

FUNCTIONAL CHARACTERISTICS OF FOOD OF ANIMAL ORIGIN

Tatjana Kalevska¹, Daniela Nikolovska Nedelkoska¹, Viktorija Stamatovska¹,
Vezirka Jankuloska¹, Gjore Nakov²

¹Faculty of Technology and Technical Science - Veles, University "St. Kliment Ohridski"- Bitola, R.Macedonia

²Department of Chemical, Food and Biotechnology, University of Ruse "Angel Kanchev", Branch Razgrad, Bulgaria



Introduction

The main role of food is to provide the necessary nutrients for humans, to prevent food-related diseases, as well as to improve the health of consumers (Siro, I et al., 2008). As a result of the growing understanding of the relationship between nutrition and health, in recent years functional food has increasingly attracted the attention of consumers and the food industry. Functional food in addition to meeting the basic needs of nutrition, should provide additional physiological and health benefits (Hasler, M.C., 2000).

Functional foods include foods and food ingredients that have a beneficial effect on health and reduce the risk of disease (Huggett, A.C. & B. Schliter, 1996). The knowledge that food with a balanced, enriched nutritional composition has additional health benefits stimulates the development of functional food products, which offer a variety of physiologically active compounds (Grajek, W., Olejnik, A., & Sip, A., 2005). Food of animal origin is important for maintaining the health of the human body (Nestle, M., 1999).

This food contains functional ingredients, such as: whey protein, calcium, bioactive peptides, conjugated linoleic acid from meat, n-3 fatty acids from fish, sphingolipids from eggs, probiotics from dairy products, which have a beneficial health effect (Prates, J.A. M & Mateus, M.R.P.C., 2002). Food of animal origin due to its nutritional composition and chemical characteristics, is suitable for incorporation of bioactive molecules (Martins, N., Oliveira, M.B.PP., Ferreira, I.C.F.R., 2018). The use of functional ingredients in products of animal origin offers manufacturers the opportunity to improve the nutritional and health qualities of their products. Production of functional food of animal origin is constantly increasing. There are various products on the market, such as probiotic fermented dairy products, meat, meat products and eggs enriched with omega-3 fatty acids, which are well accepted by consumers.

Fish is an important functional food that has potentially positive effects on human health. Fish meat is a valued and valuable food product of animal origin in the human diet (Nistor и сор. 2014). Fish is one of the main sources of protein, fats that contain essential fatty acids necessary for metabolic processes. These characteristics make fish meat a dietary product with high digestibility and give it a special place in the human diet (Cvrtila, Ž. I., & Kozračinski, L., 2006). The functional components omega-3 fatty acids (n-3 fatty acids), alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have a beneficial health effect. EPA and DHA are naturally present in fish and seafood (Bender, A., 2011). Increased intake of fish meat allows normal development and functioning of the body, as well as reducing the incidence of cardiovascular disease, atherosclerosis, hypertension and other diseases of the cardiovascular system (Increased intake of fish meat allows normal development and functioning of the body, as well as reducing the incidence of cardiovascular disease, atherosclerosis, hypertension and other diseases of the cardiovascular system (Kris-Etherton, P. M., Harris, W. S., Appel, L. J., 2002).

Whey proteins are rich in amino acids such as isoleucine, leucine, and valine, which, unlike other essential amino acids, are directly metabolized and transmitted into the muscle tissue in which they participate in tissue construction during exercise and stamina training (Sherwood, S., & Jenkins, D., 2007). Fermented whey based beverages can be functional and probiotic.

Conclusion

In recent years, the demand for functional food has increased as people become more aware of the link between diet and health. The functional characteristics of food of animal origin are a result of the natural content of bioactive components and / or the functional modifications of the food by incorporating ingredients that have a positive effect on health. Today the production of functional foods has seen a steady increase, and new products on the market are increasingly accepted by consumers. This paper presents an overview on the functional characteristics of different foods of animal origin on the basis of data from the available literature.

