The Seybold Report

ISSN 1533-9211

DOI 10.17605/OSF.IO/E2KR5

PHYSICO-CHEMICAL ANALYSIS OF MACRO AND MICROELEMENTS IN MEAT PRODUCTS SAMPLES

KUSHNAZAROVA SHOXIDAXON KOSIMOVNA

(PhD) Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

BOYMATOV ISMOILJON MAMATQULOVICH

(PhD) dosent Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

AZIMOV NURMUXAMMAD SHUXRATOVICH

(PhD) Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

SAIDAXMEDOVA NURXON YUSUPOVNA

dosent Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

SODIQOV MURODJON USMONALIYEVICH

Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

ABDULLAXONOVA GULRUX ABDULLAJON QIZI

Department of Chemistry, Kokand State Pedagogical Institute of Uzbekistan.

Abstract

This article provides information on the methods of determining the content of chemical elements in meat products and their quantitative analysis.

Key words: Macro-micronutrients and their amount, chicken meat, horse meat, lamb meat.

The variety and variety of meat-dairy products assortment requires the classification of goods by the customs officials during the customs clearance process based on the commodity nomenclature of foreign economic activity (TIF TN). Therefore, the development of specific criteria for the classification of various types of meat products for export and import is one of the current problems. All nutrients in food must be in the right proportion and quantity for the health of the body . If the product contains a lot of these substances, harmful effects may occur. As a result, microcomponents are formed in the human body. During the production of food products, as a result of growing raw materials, storage of raw materials and storage of finished products, or violation of production technology , various harmful substances are formed in food products . Substances that are toxic as a result of violation of sanitary rules (mercury, lead, cadmium, arsenic, zinc, copper, iron, tin) is produced [1; 136–140 b].

is considered the duty of food industry experts . For short-term storage , it is recommended to transfer to glass containers instead of pre-prepared tunic containers , because the corrosion of tunic containers under the influence of various gases in the air leads to an increase in the content of heavy metals in the product inside the container [2; 38–41b, 3; 27–30 b].

The Seybold Report
ISSN 1533-9211
DOI 10.17605/OSF.IO/E2KR5

The increase in modern high-tech materials is causing an increase in the assortment of meat products and new types of food products made from them. There is a need to create classification criteria for these goods as a trade object based on their various characteristics. Products classified as meat products can be divided into groups, classes and categories based on classification criteria such as their consumption value, chemical composition and application.

The classification of goods is to divide them into different classes according to similar characteristics. As a result of the classification, a classification system, that is, a classifier, is produced. In other words, a classifier is a grouped list of objects that allows finding a place for each product assigned a certain classification code [4; 40-b].

In order to study meat products in laboratory conditions, samples of chicken, horse and sheep meat were selected. Each sample was thoroughly crushed , then 2 g of the finished mass was taken, placed in a special porcelain container and burned on an electric stove until the color darkened and the smoke disappeared. After the annealing process was completed, the sample was heated in a muffle furnace from 150 °C to 450 °C until it turned gray. After heating, the sample was removed and cooled, then 1 mL of 1:1 nitric acid was added and heated on a hotplate for 10–15 min until the vapor disappeared. After completing the steaming process on the electric plate, it was placed in a muffle furnace at a temperature of 250°C for 1 hour. 1 ml of hydrogen per sample taken from the muffle furnace chloride, 1 ml of hydrogen peroxide was added, mixed, evaporated again on an electric plate and cooled. After the cooling process was completed, the mixture was filtered using a filter and checked in the AVS-1.1 voltammeter analyzer with a computer polygraph device. The amount of heavy metals in the obtained samples is compared with the permissible standard levels according to SanPin 0283-10 (Hygienic requirements for food safety) and recommended for consumption. In view of the fact that it is not possible to determine the complete composition of chemical elements contained in the meat samples obtained by this method, the optical emission spectrometer method allows to obtain effective results in order to fully study the composition of meat products. Using this method, it is a highly effective method for the complete analysis of the composition of macro and microelements in meat products. .

