POSSIBILITIES OF PROCESSING OILSEED RAW MATERIALS TO OBTAIN VEGETABLE OIL FROM *XANTHIUM STRUMARIUM L.* FRUITS.

Babajanova Rimajon Kurambaevna
post-doctoral of Urgench State University
Akramova Rano Ramizitdinovna
Tashkent Chemical-Technological Institute

Abstract: This article presents the experimental part of the research work. The article discusses the possibilities of processing non-traditional oilseed raw materials to obtain high-grade vegetable oil rich in fatty acids, vitamins, trace elements, amino acids, and most importantly, iodine, which can solve the problems of iodine deficiency in the region.

Key words: fruits, Xanthium Strumarium L., amino acids, trace elements, fatty acids, iodine.

Using modern physicochemical analytical methods, we determined the chemical composition of Xanthium Strumarium L. fruits and secondary products of their processing. We determined the organoleptic properties characteristic of the fruits of the local cocklebur, determined the mass fraction of debris (6%), the mass fraction of moisture (5.39-5.93%), husk content of fruits, the nature and weight of 1000 pieces of fruits with and without needles.

Using the method of exhaustive extraction in a Soxhlet apparatus, we determined the mass fraction of oil in crushed fruits (10.2%), in fruits with the separation of most of the pericarp (11.2%), in fruits without needles and pericarp (11.8%) and in peeled seeds (34.6%) and the fatty acid composition of the extracted oils.

The results were compared with the lipid content and fatty acid composition of the fruits and seeds of Xanthium Strumarium L. Growing in the territory of the Russian Federation, it was found that the amount of lipids in our region is slightly less than that of the Russian cocklebur, but in the fatty acid composition of linoleic acid is slightly higher than that of the Russian analogue.

Lipids of the pericarp of Xanthium Strumarium have been studied for the first time. Research has been conducted to determine previously unstudied proteins, carbohydrates of fruits and secondary processing products. In order to determine the method of further processing, their amino acid, vitamin and carbohydrate composition of the pericarp and meal has been established.

In the flavonoid composition of the fruits, pericarp and meal of Xanthium Strumarium L., the presence of significant amounts of salidroside (rhodioloside), which is present in Rhodiola rosea, has been determined.

The mineral composition of the fruits of Xanthium Strumarium and secondary processing products has been thoroughly studied, the presence of a large amount of potassium and calcium in the pericarp and meal of the fruits of Xanthium Strumarium L. has been established.

Of particular importance are studies of the qualitative and quantitative determination of organically bound iodine in the fruits, pericarp and meal of the fruits of Xanthium Strumarium.

The organic and physicochemical indicators of the oil and oil extract were determined using modern analytical methods. The density, color, refractive index, presence of wax-like substances, acid and iodine values, and carotenoid content were determined. The presence of flavonoids and terpenoids in the oil was identified.

To determine the optimal modes of operations for preparing raw materials for extraction, the structural features and properties of the thorn apple fruit husk were studied. An increase in oil yield was found when separating most of the pericarp and needles of the thorn apple fruit, as well as the dependence of the yield of sifting fractions on the time of crushing the fruit.

A description of laboratory installations for extracting oil from the thorn apple fruit husk and obtaining an oil extract of Xanthium Strumarium L. by maceration with sunflower oil is given.

The developed technology for the production of oil extract includes operations for preparing fruits for maceration (cleaning, grinding, crushing and sifting), as a result of which most of the needles and pericarp of the Xanthium Strumarium fruits

are separated, extraction and the process of extrusion processing and pressing of organically bound iodine compounds and carotenoids pass into the extract.

Low maceration temperature allows preserving the quality indicators of refined deodorized sunflower oil enriched with iodine compounds and carotenoids.

The obtained products of processing Xanthium Strumarium L. fruits have high physiological properties with native nutritional value and contain a significant amount of organically bound iodine, carotenoids and saturated fatty acids.

