Journal of Chemistry of Goods and Traditional Medicine

J Chem Good Trad Med, Volume 4, Issue 1, 2025 Traditional Medicine

EVALUATION OF THE ACUTE POISONING PROPERTIES OF FOOD ADDITIVE "ASJAL"

Ibragim R. Askarov
Andijan State University Professor of the Department of Chemistry, Doctor of Chemistry, Honored Inventor of Uzbekistan, Chairman of the TABOBAT Academy of Uzbekistan
https://orcid.org/0000-0003-1625-0330

Boburbek A. Jalilov
Andijan State Pedagogical Institute Deputy Dean
https://orcid.org/0009-0008-1734-7269
E-mail: boburbekjalilov654@gmail.com

DOI: https://doi.org/10.55475/jcgtm/vol4.iss1.2025.404

Keywords:
Ricinus, flax, toxicity, "ASJAL", food additive

Annotation
In this article, the food additive "ASZHAL", consisting of plant components, was tested in experiments in the laboratory of pharmacology and screening of the BFM Bioorganc of the Academy of Sciences of the Republic of Uzbekistan in the test for assessing the acute toxicity of chemicals administered orally in a strictly "fixed dose" recommended by the OECD (2002).

How to Cite
Askarov, I. R., & Jalilov, B. A. EVALUATION OF THE ACUTE POISONING PROPERTIES OF FOOD ADDITIVE "ASJAL". Journal of Chemistry of Goods and Traditional Medicine, 4(1). https://doi.org/10.55475/jcgtm/vol4.iss1.2025.404

Introduction. In the modern food industry, various additives are widely used to extend the shelf life of products, improve their taste and appearance. One such substance is the "ASJAL" food additive, which plays an important role in improving product quality and its attractiveness to consumers. However, the effects of any chemical substance on the body must be thoroughly studied and evaluated. Therefore, assessing the acute toxicity of the ASZHAL food additive is one of the important scientific tasks. This study is aimed at studying the effects of this compound on the human body, establishing safety criteria, and determining their regulatory limits when consumed.

Within the framework of this work, the toxicological properties of the ASZHAL food additive, the results of experimental tests, and its potential harmful effects on the body were analyzed. The research results serve to determine the suitability of this substance for consumption and to formulate recommendations for its use.

Cane (Sesamum indicum) and flax (Linum usitatissimum), which are the basis of the ASJAL food supplement, have long been known for their medicinal properties, and the beneficial substances they contain are of great health importance. Medicines prepared from these plants have many beneficial effects, such as boosting immunity, reducing inflammatory processes, and strengthening the cardiovascular system.

The active substances of these medicinal plants (vitamins, flavonoids, nutrients, saccharides, amino acids, proteins) are important for activating biochemical processes in the body and normalizing metabolic processes, metabolism, and the functions of vital organs and systems[1-2].

Experimental part:

The experiments used an assessment test for the acute toxicity of chemicals administered orally at a strictly "established dose," recommended by the OECD (2002) (organization for economic co-operation and development).

This test is carried out by phased administration to a group of animals of the same sex at a strictly fixed dose of 5000 mg/kg. The experiments were conducted on non-strained white male laboratory mice with a body weight of 22±2 g and 5 mice for each group. Pharmacological experiments were conducted on healthy sexually mature mice that had undergone a 10-14 day quarantine period.

The experiment was conducted in two stages, in the I stage, a substance was administered to the stomach of 2 mice in the group at a dose of 5000 mg/kg in a volume of 0.4 ml once using a special probe, and upon observation for 2-3 days, no lethal outcomes were observed. In the second stage of the experiment, the remaining 3 animals of this group were administered 5000 mg/kg of each substance and 0.4 ml using a special probe, and no lethal outcome was observed for 2-3 days. In the second stage of the experiments, the remaining 3 animals of this group were also administered distilled water in equal volumes. During the first day of the I and II stages of the experiment, the general condition of the animals, possible cases of tremor and death, were monitored hourly.

Daily, for 2 weeks, the animals of all groups were examined for their general condition, motor activity, skin and hair condition, respiratory rate and depth, urination, body weight changes, and other indicators.

Experimental animals were kept under normal feeding conditions, without restrictions on water and food. At the end of the experiment, the average lethal dose of the extract substance in the "ASJAL" - LD50 ratio and the toxicity class were determined.

Discussion of the research results:

After 15 minutes of administering the food supplement "ASZHAL" at a dose of 5000 mg/kg, the animals experienced increased respiration, congestion in one place, and narrowing of the eyes. After this process lasted 20-25 minutes, the mice began to return to their normal state. Throughout the experiment, no deaths were recorded in all groups of animals receiving the ASJAL food supplement at a dose of 5000 mg/kg (5/0).

The animals of the experimental groups, compared to the control group, did not show a decrease in the body weight of the mice during the experiment (7 and 14 days) at the administered dose. The average lethal dose of the "ASZHAL" food additive extract - LD50 and its toxicity class were determined. The obtained results are presented in Table 1.

