BIOTECHNOLOGY IN DESIGNING OF MEAT PRODUCTS

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Manufacture of qualitative food stuffs for the healthy nutrition is the direction of the high priority in the national policy of Russia. In this direction preference is given to biotechnology which designs and develops the products of a new generation with functional properties and various active components.

Food stuffs must possess the qualitative composition, contain nutrients of a high functionality and have high consumer properties.

Meat product are the greater part of protein – contained food of Russian consumers; these product contain such essential agents , as vitamins of B and E groups, iron, zinc, and conjugated fatty acids. Deficiency of certain these compounds or their absence leads to the reduction in the quality and benefits of meat products. The replenishment of biologically active compounds deficiency is possible, in our opinion, by means of two ways. The first way is in the introduction of functional nutritional ingredients; the second way involves bio modification of animal and vegetable stocks which used in the formulates of meat products. The second way seems to be more perspective since it allows for designing products with desired technological and sensoric characteristic and enriched with micronutrients.

The current advancement of natural sciences demonstrates that the modification of animal and vegetable stocks is possible with application of biotechnological processes which are powered by microorganisms and ferments of various kinds. Stock hydrolysis under the proteolytic ferments leads to the improvement of technological characteristics, and action of microorganisms improves the nutritive and biological values of the stock used. Our long-standing studies established the positive affect of certain microorganism on the qualitative characteristics of the delicious meat products, which are manufactured from the meat stock of superior quality. The results obtained serve as a basis for designing bacterial preparations adapted to the meat stock. These preparations are based on the lactic acid bacteria, micrococcus and yeast. It was established that under the action of the definite strains of microorganisms the technological properties of stock are substantially improved. Moreover, the qualitative composition of substrates has undergone a change, namely, the proportion of biology active compounds is increased, and these compounds can enrich the products.

Considering that meat products are manufactured not only from the stock of superior quality but from the second grade stock secondary stock, it would appear reasonable that the modification mentioned above can be used for the preparation of the second grade stock to introducing it into composition of combined minced meat products.

The results of theoretical and experimental studies serve as base for solving this problem.

Figure 1 presents a diagram illustrated the effect of lactic acid bacteria, denitrifying micrococcus and yeast on the characteristics of meat stock. The selection of microorganisms were carried out under intensive study of their biochemical, technological and probiotic properties. Based on the results of phenotypic and genetic studies and in terms of International requirements the classification of the most promising strains was developed.

As a result of selected multistrains modification of the second-grade meat stok with poor functional and technological properties, specific organoleptic characteristics, and high- contaminated meat stock the next processes occur :

