

ENSURING CHEMICAL SAFETY OF FLOUR AND BREAD PRODUCTS IN UZBEKISTAN

Kurbonov Jamshed - Professor, Doctor of Technical Sciences, Samarkand
Institute of Economy and Service

Khalturayev Kholtura Kuvatovich - assistant, Termez State University

Abstract: In this study, the results of the production of toxic elements of flour, bread, and bakery products "Obi-bread" in the dough and bread: amino acids in a protein, the fractional structure of amino carbonyl compounds, their fatty acids, mineral content, and confirming their chemical safety.

Keywords: chemicals, toxins, fat lipids, proteins, amino acids, minerals.

Introduction. The President's address to the Oliy Majlis and many other resolutions and decrees set tasks on measures to further ensure food security of the country.

Currently, due to the changing ecological situation in the country, the unfavorable weather conditions, uneven operation of industrial enterprises, especially the use of chemicals in agriculture and others (pollution, increased waste, weak control), a certain amount of various elements in the composition of food. falling can reduce its level of security.

Since bread from foodstuffs is a food product that a person consumes on a daily basis, in addition to the fact that its production is considered to be of great importance in the national economy, it is important to determine how safe it is for the human body.

Along with the rest of the world, Uzbekistan produces a wide range of bakery products, while in foreign countries the average per capita production of bread is 128 kg on an industrial scale, in Uzbekistan it is now 50-60 kg (including home bread - 19.8 kg), and the rest is different. made

in small workshops, ovens and at home.

At present, 18-20% of the total industrial production in Uzbekistan is food production, the bulk of which falls on bakery products and up to 920 thousand tons per year. has been one of the important tasks.

The range of bakery products differs mainly in the chemical composition and energy value of the technology from which they are made. The lack of high or low nutritional value of food, the presence of factors that alter the pathological state of the human body with various poisonings, and especially toxic elements, as well as its impact on the human body are among the current scientific research.

Therefore, the purpose of our scientific work is to conduct scientific research and control the chemical safety of bakery products in Uzbekistan without violating the range and technology of bakery products, which are necessary for the human body.

The main part. Analytical analysis of the literature on the range of bakery products, production technology and requirements to them showed that among other bread and bakery products produced in Uzbekistan is the so-called "Uzbek lepushkasi" and widely consumed "Obi-non". We chose Obi-non as

In accordance with the requirements of the Republic of Uzbekistan Sanitary and Food Safety Standards (01 38-03) and SanKM № 0283-2010, the sanitary safety standards and nutritional value of bread and flour products are given in Table 1.

The nutritional value of sanitary norms of safety of bread and flour products is determined by its: nutritional value of bread products (protein, fat, carbohydrates and total energy value); vitamins (thiamine-B₁, riboflavin-B₂, nicotine-RR); toxic elements (lead, arsenic, cadmium, mercury, copper, zinc), which are safety criteria; mycotoxins (aflatoxin,

desoxin and tenol, zearamenin, T-2 toxin); radionuclides (cesium-137, strontium-90); microbiological risk (BGKP-cameophore, S-aureos, pathogenic; salmonella, mold) and others

In our work, we conducted a study of flour and bread used for the preparation of "Obi-bread" in Surkhandarya and Samarkand regions, including its composition and the amount of toxic elements, which are safety criteria.

Laboratory researches Surkhandarya branch of SUE "Uz Tect" Termez It was held at the "Testing Laboratory of Food and Agricultural Products", "Samarkand HPP", "Samarkand Laboratory of Standardization, Metrology and Certification" and Termez DU Samarkand ISI laboratories.

Methodology. The chemical composition of bread dough and raw materials was determined using the following general methods (colorimeter, chromatography, polarimetry, etc.) [3].

The content of dry matter was determined by drying in a cabinet SESh-1 until it has a constant mass. Flour at a temperature of 105 ° C, dough and bread at 130 ° C in accordance with GOST 21094-75. The difference between the weights of the initial raw mass and the dry matter obtained was taken as the moisture content.

