UDC 635.65:664.69

Zhambyl A. M.[1]**,** Master's Degree Student[*], **Borankulova A. S.**[1]**,** PhD,
Kabylda A. I.[2]**,** Candidate of Agricultural Sciences, Associate Professor
[1]*M.Kh.Dulaty Taraz Regional University*
[2]*Astana branch of "Kazakh Research Institute of processing and food industry" Ltd*
e-mail**:** maratkyzy07a@gmail.com, aselboor@mail.ru, anara121579@gmail.com

THE USE OF CHICKPEAS IN THE PRODUCTION OF GLUTEN-FREE PASTA

In Kazakhstan, pasta is popular, consumed in large quantities, and is included in the list of everyday goods, because of its long shelf life, affordability, quick preparation, and sufficiently high nutritional value. According to the Internet resource – Kazakhzerno based on the results of research conducted by TNS Gallup Media Asia Pasta is consumed by about 97% of the population.

Trends and features of consumer behavior in the market of pasta products indicate the necessity of expanding the range by increasing the nutritional and energy value of the product, giving the product a functional purpose of therapeutic and preventive properties. Especially urgent problems are the protein intolerance of wheat flour, which is the basic source of raw materials for the preparation of bread, pastries and pasta. Gluten-free products are steadily gaining the food sector of the Kazakhstani market.

Many of the national and foreign scientists in the search for new sources of raw materials and functional additives for pasta production, which would reduce calories, increase nutritional value, enrichment with functional ingredients, talk about the relevance of this direction.

The use of non-traditional raw materials for pasta production, in particular leguminous crops such as soybeans, peas, chickpeas, lentils, beans, lupines, peanuts, china, vetch, etc. will contribute to the food value, providing additional high-quality products. Grain legumes are an important source of high nutritional protein, starch, dietary fiber, vitamins, and most minerals. The protein in most of them is hypoallergenic.

In the diet of children and adults with celiac disease it is recommended to use specialized gluten-free products made from gluten-free components (buckwheat, rice, corn flour, potato, corn, rice starch, etc.), but imitating traditional gluten-containing products (bread, cookies, pasta). In compliance with the Codex Alimentarius of FAO/WHO, gluten content in such products should not exceed 20 mg/kg. Chickpeas are the most promising raw material of plant origin, useful in terms of nutrient content, having a valuable chemical composition and a set of biologically active substances [1].

In this regard, it is advisable to consider the possibility of using chickpea flour in pasta production to increase the biological value of products and give them therapeutic and preventive properties. Chickpea flour proteins are significantly superior to wheat proteins in amino acid composition and fiber. In addition, chickpea flour contains minerals and vitamins in easily digestible form.

[*]Scientific adviser – Borankulova A.S., PhD, Acting Associate Professor.

Taking into account above-stated, on the bases of research laboratory "Nanoengineering research methods" named after academician of International Engineering Academy, doctor of technical sciences, professor Akhmetov A.S. of M.Kh. Dulaty Taraz Regional University and laboratory of Astana branch of "Kazakh Research Institute of processing and food industry" Ltd conduct research on development of gluten-free pasta preparation technology with chickpea.

Chickpeas are a high-protein crop that is one of the main representatives of legumes. It is a "pea" of yellow-sand color with a slightly pointed tip. In this regard, the chemical composition of chickpeas was studied in comparison with hard chickpeas (Table 1) [2].

Table 1 – Chemical composition of grains (in mg per 100 g of the product)

Grain	Protein	Fats	Carbohydrates			Ashes
			mono- and disaccharides	starch	fiber	
Durum wheat	12,5	1,9	2,1	54,9	2,3	1,8
Chickpeas	20,1	5,0	6,2	43,2	3,7	3,0

The data in Table 1 indicate that chickpea has a significantly higher content of proteins in its chemical composition, represented mainly by globulins (60-90 %) and albumin (10-20 %), can range from 20.1 to 32.4 %.