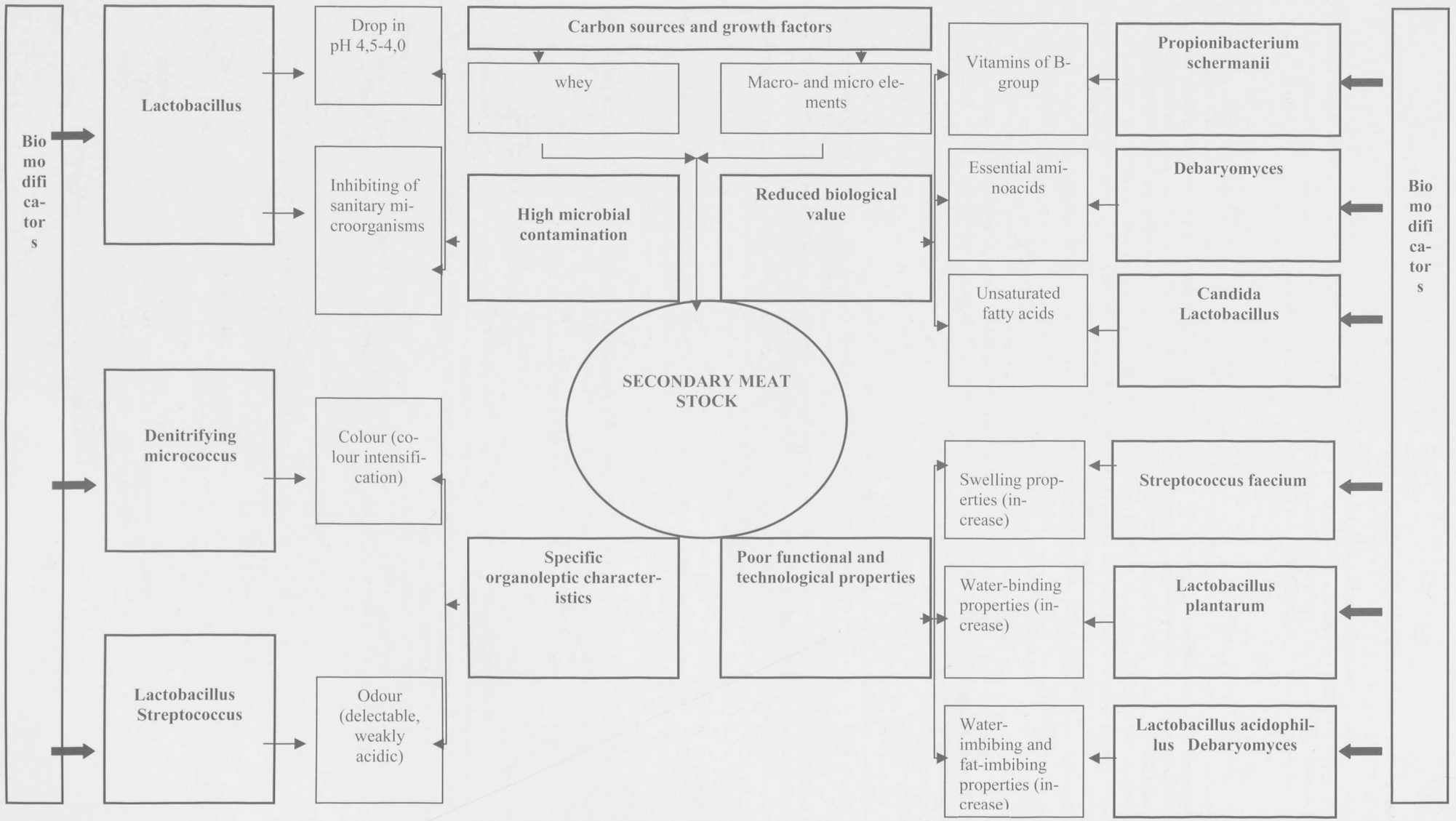
- A rapid drop in substrate's pH, that leads to the reduction of the growth of pathogenic microflora;
- A growth of multistrain biomass enriched with essential aminoacids and products of secondary metabolism;
- Increase in the whole value protein portion;
- Accumulation of odour-forming compounds;
- Improving sensoric characteristics

Furthermore use of the substrate composition the natural vegetable stock (vegetables, plants, etc.) and introduction of the additional certain microorganisms into multistrain germ culture result in the enrichment of stock with vitamines, in particular, of B – groups, β-carotene, ect. The same results can be obtained using the fermentative hydrolysis of the animal and vegetable stock.

The data of experiments from the base of the special technologies of meat products with use of secondary meat stock and vegetable components.

An other perspective direction in biotechnology is the study of high and low temperature effect on the tolerancy of bacteria cells and design development of sublimated products with probiotic properties.

The biotechnological approaches advanced extend the capabilities of meat and vegetable stock use in the design and manufacture of various food stuffs with desirable functional properties, with allows for substantial improving the present of human nutrition.


Biomodificators
Lactobacillus
Drop in pH 4,5-4,0
Inhibiting of sanitary microorganisms
Denitrifying micrococcus
Colour (colour intensification)
Lactobacillus Streptococcus
Odour (delectable, weakly acidic)
Carbon sources and growth factors
whey
Macro- and micro elements
High microbial contamination
Reduced biological value
SECONDARY MEAT STOCK
Specific organoleptic characteristics
Poor functional and technological properties
Vitamins of B-group
Propionibacterium schermanii
Essential aminoacids
Debaryomyces
Unsaturated fatty acids
Candida Lactobacillus
Swelling properties (increase)
Streptococcus faecium
Water-binding properties (increase)
Lactobacillus plantarum
Water-imbibing and fat-imbibing properties (increase)
Lactobacillus acidophillus Debaryomyces
Biomodificators