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### **MULTIPLICATIVE TYPE ADDITIVE MODEL OF COMPLEX WORT ASSESSMENT FOR OPTIMIZATION OF THE QUALITY OF POLY-MALT EXTRACTS**

*M.L. Mikulinich, A.V. Ivanov, S.L. Masansky, P.V. Mikulinich, A.N. Morgunov*

Physico-chemical indices and chemical composition of the poly-malt wort have been studied depending on the fractional composition of ground malted hulless raw materials. To produce high-quality poly-malt extracts there has been developed a list of quality indicators and their assessment criteria. The coefficients of ponderability for inter- and intragroup quality indicators have been determined. Relative quality indicators have been estimated taking into account the coefficients of ponderability for all combinations under study. As a result, there has been modeled an additive model of multiplicative type, which makes it possible to optimize the fractional composition of ground malted hulless raw materials in the preparation of the poly-malt wort as well as to ensure the quality of the extract with high consumer and technological properties.

### **USE OF SPECIAL MALTS OF BELARUSIAN SELECTION IN THE PRODUCTION OF TOP FERMENTATION DARK BEER**

*Yu.S. Nazarova, N.V. Samankova*

Physicochemical parameters of special malts of the Belarusian selection were studied. The component composition of the malt was determined in the process of mashing grain raw materials. A comparative analysis of control and test samples in beer wort fermentation was carried out. There was shown the possibility of import substitution of expensive malts in the production of top fermentation dark beer of stout type.

### **OPTIMIZATION OF TECHNOLOGICAL PARAMETERS FOR THE PRODUCTION OF INFUSIONS FROM SPICY AROMATIC RAW MATERIALS**

*V.N. Timofeeva, N.V. Samankova, V.D. Lavshuk*

Physicochemical parameters of spicy aromatic raw materials have been studied. The influence of technological factors on the completeness of extraction of biologically active substances in the process of infusion of spicy aromatic raw materials was studied. The optimal parameters for infusing water or apple juice with cinnamon, cloves, allspice and dried ginger have been determined, which allows using the infusions obtained in the production of juice-containing drinks.

### **STUDIES ON THE METHOD OF INTRODUCING RYE FLOUR FERMENTED SEMI-FINISHED PRODUCT ON THE BASIS OF BACTERIAL CONCENTRATES INTO DOUGH**

*T.A. Gurinova, A.G. Piskizhova, VP. Papko*

Two-phase and three-phase methods of introducing the fermented semi-finished product on the basis of the bacterial concentrate into dough in the production of rye-wheat bread have been studied. Regression equations which make it possible to optimize the main technological parameters of dough process (acidity of the fermented semi-finished product, amount of flour

introduced with fermented semi-finished product, dough fermentation time) have been developed. It is shown that rye-wheat bakery products made by means of a three-phase dough process using a liquid dispersed phase have the best quality indicators.

#### **INCREASE IN THE EFFICIENCY OF DURUM WHEAT GRAIN USE**

*I.S. Kostsova, T.M. Goncharenko, A.N. Savchenko*

The expediency of selecting fine fractions of durum wheat in the preparation of grain to be milled for the production of macaroni is substantiated. Physical and biochemical indices of fine grain fraction of durum wheat have been studied. Recommendations on the possible further use of selected fine grain fractions are given.

#### **TECHNOLOGICAL PROPERTIES OF LEGUMINOUS CROP SEEDS AS RAW MATERIALS FOR FLOUR CONFECTIONERY PRODUCTS**

*L.V. Rukshan, E.S. Novozhilova, D.A. Kudin*

Physical, physico-chemical properties, chemical composition of lupine seeds, peas and beans of Belarusian selection have been studied. The technology of producing flour from the crops under study has been developed. The properties of the flour obtained have been examined. The possibility of using flour from leguminous crops of Belarusian selection in the production of flour confectionery products has been studied. Recommendations on carrying out technological processes for manufacturing short and sponge semifinished products with the use of bean flour have been developed. The use of bean, lupine or pea flour instead of 10-15% of wheat flour is found to improve color, appearance, porosity structure of finished products and to have a positive effect on the food value.

#### **DETERMINATION OF OPTIMUM PARAMETERS FOR MANUFACTURING MACARONI PRODUCTS FROM BELARUSIAN MACARONI FLOUR**

*Zh.V. Koshak, E.L. Volynskaya, A.V. Pokrashinskaya*

A study was made on the possibility of using high grade macaroni flour (semolina) obtained from durum wheat of Belarusian selection for manufacturing macaroni products. Appropriate technological parameters such as dough moisture and water temperature proper for dough mixing that ensure optimal productivity of macaroni press and strength of dry macaroni products were chosen by designing tin experiment in StatGraphics Plus package.

#### **FOOD VALUE OF BELARUSIAN SELECTION DURUM WHEAT AND WHEAT PROCESSED PRODUCTS**

*Zh.V. Koshak, E.L. Volynskaya, E.M. Minina, G.V. Slobodnitskaya*

The food value of durum wheat grain of Belarusian selection, coarse dust products and macaroni flour obtained in durum wheat milling was studied. The content of essential amino acids, vitamins and minerals was determined. Hydrothermal processing of durum wheat grain of Belarusian selection was optimized. Optimal parameters for softening period and final moisture content of durum wheat grain were determined.