The active acidity of the bread dough was determined in RN-meters. The total acidity of flour in bread dough Chijov V.N. method and b.q. s, titrated in 0.1 n alkaline solution according to GOST 5670-51 and called it Neumann degrees (N). The amount of crude gluten was determined in accordance with GOST 9404-60 by washing the dough in water (2N). Toxic elements were identified according to OzDst 104-2006.

The total amount of lipids in the product was determined by extraction of the pulverized product according to the modified method of

foil. In this case, a mixture of chloroform and ethanol in a ratio of 2: 1 was used in accordance with GOST 5668-68.

The results obtained. Chromatograms of toxic elements cadmium, arsenic, lead, mercury, zinc and copper and mycotoxins, as well as iron were obtained from the 1st grade wheat flour produced by Surkhandonmahsulotlar JSC (Termez). The chromatogram graph showed that the flour contained only zinc: 1.8 mg / kg; we can see that the element iron is 20 mg / kg. The tests were performed under laboratory conditions with a relative humidity of 48% and a temperature of 220 ° C. The total acidity was found to be 1.20.

A similar study was conducted on 1st grade wheat flour from 4 dispensers produced by JSC "Shurchidonmahsulotlar":

№1 dispenser containing zinc -1.9 mg / kg; №2 da-2.0; №3 da-1.8; and №4 at -2.2; iron element -30. 25, 30. showed the presence and acidity of 25 mg / kg: 0.9, 0.8, 1.0, 0.80. Laboratory relative humidity 54%, temperature 200 C.

The 1st grade wheat produced by "Sariosiyo Don" LLC was made of zinc-16.0 mg / kg, iron 60.0 mg / kg, acidity-0.80, test laboratory relative humidity 48%, temperature Toxins and mycotoxins were not detected.

A chromatogram of cadmium, lead, zinc and copper, which are toxic elements, was obtained from the Samarkand branch of Asia-Afrosiyob. The chromatogram graph showed that the flour examined contained only copper and no lead.

The amount of copper in 1 kg is 2.18 mg, zinc - 17 mg. This amount is harmless and even useful in the diet of normal bread, because the daily intake of copper is 0.5 mg per kg of body weight. For the purpose of comparative analysis of the obtained results, the amount of toxic elements on the scale of enterprises is given in the table 1.

1 table.

Amount of toxic elements of grain products in Surkhandarya and
Samarkand regions at the enterprise level, mg / kg.

Toxic elements	Surkhandonmahsulotlar "JSC (Termez city)	SA "Shurchi grain products" JSC	"Sariosiyo Don" LLC	JSC "Jomboydon products" (Samarkand)	LLC GPM Realty TOO "Zopolya" wheat flour (Tashkent)	Samarkand branch of "Asia-Afrosiyob"
Fe	20	25-30.	60,0	56	22	43
Cu				2,32	1,3	2.18
Zn	1,8	1,9-2,2	16,0	18	2.1	17

The amount of toxic elements of grain products in Surkhandarya and Samarkand regions at the enterprise level indicates that the products in the regions meet the requirements of SanKM № 0283-2010. However, the 1st grade flour produced from wheat grown in Surkhandarya is much less than the enterprises in Samarkand region. In our opinion, this is probably due to the diversity of the structure of the cultivated land and climatic conditions.

Studies have shown that the presence of zinc, copper and iron elements (around the required standards) makes bread and bakery products safe for the human body, harmless and even useful in the diet, as it serves to meet the daily human need for zinc, copper and iron. Accordingly, if these flours are mixed and bread is produced, bread and bakery products made from them can be more useful for the human body.

Bread and bakery products produced in the regions were studied. In the study, the organoleptic assessment of the toxic elements and their quality of "Kolipli non" and "Boysun Kut Baraka" pasta of "ZILOLA KAPITAL SAVDO" JSC, the above results were obtained and their chemical safety and quality requirements SanKM № 0283 -2010 confirmed the answer.