Milk and milk products

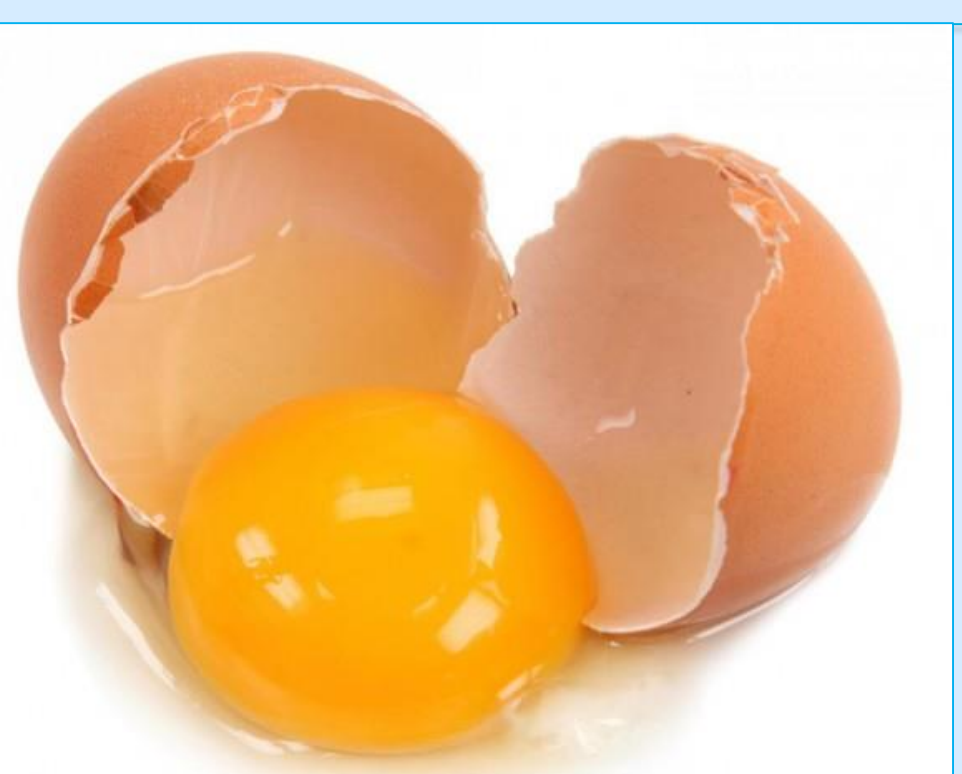
Milk with about 300 nutrients in its composition, with a favorable ratio of nutrients and protective ingredients is considered a naturally perfect food (Fox, P.F. & McSweeney, P.L.H., 1998).

Functional food is developed in almost all categories of food products, but the most common on the market are fermented dairy products (Menrad, K., 2003). The design of functional fermented dairy products is done by enriching or modifying their natural basis with probiotic strains of certain bacterial species (probiotics) (Samardjija, D., 2015).

The functional and physiological role of fermented probiotic dairy products is direct through consumed microorganisms or indirect, as a result of the action of microbiological metabolites as nutrients, generated during the fermentation process. (Gasmalla, M.A.A., et al., 2017) Probiotic microorganisms are isolated from the gastrointestinal tract in humans. *Lactobacillus* and *Bifidobacterium* species are most frequently used as probiotics (Yerlikaya, O., 2014).

Prebiotics are added to stimulate the growth and metabolic activity of probiotic bacteria in the production of fermented dairy products.

Oligosaccharides, inulin and lactulose which are incorporated into fermented milk products to promote the growth of bifidobacteria and other probiotic bacteria, promote intestinal health. (Martins, N., Oliveira, M.B.PP., Ferreira, I.C.F.R., 2018). Kefir is a natural probiotic that contains live bacteria, beneficial to health which improves the peristaltic activity of the intestinal tract (Salminen et al., 1998)



Eggs naturally contain essential and functional active compounds or can be modified to provide nutrients to promote health. Eggs are a good dietary source of many essential (e.g. proteins, vitamins, minerals, fatty acids, amino acids, sphingolipids, choline and n-3 PUFA) and non-essential (e.g. lutein/zeaxanthin) components which may promote optimal health (Hasler, M. C., 2000; Miranda, J. M., 2015).

Eggs are suitable for the production of functional food because they can be easily enriched with certain useful ingredients. By adding oils rich in omega-3 fatty acids (linseed oil, beet seed, sunflower oil, fish oil and seaweed) to the diet of laying hens, its content in the eggs can be significantly increased. Feeding laying hens with foods rich in omega-3 fatty acids results in the production of eggs rich in omega-3 fatty acids (Kralik, G., Grcevik, M., & Gajcevik - Kralik, Z., 2010).



Meat is specifically valuable as a source of omega-3 fatty acids, protein, vitamin B₁₂, and iron (Hoffmann, M., Waszkiewicz-Robak, B., & Świderski, F., 2010). Meat is a natural source of functional compounds such as conjugated linoleic acid (CLA) with anticancer properties and bioactive substances (L-carnitine, taurine, creatine, choline and such antioxidants as carnosine and anserine) (Hoffmann M., Waszkiewicz-Robak B., Świderski F., 2010). Meat and meat products as essential products in the diet can be modified by adding ingredients that are useful or by removing or reducing ingredients that are harmful to human health. These modifications to improve the functional characteristics of meat and meat products include functional modifications to the composition of animal feed and modifications to meat products with the addition of non-meat additives.. The functional modification made in meat is a change in its fatty acid composition and cholesterol level (Bhat,'Z.F., & Bhat,'H., 2011). The addition of natural extracts with antioxidant properties (rosemary, sage, soy, citrus peel, sesame seeds) in meat products prevents the oxidation of lipids, which causes undesirable changes in taste, texture and nutritional value.