#### **FROM RYE-WHEAT DOUGH IN A STEAM AND CONVECTION OVEN**

*I.M. Kirik, E.A. Nazarenko, A.V. Kirik*

A study was made into the baking process of rye and wheat flour dough pieces in a steam and convection oven. Optimum values of technological parameters for baking were determined,

which make it possible to achieve the highest quality indicators of bakery products when minimum specific energy is consumed.

### **STUDIES ON TECHNOLOGICAL PARAMETERS OF OBTAINING BULK STARTER ON THE BASIS OF SYMBIOTIC CULTURE OF RICE FUNGUS**

*T. I. Shingareva, A. A. Kupriets*

Studies have been made into the technological parameters of making bulk starter on the basis of rice fungus culture. The influence of temperature, souring time, amount of the primary starter of rice fungus introduced into milk on the properties of the bulk starter has been considered. Mathematical dependencies which make it possible to optimize the process of obtaining bulk rice fungus starter for manufacturing fermented milk products have been developed. A comparative analysis of the properties of bulk rice fungus starter and kefir starter has been carried out.

### **DEVELOPMENT OF HIGH FOOD VALUE DAIRY-CEREAL PRODUCT**

*T.L. Shulyak, N.F. Guscha*

Main technological parameters for manufacturing combined fermented milk product obtained from baked milk with "7 cereals" supplement are substantiated. Beneficial impact of the cereal supplement on structural and mechanical properties of the combined fermented milk product was revealed. The product developed has a high degree of clot structure reconstitution after being mixed at both room temperature and storage temperature.

The parameters characterizing food and biological value of the developed product such as mass fraction of dry substances, protein, fat, sugars, ash as well as amino acid composition, vitamin and mineral content, etc. have been studied. The fermented dairy product obtained from baked milk with a cereal supplement added is shown to be superior to a check sample without a cereal additive in a number of parameters, which confirms its increased nutritional and biological value.

### **INTENSIFICATION OF MATURING GRAIN DISTILLATE WITH OAK WOOD OF DOMESTIC AND FOREIGN ORIGIN**

*T.M. Tananaiko, A.A. Pushkar, V.I. Solovey*

A study was made into grain distillates aged with oak wood. The analysis of their qualitative and quantitative composition in terms of aging conditions and country of origin of oak wood was performed. An intensification of maturing process of grain distillates at the initial stage of aging was carried out. The possibility of using oak wood is shown to be irrespective of the country of its origin, which ensures obtaining of aged grain distillates with a certain component and quantitative composition of aromatic substances.

### **STUDIES ON THE POSSIBILITY OF USING TRIPOLI IN THE PRODUCTION OF PREMIXES FOR FOWLS**

*L.V. Rukshan, L.P. Max, V.V. Smeshkov, M.V. Galinovsky*

Physical properties (bulk weight, density) and flowability of tripoli as well as the elemental composition (micro- and macroelements) were studied. Adsorption properties of tripoli were also examined. Qualitative analysis of IR spectra of tripoli was carried out. Formulae for premixes intended for broilers were developed. Premixes with tripoli were made in laboratory and production conditions as well as their quality was considered. Optimum amount of tripoli used for premixes was determined. The use of tripoli as a filler in the production of premixes in the feed mill industry was revealed.

## **PROTEIN AS A BASIS OF MIXED FODDERS INTENDED FOR FISH**

*Zh.V. Koshak, L.V. Rukshan, A.N. Rusina, N.V. Zenovich*

Quantitative and qualitative analysis of the formulae for mixed fodders intended for fish has been carried out. Chemical composition of feed additive Actipro 95 BHS, which is a hemoglobin meal of animal origin, has been studied. The amino acid score of the feed additive has been determined. It has been established that 20-40% of the feed additive should be introduced into the mixed fodder for trout, and up to 2% for carp. The quality of waste products received in freshwater fish processing has been analyzed. It has been found that they can be used to produce a protein feed additive.

## **CONSTRUCTIVE SOLUTIONS AND AREAS OF APPLICATION OF MULTI-LINK IMPACT CRUSHERS WITH VERTICAL ROTOR POSITION**

*V.G. Kharkevich*

Various design solutions of impact crushers with a vertical shaft position were considered and critically analyzed as well as their comparative analysis was carried out. There was identified the most advantageous type of grinders for processing brittle medium-hard and soft food materials with low humidity and viscosity. It is shown that currently one of the simplest and most successful designs of multi-link impact crushers with a vertical rotor position is a two-bearing single-drive hammer-type crusher.

## **FORMATION OF THE INVESTMENT PROGRAM OF THE ORGANIZATION**

*M. I. Kakora*

The article describes the main approaches to the formation of the investment program. The algorithm of forming the optimal investment program processing of agricultural organizations taking into account financial constraints.