It was also proved that the bread sample produced at the Samarkand bakery contained only copper, zinc and iron, no cadmium and arsenic. The detected copper in the sample was -0.32, iron -38 zinc- 19 mg / kg. It is harmless to the human body and satisfies its daily need for mineral elements.

Samarkand Cadmium, lead and arsenic were not detected in Registon bread and in the flatbread made by Oila-non enterprise of Ishtikhon district. The elements of copper, iron and spirit were in the norm. Therefore, their consumption is safe for the human body.

In addition to the above-mentioned metallic toxins, the chemical hazard of bread dough and bakery products is studied by their chemical composition: amino acids in protein, fractional structure of monocarbonyl compounds, fatty acids in them, the results of experimental studies are given in Tables 2 -5.

From the data obtained (Table 2), it was found that 8 out of 19 amino acids in the protein of Obi-non made from 1st grade wheat flour were controlled, as their relative abundance ensures the safety of bread products. Type 1 wheat flour contains proline -33.23%, glutamic acid-28.05% and leucine -6.15%, which are considered to be the most essential for the human body, and amino acids are more than others. At the same time, aspartic acid occurs in relatively small amounts of -2.16%, serine -3.08%. In Obi-non, which is made from this wheat flour, all of these amino acids

are relatively low, but all of them are preserved. In general, the amino acid content of wheat protein is considered satisfactory, and its consumption ensures the safety of the human body.

2 table

The amino acids (% in relation to proteins) in the protein content of grade 1 wheat flour and the dimensions that characterize these amino acids.

№	Name of amino acids	1st grade flour [4]	Uzbek national bread	PK α -COOH	PK α -NH	PK rp-R
1	Leitsin	6.15-0.08	6.23-0.03	2.30	8.2	
2	Valin	3.42-0.08	3.04-0.07			
3	Meanin	3.42-0.08	3.23-0.03	2.10	7.65	9.03
4	Asparagine acid	2.16-0.07	1.9-0.08	2.05	8.30	3.67
5	Serin	3.08-0.07	3.80-0.04	2.11	8.05	
6	Glutamic acid	28.05-0.07	25.98-0.03	2.09	8.87	4.11
7	Prolin	33.23-0.05	42.07	0.09		
8	Arginine	8.21-0.07	956-0.03	2.12	8.4	12.06

The results of the study of the fractional structure of monocarbonate compounds in the composition of wheat flour dough and "Obi-bread" obtained for the study are given in Table 3, in which 12 names of monocarbonate compounds were identified.

3 – table

Monocarbonate compounds of dough and bread
fractional structure

№	Monocarbonyl compounds	Monocarbonilli compounds structure (% of total amount)	
		Obi-non Uzbek bread	
		In the dough	In the bread
1	Methyl glioxal	4.01	3.46
2	Acetaldehyde	11.33	19.88
3	Acetone-n butanol	42.79	47.41
4	Isomoy aldehyde	19.14	10.06
5	2-methyl butanol 2-methyl butanol	13.76	4.56
6	Isovalerian aldehyde	1.09	1.84
7	Methyl ethyl ketone	0.34	1.32
8	Not identified	0.34	0.87
9	Pentanon-2	0.14	0.52
10	Metimeropilketon	0.04	0.81
11	Hexanal	0.88	2.19
12	Butyl methyl ketone	0.09	2.12

Some of the monocarbonate compounds appear to increase when bread is formed from dough. For example, acetaldehyde is 40%, acetone butanol - 1.5 isovalerian aldehyde - 60%, methyl ethyl ketone - 80%, and

so on. Methylglioxal, isomoic aldehyde, 2-methylbutanols are also sharply reduced. Such a change in them, i.e. a change in the dough to bread or bread types, also ensures the safety of the human body by maintaining the content of monocarbonate compounds.

