INSTITUTE PORRIDGE COMPOSITION OF THE FUNCTIONAL PURPOSE: TECHNOLOGICAL ASPECTS

Problem statement. It is known that collagen plays a significant role in the human body as a specific protein. The collagen preparation (glutin) with inherent complex of physico-chemical properties can be used as a universal functional component in the production of food products. Fish waste is a source of collagen and its hydrolysate products, which can be widely used in the food industry. Recently the interest to fish collagen has considerably grown. This is due to the fact that collagen is a structural and functional component of the skin, muscles, bone, cartilage, the cardiovascular system, etc.

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The instant compositional mixtures were prepared according to the developed recipes. The technological process included operations of mixing extracted cereal mixtures, gluten and chopped licorice root with further stirring[6]. It was determined that the shelf life of the collateral preparation added to the recipes is 6 months (relative humidity is 60…70 %, temperature is 18…20 °C). Amino acid composition of the developed collagen preparation is demonstrated in the Table 2.

Table 2 – Amino acid composition of the collagen preparation [11]

<table>
<thead>
<tr>
<th>Amino acid</th>
<th>g/100 g</th>
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</tr>
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<tbody>
<tr>
<td>Valine</td>
<td>2.56</td>
<td>Alanine</td>
<td>10.93</td>
</tr>
<tr>
<td>Leucine</td>
<td>0.42</td>
<td>Valine</td>
<td>2.02</td>
</tr>
<tr>
<td>Histidine</td>
<td>4.45</td>
<td>Methionine</td>
<td>0.61</td>
</tr>
<tr>
<td>Aspartic</td>
<td>4.90</td>
<td>Isocitrate</td>
<td>1.36</td>
</tr>
<tr>
<td>Threonine</td>
<td>1.87</td>
<td>Alanine</td>
<td>2.66</td>
</tr>
<tr>
<td>Serine</td>
<td>3.87</td>
<td>Tirozin</td>
<td>0.52</td>
</tr>
<tr>
<td>Glutamic</td>
<td>7.19</td>
<td>Phenylalanine</td>
<td>1.31</td>
</tr>
<tr>
<td>Proline</td>
<td>11.82</td>
<td>Hydroxyproline</td>
<td>9.21</td>
</tr>
<tr>
<td>Glycine</td>
<td>13.50</td>
<td>Hydroxylysine</td>
<td>0.76</td>
</tr>
</tbody>
</table>

To evaluate the quality characteristics of instant porridges with the collagen preparation several physicochemical and rheological parameters such as fluidity, swelling, and water-retaining capacity at different hydraulic were investigated. These characteristic values confirm the ability of the developed product to bind water, to be dissolved in it and the changing of its consumer properties. In addition, studies have revealed the recommended mass fraction of the collagen product in the mixture.

To establish rational hydromodulus (HM) for the technological process of porridge preparation the flowability of mixtures was determined. The data showed that glutin has high ability of heavy metals sorption of cholic acids and heavy metals was determined. The developed product contains 0,23 % of heavy metals. Hydroxyproline and hydroxylysine are specific amino acids that are found only in collagen structures. The presence of these amino acids in the hydrolysate shows a high biological role of the collagen preparation (glutin). It is known, that glutin is well digested in human body [5].

Because the collagen preparation was obtained using partially alkaline hydrolysis, it is a natural ion exchanger. The presence of free amino groups and carbonyl groups of collagen causes the ability of the drug to bind heavy metal ions to form insoluble complexes that are excluded from the human body. Based on the physiological effects, some researchers refer to the collagen fiber [12]. Products of the collagen hydrolysis (glutin, gelatin, etc.) actively stimulate secretory and motor functions of the stomach and intestine, they are beneficial to the state and function of the beneficial intestinal microflora. The ability of the starting materials and glutin to sorption of cholic acids and heavy metals was determined. The data showed that glutin absorbs cholic acid and the Pb+ ions in an amount of 4.8 mg/g and 27.4 mg/g respectively. It was established that glutin has high ability of heavy metals and cholic acids sorption, so it can be used as enterosorbent to detoxify the human body.

Inclusion of the collagen preparation to the grain-based instant porridge adjusts amino acid composition and enhances biological value of the product. Additionally, the technological processing of grain raw materials by extruding accelerates the assimilation of nutrients and retains their nutritional value. Extrusion increases the digestibility of nutrients (due to starch gelatinization and denaturation of proteins ) and reduces the term of heat cooking.

Studies showed a change of rheological properties of compositional mixtures with different content of porridge preparation for the same values of HM, temperature and duration of recovery. It was observed that flowability of porridges increased in mixtures with a higher content of collagen preparation due to limited ability of collagen preparation to swell. Collagen binds water to 220 % due to hydration of functional groups of protein peptide bonds as the result of formation of hydrogen bonds in the interaction of OH-, COO-, COOH- and NH-groups with water molecules. The developed porridge shows slightly and comply with the standards established for this type of food.

Organoleptic evaluation (pic. 1) of the developed instant porridges showed the following results: the color (cream yellowish color), taste and flavor (which correspond to the original grain raw materials) had satisfactory consumer properties.

The technological process of producing instant porridges with inclusion of collagen preparation is recommended. Developing of the grain compositional mixture with collagen preparation added in the recommended amount can balance the amino acid composition of foods. Applied extrusion technology for processing grain raw materials enhances the bioavailability of major food components and accelerates cooking time. The rational restoration conditions of dry mixtures are established, basic physical and chemical properties of the developed high-protein hydrolysates are determined. The developed product contains polymers-detoxifiers, which have a positive effect on cleansing the body of xenobiotics such as heavy metals, free radicals, etc.
Композиція каш функціонального призначення: технологічні аспекти

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Анотація. Розроблені композиції та технології сухих композиційних смесей з включенням глютена для інстантних каш функціонального призначення з використанням метода математичного моделювання репетиторських композицій з заданою пищовою цінністю.

Глютен постачає ще одному гідролізу вторинної води сиру. Належене, що введення в рецептури глютена, способствує підвищенню біологічної цінності і придає блюдам функціональні ознаки. Опреділені на біологічну цінність розроблених інстантних каш методом поштов-омбре схеми хроматографії та установлено, що степень утворення субстанційної пищової цінності і незамінних амінокислот при потреби порівняно фрі босет потребує 30%. Існує інші орніптічні, щетичні і фізико-хімічні характеристики розробки продуктів, що відповідають специфічним вимогам.

Ключові слова: інстантні каші, коллатеральні прилади, глютен, композиційні смесі, математичне моделювання, експериментування.

References: