a protein contains all the essential amino acids in the proportions needed by the body, it is said to have a high biological value. If a protein lacks sufficient amount of one or more essential amino acids, it is by itself unable to support life and is said to be of low biological value. Thus, biological value indicates the relative nutritional value of a protein.

Food proteins vary greatly in their amino acid composition. For example, animal foods such as milk, eggs, fish, poultry etc., contain all essential amino acids. But cereals are low in lysine and most pulses are low in methionine. However as cereals and pulses are normally consumed together with other foods such as vegetables, milk or curd, the lack in one food is supplemented by the other foods. In other words, various foods, when eaten together in a meal, complement each other and the biological value of protein mixture in the meal is much higher than that of the individual food proteins, when eaten separately.

Vitamins

Vitamins are small, carbon-based molecules that are needed to regulate metabolic processes [3]. They are found in almost all the foods we eat, but no one food is a good source of all of them. Some vitamins are soluble in water and others are soluble in fat, a property that affects how they are absorbed into and transported throughout the body. Vitamins do not provide energy, but the body needs many of them to regulate the chemical reactions that extract energy from sugars, fatty acids, and amino acids. Some vitamins are antioxidants, which protect the body from reactive oxygen compounds like free radicals. Others have roles in tissue growth and development, bone health, and blood clot formation.

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Vitamins are a large group of potent organic compounds necessary in minute amounts in the diet [4]. They are usually divided into two classes based on their solubility characteristics. The watersoluble vitamins are soluble in water and usually function as coenzymes in the metabolism of protein, fats, and carbohydrates. The fat-soluble vitamins are not usually soluble in water but are soluble in one or more solvents such as alcohol, ether, or chloroform.

Each of the vitamins has a specific chemical structure and many can be synthesized rather inexpensively. Thus, multivitamin supplements can be purchased in drugstores for a modest price. While specific vitamins can cure specific deficiency diseases, the use of supplements by people consuming a wide variety of raw and cooked foods may be unnecessary.

Food Safety

The concept of food safety can take many forms. Perhaps the most commonly thought of notion related to unsafe food is the acute illness that follows from foodborne contamination threatening the health of all users of the product [5]. Food might also be unsafe if it contains an undisclosed ingredient that is harmful to a portion of the population, such as a common allergen. Another type of unsafe food might occur when an ingredient is unsafe to consume over time, such as trans fat, or becomes unsafe at high levels, such as caffeine. Finally, certain production practices may result in food of questionable safety, subject to inquiry and debate by scientists, as occurred with the addition of growth hormones and antibiotics to food-animal feed.

Globally, food safety issues are of top priorities to the food industry, government food safety regulators, and consumers as a result of a significant increase in the number of foodborne disease cases and outbreaks reported worldwide in the 20th century [6]. These issues led to the proliferation of several food safety programs designed to reduce the incidence of foodborne illness. Although a number of producers and processors have implemented a variety of food safety programs, the occurrence of foodborne illness from emerging and existing pathogens remains a challenge to the food

industry and food safety regulators. Food safety begins on the farm and continues through processing, transportation, and storage until the food is consumed.

The three main categories of food safety concerns in the food industry include microbiological, chemical, and physical hazards. The microbiological hazards are those involving foodborne pathogens; chemical hazards include concerns related to antibiotics, pesticides, and herbicides; and physical hazards are those related to foreign objects in foods that can result in injury or illness when consumed with foods.

Food can also contain health risks as a result of contamination from the environment (like heavy metals, dioxins) [7]. In this context, it is of practical relevance to point out environmental pollution for agricultural products. Contaminated soil, water and air pollution have negative effects on food security for agricultural products. Environmental protection thus gains in significance in making secure the natural resources for food safety and food quality, but also in significance for food security. Ensuring food safety in the production of food goods has become much more complicated due to the global agricultural and food markets and the division of labour related thereto. In an extensive network of supplier relationships, it is ever more difficult to determine who the primary producer is. The same applies to the secondary value creation/further processing. This represents a particular challenge for the traceability of food and makes the necessary, clear (transparent) conclusion about its safety and quality difficult.

The food sector has been successful in providing for increasing global demand for a long period of time [8]. Agricultural productivity has exceeded that in many other sectors and has exceeded the population growth rate. In addition to providing food, the agricultural sector has the potential to alleviate poverty in developing countries as on average the contribution of agriculture to raising the incomes of the poorest is estimated to be at least 2.5 times higher than that of non-agriculture sectors. In the transition towards the green economy, the food and

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agricultural sector will reduce negative environmental effects while increasing productivity and farmer incomes all the while ensuring food security for all, where food security is defined by the Food and Agriculture Organization (FAO) as 'all people at all times have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active, healthy life'. A key aspect of achieving food security is recognising that while intensifying crop production can boost the food security of millions of people around the world, increasing food production can contribute to problems including land degradation, water pollution, and depletion of water resources, all of which in turn threaten food security.

Increased risk for human health from food consumption is also associated with changing life styles, consumption patterns, and dietary habits [9]. We live faster and differently. Many people eat out, which is a consequence of working time duration, and sometimes also of travel-to-work time. At home, a large number of families have made drastic changes in their dietary habits. Excessive amounts of crisps, chips, and other junk foods and beverages excessively sweetened with glucose-fructose syrup are consumed. As a result, a massive increase in obesity has occurred among the people of developed countries, followed by an increase in diabetes and cardiovascular diseases. Certain foods, for example, harden vegetable fats containing trans-fatty acids, which are formed during the partial hydrogenation of vegetable oils. Transfats double the risk of breast cancer and increase the level of bad cholesterol, lowdensity lipoprotein (LDL), which translates into an increased risk of atherosclerotic diseases.