In order to determine the lipids of bread products, the lipid fatty acid content of 1st grade wheat flour was determined. The results are presented in Table 4.

4 – Table

Fatty acid content of 1st grade wheat flour and bread lipids (in% of the total amount)

№	Names of fatty acids	1 variety of wheat flour [4]	Obi-non is the Uzbek national bread
1	Palmitin	19.7+0.03	19.24
2	Stearinli	1.6+0.06	1.56
3	Oleinli	15.7+0.05	13.20
4	Linoleum	57.7+0.08	60.05
5	Linolenli	5.3+0.02	4.81
6	Amount of acids:		
	Saturated	21.3+0.04	21.30
	Unsaturated	78.7+0.05	78.70

The table shows that the content of saturated fatty acids in bread is 3.69 times higher than in unsaturated fatty acids, the ratio is the same in the 1st grade, as well as in the Uzbek national bread "Obi non". From it, after preparing the dough, the amount of some fatty acids changes during the baking process. For example, palmitic, oleic (15.7 to 13.2) decreased, while

linoleic acid increased (57.7 to 60.05). In general, all fatty acids are retained.

In order to study the mineral content of wheat flour of the 1st grade and the Uzbek national bread "Obi-non" (mg / 100 g), [4] chromatogram of the mineral content of the Uzbek national bread "Obi-non" with the given minerals was obtained and Table 5 takkoslandi.

5- жадвал

Mineral composition of 1st grade wheat flour and Obi-non
(mg / 100 g per product)

№	Minerals	1st grade wheat flour [4]	Uzbek national bread "Obi-non"
1	P	121.08-0.03	141.34
2	K	227.14-0.05	268.87
3	Ca	49.93-0.04	69.59
4	Mg	1.09-0.08	1.20
5	Fe	2.19-0.06	2.43
6	Cu	0.41-0.04	0.39
7	Zn	1.72-0.02	1.83

The results in the table show that it contains seven main mineral elements. They contain the largest amount of K and Ca, which are considered important for the human body. The presence of water and Zn is also provided in the body in the amount required. Of course, the presence

of these in normal amounts in bread products ensures food safety in human life.

Conclusion.

1. The amount of toxic elements of grain products in Surkhandarya and Samarkand regions at the enterprise level indicates that the products in the regions meet the requirements of SanKM № 0283-2010. However, the 1st grade flour produced from wheat grown in Surkhandarya is much less than the enterprises in Samarkand region.
2. The control study on the toxic elements of flour produced for "Obi-bread" showed that the toxic elements in the flour were at a normal level and there was no risk of their consumption.
3. The chemical safety of "Obi-non" dough and bread in terms of amino acids, monocarbanyl compounds, fatty acids, minerals has been confirmed.

References;

1. Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis "Zarafshon" newspaper, January 25, 2020, No. 10-11, 4 pages.
2. Presidential Decree No. PQ-3680 of April 26, 2018 "On measures to further ensure food security of the country."
3. Qurbonov J.M., Fayziev J.S. "Physicochemical methods of food research", -T. "Ilm-Ziya", 2009.268 p.
4. Chemical composition of cooked products. Book 1. Spravochnye tablitsy sodержanie osnovnykh pishchevyykh veshchestv i energeticheskoy tsennosti pishchevyykh produktov. 2nd ed. M, VO "Agropromizdat", 1987-217 p.
5. O'z.DSt. 1104; 2006 Organoleptic characteristics of "baked wheat flour".
6. Manuals on methods of analysis of quality and safety of cooked products. M, "Brandes-Medicine", 1998g.
7. SanPiN - 0138-03. Sanitary norms bezopasnosti and pishchevoy tsennosti prodovolstvennogo syrya and food products.
8. Skuratovskaya O.U. Control of the quality of products by physical and chemical methods. 2-e izd.pere. i dop M., "De-Li print", 2003