FUNCTIONAL CLASSIFICATION OF DIRECT FOOD ADDITIVES USED IN PRODUCTION OF BABY FOODS

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Background

The term ***"food additives"*** according to the adopted international concepts spreads over "substances or mixtures of substances which are not basic foods and are found in them as a result of any aspect of processing, storing and packing". As applied to baby foods, such determination of the ***"food additive"*** concept combines two independent groups of substances.

To the first group belong those which are used in product formulas purposefully. ***Food additives*** constituting the above group are assumed to be called ***"direct".***

Another group of additives includes substances getting into baby foods during delivery of raw materials, their processing and packing of finished products unpurposely. These additives are called ***"indirect".***

The aim of usage of the first-group food additives in technologies of baby foods is to give them or the basic raw material used for their production special properties that can't be attained without introduction of additives during technological processing.

The proposed scheme – classification of direct ***food additives*** (see Figure below) differentiates them in two classes: *functional-corrective* and *organoleptic-corrective.*

Functional-corrective ***food additives*** are subdivided into *functional-technological,* that is, those which influence the properties of raw materials and products being manufactured during technological production processes and storage (before eating), and *functional-metabolic,* that is, those which provide changes in dominant properties revealing themselves during taking-up food, its digestibility, assimilation and evacuation of catabolism products.

Organoleptic-corrective food additives provide purposeful changes in such important individually perceptible quality indices of baby foods as their taste gamma, aroma flavor, consistency and color. No matter how paradoxically, but precisely these indices have a great effect on buying popularity of baby foodstuffs for parents, grandmothers and grandfathers of their direct consumers when they get acquainted with them for the first time.

Explanations and examples of some groups of the first-class food additives are given below.

Lyophobilizing - these are additives favoring reduction of hydration capacity of protein substances. Food acids and calcium chloride in the technology of milk-based baby foods exemplify such additives.

Lyophilizing – these are additives opposite to lyophobilizing ones. Phosphates in the technology of meat-based baby foods can be cited as their example.

Bacteriogenic - these are microbiological mono- and polyculture preparations and special components providing active growth of technologically and/or matabolically positive microorganisms. In the technology of milk-based baby foods bacterial cultures, bacterial concentrates and prebiotics, such as special polysaccharides and their hydrolyzates lactose, lactulose, lysozyme, are referred to such additives. In the technology of meat-based baby foods, these are above mentioned prebiotics.

Bacteriocidal and *bacteriostatic additives* – these are microquantities of various substances fully depressing microorganisms or slowing down their development. Examples of such additives are sorbic and succinic acid preparations, calcium chloride.

Microtenderizing additives. In the technology of meat-based baby foods these are specific proteases "dispersing" quaternary and tertiary systems of macroprotein cytocarcass, elastin and collagen.

Peptiziding additives - these are specific proteases hydrolyzing during technological processing peptide ties responsible for the secondary and primary structural ordering of protein macromolecules.

Hydrolasoactivating - these are additives represented by native, fractionated or preparative food substances favouring increase of hydrolase activity during technological processing of raw materials. In the meat-based technology of baby foods, vegetable oils rich in ω_3 of polyunsaturated fat acids or their preparations are related to such additives, activating, for example, efficiency of proteolytic softening of meat raw materials by endogene and exogenous enzymes.

Protovital antioxidants. Natural or synthetic food substances inhibiting fat oxidative decomposition during manufacture and storage of foodstuffs relate to additives of the above group.

Functional-metabolic additives are the following:

Vitaantioxidant additives – these are natural or synthetic food substances inhibiting oxidation of lipoproteide membrains of child organism cell structures. Tocopherol (vitamin E) is a striking example of antioxidant additives of the both groups.

Alimentary-corrective - these are additives balancing amino acid, fat acid or carbohydrate composition of baby foods and providing sufficient quantities of vitamins, macro- and microelements.

Digestive-stimulating additives – these are substances activating proteolytic, amylolytic and lipolytic enzyme systems at pH and buffering, corresponding to the conditions in the child's stomach and/or intestine. Examples are pancreatin and pepsin preparations, ω_3 fat acids.

Evacuative-stimulating additives – these are polysaccharides and proteins, transit sorbents and complexing agents non-hydrolyzable or slightly hydrolyzable by stomach and intestine enzyme systems. Examples are cellular tissue, cellulose preparations, pectins, connective tissue meat proteins, casein, etc.

Immuno- and *hemopoesostimulating* – these are substances activating immune system of the organism and the function of red blood-producing. Examples of such additives are vitamins, succinic acid, lysozyme, assimilable (more than by 25%) natural-organic and mineral iron compounds, some macro- and microelements.

Usage of *direct food additives* during manufacture of baby foods is connected with the necessity of solving a variety of medical-biological and technological problems.

Experience accumulated during development of meat-based polycomponent foodstuffs, showed that hundreds of kinds of food additives presented on the Russian market which refer to *functional-technological* and *organoleptic-corrective* groups, providing rather high efficiency as to reduction of consumption of raw materials necessary for manufacture of a unit of finished products, stabilization of their structural-mechanical characteristics, increase in the shelf life and improvement of organoleptics, in most cases didn't positively influence the complex of medical-biological indices of baby foods.

Many functional-metabolic purpose additives providing improvement of medical-biological characteristics and giving specially preset properties to baby foods can be used only in microquantities not exceeding 10^{-4} – 10^{-6} from the mass of basic raw material. Uniform

distribution of such amounts of food additives over the total volume of polycomponent mixture being the base of baby foods of a new generation, seems a very complicated technological problem, solution of which is connected with application of special techniques or equipment.

Objectives

The purpose of the present article was development of a functional classification of direct food additives used during production of baby foods.

Methods

Noumenological and phenomenological methods were used.

Conclusion

- Functional classification of direct food additives subdividing them into two basic groups (functional-corrective and organoleptic-corrective) has been offered
- Detalization of elements of enlarged groups being independent sub-groups combining food additives which promote purposeful change in technological adequacy of raw materials and semi-products during their processing, organoleptics and metabolic adequacy of finished products has been carried out
- Examples of additives belonging to different sub-groups have been given and perspectives of their usage have been specified

Classification Diagram of Direct Food Additives