Taking into account the above, the macro-microelement content of chicken, horse, sheep and beef meat samples with different characteristics was analyzed. For this purpose, 200 samples were taken from each meat sample on an analytical balance (FA220 4N). A mineralization device (MILESTONE Ethos Easy, Italy) was used to mineralize the samples. 6 ml of purified nitric acid (HNO_3) and 2 ml of hydrogen peroxide (H_2O_2) as an oxidizing agent were added to each of the samples for 20 min. during 180 ^{0}C, the mixture was turned into a mineral. Distilled acid was obtained using an infrared acid purification device (Distillacid BSB-939-IR).

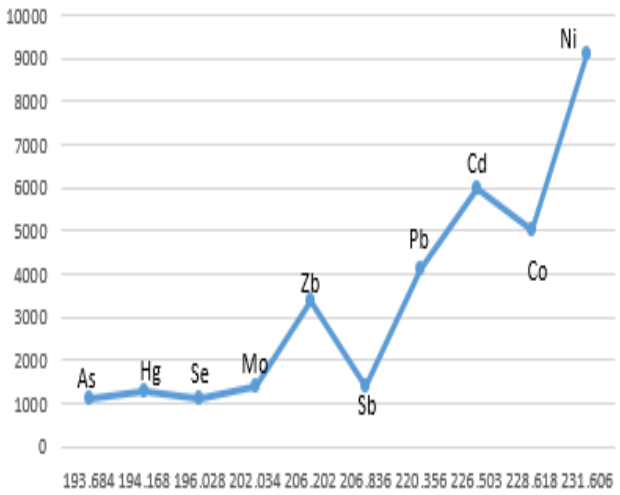
After the mineralization process was completed, the mixture in the test tube was diluted with distilled water (BIOSAN, Latvia) to 40 ml in a separate conical volumetric flask. The solution in the flask was placed in special test tubes in the Autosampling Department for analysis. The prepared sample was analyzed on an **Avio200 ISP – OES** Inductively Coupled Plasma Optical

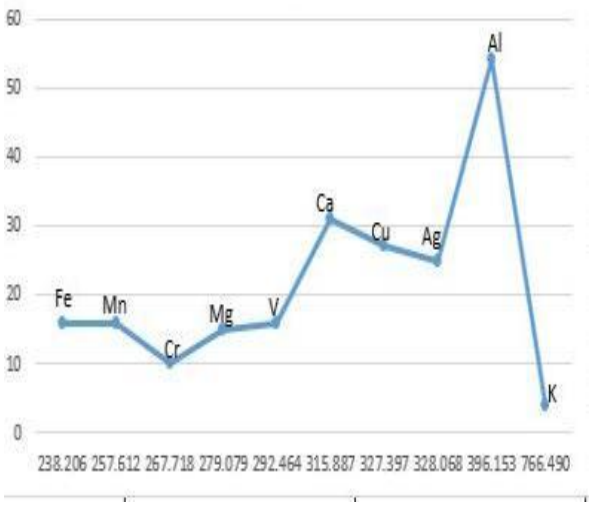
ISSN 1533-9211

DOI 10.17605/OSF.IO/E2KR5

Emission Spectrometer (Perkin Elmer, USA). The accuracy level of the device is high and allows to measure the elements in the solution up to 10 $^{-9}$ g accuracy. Macro and microelements in the composition of meat products studied by optical emission spectrometric method were determined in the spectra as follows (Fig. 1, 2, 3).

The results obtained





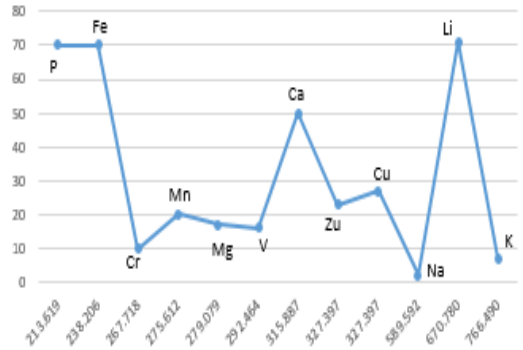
Element	Mn	Cr	As	mg	Na	Li	K	Ca	Fe	co	Ni	Cu	Zn
(mg /kg)	0.002	0.003	0.915	1.831	5.472	0.005	13.298	0.808	0.04	0	0.007	0.016	0.054
Element	Al	B	P	S	sn	Sb	Pb	hg	V	Ba	Mo	CD	Ag
(mg /kg)	0.008	0	14.982	2.077	0.008	0.015	0	0.001	0.002	0.0004	0.006	0.0003	0