Monitoring of literary sources [2,3,4] confirms the balanced amino acid composition of chickpea proteins (methionine, lysine-threonine and tryptophan), which should be considered when enriching food products. That is why this legume crop is very valuable for the food industry. The nutritional value of chickpea grains is characterized by the content of minerals and vitamins (Table 2).

Table 2 – Content of minerals and vitamins in grains (in mg per 100 grams of product)

Grain	Sodium	Potassium	Calcium	Magnesium	Phosphorus	Iron	Thiamine (B_1)	Riboflavin (B_2)	β-carotene	Nicotine (PP)	Energy value	
											kcal	kJ
Durum wheat	23	350	57	104	419	5,7	0,46	0,13	0,03	7,13	320	1339
Chickpeas	72	1084	193	126	444	2,6	0,08	-	0,09	-	329	1376

The mineral composition of chickpeas is mainly represented by vital and functionally useful elements such as phosphorus, potassium, magnesium, calcium.

Chickpeas are superior to many traditional leguminous cereals in terms of beta-carotene content (0.09 mg/kg), vitamins (P-carotene), macro- and micronutrients (sodium, iron, selenium). The absence of genetic modifications is an additional advantage of this crop.

At the present time, small private enterprises produce chickpea flour according to simplified energy-intensive technologies that do not always meet the requirements

of consumers. Regrettably, the technologies of complex and deep processing of chickpea flour, which can contribute to obtaining new functional ingredients and expanding the range of useful food products based on them, are not yet applied.

Analysis of the literature shows that recently special attention has been paid to the production of gluten-free pasta products using chickpeas, which simultaneously act as a supplier of nutrients in balanced quantities and have a preventive effect.

The use of a variety of vegetable ingredients in pasta recipes contributes to increasing their nutritional value in general.

Despite the valuable composition of chickpeas, they have not yet found widespread use as a food enrichment in the processing industry due to the complexity of their cultivation.

Based on the foregoing, it seems appropriate to widely use chickpeas for enrichment with proteins, fats, carbohydrates and vitamins, including in the production of gluten-free pasta products, which are in high demand among the population.

References

1. Kazantseva I.L. Scientific rationale and development of technological solutions of complex processing of chickpeas to create healthy foods for the population of Russia / I.L. Kazantseva. – Saratov: SSTU Publishing House, 2016.

2. Skurikhin I. M. Chemical Composition of Russian Food Products: Reference Book / I. M. Skurikhin, V. A. Tutelian. – Moscow: DeLi Print, 2002. – 236 p.

3. Shneider D. V. Development of gluten-free pasta technologies / D. V. Shneider // Food Industry. - 2012. - № 9. - p. 40-41.

4. Zakharova I. I., Tolstova E. G., Ivanova O. N. The study of the possibility of using chickpeas as an ingredient of the basic biscuit // Bulletin of Krasnoyarsk State Agrarian University. 2021. No. 3, pp. 150-156.

5. Tsareva N.I., Bondarenko N.V. Prospects for the use of chickpea legumes in the production of food products // Natural and Human Sciences in the Modern World: Proceedings of the International Scientific and Practical Conference. Orel, May 13-15, 2020, pp. 100-102.

УДК 663. 41

Ахметжанова А. А., докторант, **Изтаев А. И.,** д-р техн. наук, профессор,
Байгазиева Г. И., канд. биол. наук, доцент
Алматинский технологический университет
e-mail: aytowa@mail.ru

ИНФОРМАЦИОННЫЕ ИССЛЕДОВАНИЯ ПО ТЕХНОЛОГИИ ПРОИЗВОДСТВА БЕЗАЛКОГОЛЬНОГО ПИВА

Пиво относится к числу наиболее древних и наиболее сложных по составу алкогольных напитков. Оно содержит значительное количество ценных в пищевом отношении компонентов. Но не надо забывать, что одним из компонентов пива является этиловый спирт, массовая доля которого в зависимости от сорта пива может колебаться от 2% до 11%. В связи с этим пиво