Table 1. Indicators for assessing the acute toxicity of the food additive "ASZHAL" in mice (M±m, n=5)

Groups	Dose, mg/kg, ml	Animal in the group/ number of dead animals	Average animal mass, g			LD_{50}, mg/kg
			1 day	7 day	14 day	
Control	0.5 ml of dis water	5/0	21,5 ± 0,3	23,6 ± 0,4	24,5± 0,5	-
Food Additives "ASJAL"	5000 mg/kg	5/0	21,8 ± 0,25	22,8 ± 0,3	23,9± 0,4	>5000 mg/kg

Note- *P<0.05 for control

Toxicity is the property of a substance to enter the human, animal, or plant body in certain quantities, leading to their poisoning or death. Acute toxicity is the toxic effect of a substance in one or more doses lasting no more than 24 hours, which can manifest as a disruption of the physiological functions or morphology of the organs of experimental animals.

When classifying the results obtained from the single administration of the "ASZHAL" food supplement to the stomach of mice at a dose of 5000 mg/kg according to the OECD, it was established that these samples belong to the B-class of practically non-toxic chemical substances (LD50> 5000 mg/kg) [3-4].

Flax and sesame seeds are a valuable source of proteins, fats, phospholipids, and macro- and microelements. As a result of studying the elemental composition of sesame and flax plant samples obtained in a 1:1 ratio using optical emission spectrometry with inductively coupled plasma (IPEC), it was established that all studied plant samples contain 61 elements. Among the macroelements present in the sample, phosphorus, potassium, and calcium are the most common. Among the microelements, iron, aluminum, manganese, zinc were found to have a higher content than other elements[5].

They are rich in protein (18.23%), their amino acid composition is similar to soybean proteins. Flax seeds contain 30.41% oil. Fats are represented by various fatty acids that are part of the triacylglycerides of linseed oil. Saturated fatty acids (unwanted in the human diet) make up only 6.10%, of which palmitic acid (3.5-5.2%) and stearic acid (3%) are the most common. The proportion of monounsaturated fatty acids in linseed oil is 14.15.5%, with the majority represented by oleic acid. The antioxidant activity of adrenaline in the above-mentioned plant extracts was determined by inhibiting the autooxidation reaction in vitro. Studies have shown that the antioxidant activity of all samples is higher than 10%, meaning they possess antioxidant activity[6].

The presence of gall acid and other flavonoids in sesame and flax seeds provides antioxidant activity. The amount of phenolic compounds in the aqueous extract obtained from sesame and flax seeds in a 1\1 ratio was determined by HPLC. In 100 g of the sample, the amount of gallic acid was 1.318 mg, rutin 1.678 mg, salicylic acid 1.373 mg, quericin 6.703 mg, and arginine 4.740 mg. In this experiment, quercetin and apigenin were found to have higher acid content[7].

Conclusion. As a result of the above experiments, it was established that the food supplement "ASJAL" is beneficial for the human body. The experiments were tested in the Laboratory of Pharmacology and Screening of Bioorganic Substances of the Academy of Sciences of the Republic of Uzbekistan in a test to assess the acute toxicity of chemicals administered orally at a strictly "established dose," recommended by the OECD (organization for economic cooperation and development) (2002). When classifying the results obtained from the single administration of the "ASZHAL" food additive to the stomach of mice at a dose of 5000 mg/kg according to the OECD, it was established that these samples belong to the B-class of practically non-toxic chemicals (LD50> 5000 mg/kg). These biologically active substances prevent or inhibit the occurrence of cancer, strengthen blood vessels, protect the liver and gastrointestinal tract from damage, and contribute to the improvement of brain, heart, and gastrointestinal tract functions.

References

1. Asqarov I.R. Sirli tabobat// T: Fan va texnlogiyalar nashriyot-matbaa uyi. Toshkent. 2021-y. –B. 1010

2. Asqarov I.R. Tabobat qomusi// T.: Mumtoz so`z. Toshkent. 2019-y. –B. 1590

3. Xalikov B.M, Ergashev B.D, Po`latov S.M, Chakanda va uning foydali xususiyatlari, Yosh mutaxassislar" ilmiy – amaliy jurnali 2023-yil 5-son

4. Аскаров И. Р. и др. Kanakunjut va zig'ir o'simliklari urug'i tarkibidagi makro va mikro elementlar miqdorini o'rganish //Журнал химии товаров и народной медицины. – 2024. – Т. 3. – №. 2. – С. 194-204.l

5. Аскаров, Ибрагим Рахманович, and Бобурбек Абдурахим угли Джалилов. "Kanakunjut va zig'ir o'simliklari urug'i tarkibidagi makro va mikro elementlar miqdorini o'rganish." Журнал химии товаров и народной медицины 3.2 (2024): 194-204.

6. OECD (2001) Guideline for testing of chemicals. Acute Oral Toxicity – Fixed Dose Procedure No 420 РуководящийдокументОЭСР Test № 420 « Acute Oral Toxicity - Fixed Dose Procedure».
7. Миронова.А.Н Руководство по проведению доклинических исследований лекарственных средств. Часть первая / Под ред. М.: Гриф и К, 2012. – 944 с.