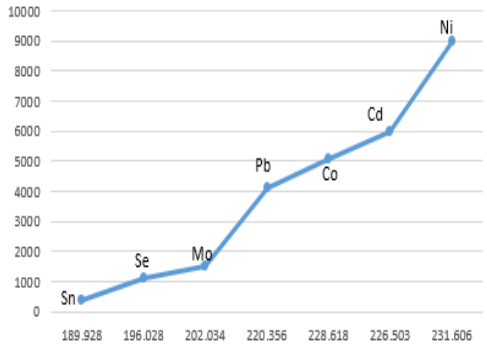
Figure 1: Chicken meat Optical emission spectrometer results

chicken meat obtained by the optical emission spectrometric method is several times higher than other elements, and that boron, lead and silver elements are not found in this meat (Fig. 1). The element of arsenic is found in a slightly larger amount compared to other meat samples, because it was found that there is As in the composition of various drugs added to chicken feed in order to prevent the birds from contracting various diseases.

ISSN 1533-9211

DOI 10.17605/OSF.IO/E2KR5

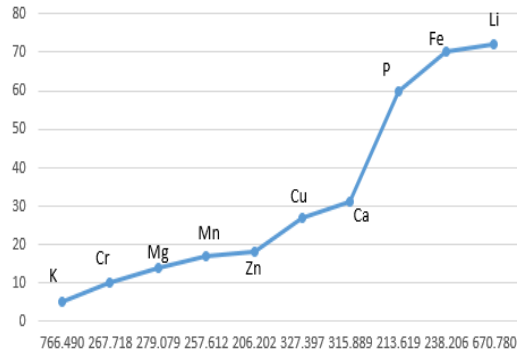


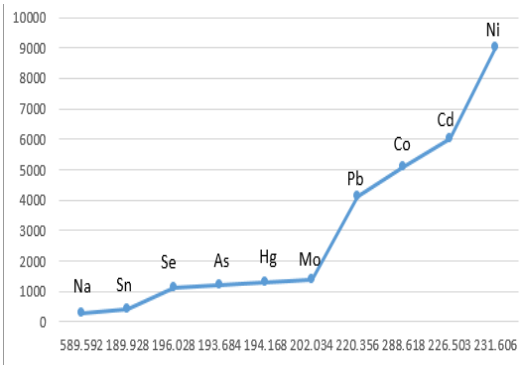


Element	Mn	Cr	As	mg	Na	Li	K	Ca	Fe	co	Ni	Cu	Zn
(mg /kg)	0.004	0.004	0.359	0.034	49.999	0.008	22.041	1.724	0.319	0.002	0.006	0.021	0.466
Element	Al	B	P.S	SH	This	Sn	Sb	Pb	Hg	They	Here	Cd	Ag
(мг /кг)	0.006	0	18,032	1,452	0.021	0.011	0.007	0.002	0.002	0.0003	0.002	0.001	0

Figure 2: Horse meat Optical emission spectrometer results

The amount of sodium, phosphorous, and gold-sulfur elements in horse meat obtained by optical emission spectromeric method is several times higher than other elements, as well as the amount of lead and mercury elements is close to the standard requirements, and it is more than arsenic element, as well as boron and silver elements in this meat. found that it does not occur in the composition (Fig. 1).