Food Preparation

Food processing and preparation is an essential part of meeting the nutritional needs of people [1]. It is not enough that food be nutritious, it must be pleasing in appearance and taste so that it is eaten with relish. Excellent food processing and preparation is a very important prerequisite of food acceptance. It is necessary

to acquire the ability to process, prepare and serve food, which is not only nutritious, but also acceptable to the consumer.

The science of food processing and preparation is based on the understanding of physical and chemical changes that occur during processing and preparation. Further, these need to be manipulated to obtain the best product in terms of nutritional quality and acceptance.

This knowledge can be used to combine food ingredients in diverse ways to prepare innumerable products with delicate flavours, textures, and colour, which delight the senses. Thus, food preparation is both a science and an art. Food preparation is very much a part of the culture of the region. Each region has its own methods of blending flavours to bring about acceptable combinations.

Health Status

Measurements of height, weight, bone density, fat mass, and muscle mass indicate whether the energy and protein needs are being met [2]. Normal growth and development do not occur when macronutrient intake is inadequate. On the other hand, there can be specific tissue or cell failures when one or more of the micronutrient requirements are not met. Rickets, a breakdown in the growth and development of bone, is one such failure. Anemia, a failure to produce functionally adequate red blood cells, is another. Signs and symptoms of each of these as well as other failures are sought when the nutritional status of the individual is determined. One of the most accessible tissues for use in assessing micronutrient status is the blood. Both red cells (erythrocytes) and white cells (leukocytes) can be examined, as can the sera. Red cells are easier to isolate and assess than are white cells because of their larger size and greater number. However, because malnutrition is frequently characterized by anemia, there may be fewer red cells to work with for these analyses. Anemia can be due to inadequate hemoglobin synthesis, inadequate red cell synthesis and maturation, or both. Vitamin A, B₆, folacin, B₁₂, ascorbic acid, iron, copper, and zinc deficiencies can have anemia as a characteristic. Red cells are constantly

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being replaced; hence, a deficiency in any one of the many components needed for the replacement of the red cell and its chief component, hemoglobin, will result in anemia. Furthermore, in the hierarchy of essential needs for these nutrients, red cell replacement may be relatively low; therefore, anemia can be a fairly sensitive indicator of nutrient status. The body has many red cells and can function, if necessary, with fewer. A 10 or 20% reduction in functional capacity is not incompatible with life. However, optimal function of that body might not be realized.

Erythrocytes at maturity are circular, biconcave disc-like cells having no nucleus. They are about $7.7 \mu\text{m}$ in diameter. Their principal function is to carry oxygen from the lungs to all the cells of the body and exchange this oxygen for carbon dioxide which is then transported back to the lungs for expiration. The average adult male has 5.5 to 7×10^5 red cells per milliliter of blood whereas the average adult female has 4.5 to 6×10^5 red cells per milliliter whole blood. These red cells contain hemoglobin, a globular protein having the iron-containing heme as an essential component. It is this iron-containing hemoglobin that carries the oxygen or carbon dioxide.

Health Care

Health care is being met with increased public awareness associated with the cost of, and equal access to, high-quality care [10]. The percentage of the national budget spent on health care is still rising at an alarming rate and will require persistent emphasis on cost-effective management. Past cost-control efforts include rightsizing the workforce by staff reductions, flattening management levels, using multidepartment management, heightening productivity, and participating in purchasing groups. Changes occurring within health care are affected by the economy and by business and industry trends. In addition to their effect on health care cost, these trends will affect methods of operation, especially as those methods relate to quality, customer satisfaction, and management style.

Hospitals of the future will experience increases in patient age and acuity level and a continued population

shift from inpatients to outpatients. Responses to these changes have caused hospitals to add extended-care services such as rehabilitation units, skilled-nursing units, and behavioral health centers to increase inpatient census. Hospital-owned home care services now extend services for patients after discharge while they increase revenues. Once the primary health care facility, hospitals now face competition from a growing number of alternative health care facilities. These competitors include nursing homes, adult day care centers, retirement centers with acute care facilities, freestanding outpatient clinics, and independent home care agencies.

There is continuing concern about the millions of people who do not have any form of health insurance or access to health care, as well as for the millions of others who have severely restricted or inadequate protection. The health care field faces still other concerns. These include the growing number of persons affected with the human immunodeficiency virus (HIV), the increased number of people with tuberculosis (TB), the increased prevalence of child and spousal and drug abuse, the aging of the population, few medically trained personnel in geriatric medicine, and the emotional stress of daily living and working that takes its toll on health care providers.

Conclusion

A man is faced with the question every day: to eat what he likes or to eat what is healthier. As a rule, a person eats what he likes, and less what is better and healthier for his body. The following should be adhered to in the diet: eat what you like, but not to be harmful to the body. Despite the strong development of nutrition, we still do not have the right answer or a medical prescription in which would be written instructions about what types of food we need to eat and in what quantities to be healthy. Although we know what a person must eat to live, there is no universal recipe because every person has different needs. In addition, nutrition is closely related to the climate in area a person lives.

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Citation: Siniša Franjić. (2020), "The Quality of the Food which we Eat". Int J Food Sci Res.; 2(1): 1-6.

DOI: 10.31829-2576-3733-ijfsr2020-2(1)-106

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