Element	Mn	Cr	As	mg	Na	Li	K	Ca	Fe	co	Ni	Cu	Zn
(mg /kg)	0.003	0.005	0.693	1.639	5.422	0.006	15.757	0.828	0.303	0.001	0.006	0.018	0.376
Element	Al	B	P	S	Se	Sn	Sb	Pb	Hg	Ba	Mo	Cd	Ag
(mg /kg)	0.006	0	16,065	1,766	0.02	0.014	0.007	0.006	0.002	0.0003	0.003	0.0004	0

Figure 3: Optical emission lamb spectrometer results

The data obtained as a result of the analysis are presented in the following table. Among the elements obtained by the optical emission spectrometric method of sheep meat, compared to the composition of other meat samples, the amount of sodium, phosphorus, gold and sulfur elements is high, as well as the partial presence of lead, arsenic and cadmium elements, and the absence of boron and silver elements in this meat. possible (table 3.2.1). The amount of

ISSN 1533-9211

DOI 10.17605/OSF.IO/E2KR5

macro and microelements in meat products was analyzed by optical emission spectrometric method with inductively coupled plasma. As a result of the optical emission spectrometer with inductively coupled plasma, it was found that **Cu** (copper), Ag (silver) and **V** (boron) elements are not present in the meat in all four samples, lead and cobalt elements are not found in chicken meat, and the amount of sodium element in horse meat is compared to the other three samples. It was found to be ~9 times more, and potassium and phosphorus elements make up a larger mass fraction in all four samples compared to other elements.

References

1. Suldina T.I. The content of heavy metals in food and their effect on the body. Rational nutrition, nutritional supplements and biostimulants. – 2016. No. 1–136–140 /
2. Gusht va gusht mahsulotlari hafsizligi yagona talablari /standart.uz/cyz/nvws/view?id=1337 .26.01.2018
3. Biological safety of food products: Proc. allowance / A.I. Mashanov, E.A. Rechkina, G.A. Gubanenko; Krasnoyar. state agricultural un-t. – Krasnoyarsk, 2016. 2 7–30 b
4. O.G.Strakova Commodity nomenclature of foreign economic activity : textbook for universities - St. Petersburg 2012
5. Kushnazarova, K. Sh. (2022). perfection
6. The classification system of meat and dairy products based on the commodity nomenclature (Doctoral dissertation, Abstract of the dissertation for the degree of Doctor of Philosophy in Technical Sciences (PhD). Tashkent) (Doctoral dissertation, Abstract of the dissertation for the degree of Doctor of Philosophy in Technical Sciences (PhD). Tashkent).
7. Kushnazarova Shohidakhon Kosimovna, Azimov Nurmuhammad Shukhratovich, Valiev Nematjon Valijon Ogli, & Ochilov Golibjon Mamayunusovich (2022). Results of the Determination of Heavy Metals in Some Types of Raw Meat. Universum: Chemistry and Biology, (11-1(101)), 53-57.
8. Khuzhaev Vakhobjon Umarovich, Ochilov Golibjon Mamayunusovich, & Kushnazarova Shokhida Kasimovna (2020). Classification and Determination of the Fat Content of Meat Products with the Method of Gas Liquid Chromatography. Universum: Engineering Sciences, (12-2(81)), 108-115.
9. Kushnazarova Shahidakhan Kosimovna (2020). Methods of identifying low-quality and fake meat products. Life Sciences and Agriculture, (2-2), 1-5.
10. Kushnazarova , Sh . K. Poor quality and fake meat products to determine methods. Life Sciences and Agriculture, 2-1.
11. Kushnazarova, S., Huzhaev, V., & Ochilov, G. (2021). Étude De La Teneur En Métaux Lourds Des Produits Laitiers Produits En Ouzbékistan. Pridneprovsky Scientific Bulletin Founders: Private enterprise Publishing house "Science and education", 12 (4), 16-21.
12. Omonjonovich, NB, & Kosimovna, KS Valijon o 'g 'li, VN, & Shukhratovich, An (2022). On The Modern Interpretation of the History of Chemistry. Open Access Repository, 8 (12), 655-658.
13. Meat - milk products contained heavy metal (Pb, As, Cd, Hg and Zn) salts to determine V. _ He. Khujaev , Sh . K. _ Kushnazarova, G'.M.Ochilov 2021 chemical research volume 13.55 pages 33-41 ASU scientific notification.
14. Kosimovna, KS, & Usmobovna, NI (2023). Issues Related To Determining Assortments Of Dairy Products. Conference , 105-107.