The technological scheme for obtaining the extraction oil of Xanthium Strumarium L. fruits without needles includes the operations of cleaning the fruits from foreign impurities, separating the needles and pericarps of the Xanthium Strumarium fruits and direct extraction of crushed fruits with extraction gasoline, as a result of which we obtain secondary products of production:

- branches and leaves of the Xanthium Strumarium;
- needles of the pericarp;
- pericarps and seed coats of the Xanthium Strumarium fruits;
- meal.

According to literary sources, various biologically active substances are present in all above-ground parts of the plant, such as flavonoids and tannins, phenolic acids, chlorophyll and carotenoids, saponites, minerals, organic iodine compounds, essential oil, oxycinnamic acids.

The possibilities of further processing of secondary products of obtaining the extraction oil and oil extract of the Xanthium Strumarium L. fruits are presented in the scheme in Figure 1.

Thus, the Xanthium Strumarium L. fruit waste, consisting of dry leaves and branches of the cocklebur, can be used as raw material for obtaining biologically active substances present in their composition.

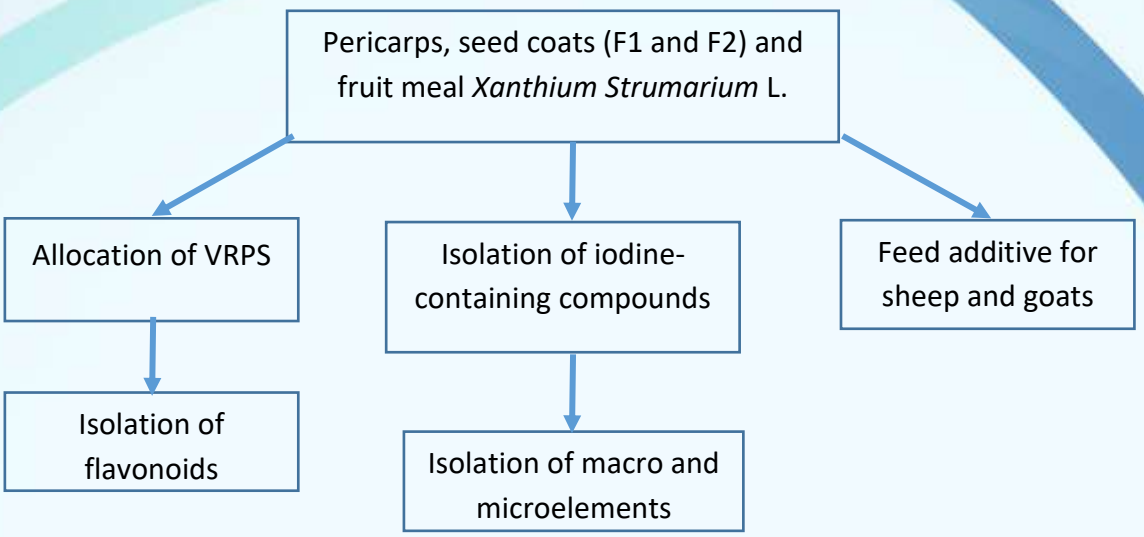

Figure - 1. Obtaining extraction oil and oil extract of Xanthium Strumarium L fruits

Analysis of the chemical composition of the pericarp and meal showed the presence of significant amounts of flavonoids, namely salidroside, rutin, luteonine. In addition, their protein composition was determined, containing tryptophan and valine in significant amounts from essential amino acids, and glutamine and cystine from conditionally essential ones.

References.

1. PREVENTION OF IODINE DEFICIENCY DISEASES [Electronic resource]: Law of the Republic of Uzbekistan, dated 03.05.2007 No. ZRU-97. – Access mode: lex.uz/ru/docs/1184051#1184135 (date of access: 19.02.2024).

2. Nadtochiy I. N., Budrevskaya I. A. RANGE AND HARMFULNESS ZONE OF XANTHIUM STRUMARIUM L. (ASTRACEAE DUMORT. FAMILY). Plant Protection Bulletin, 2011, No. 3. - Access mode: https://cyberleninka.ru/article/n/areal-i-zona-vredonosnosti-durnishnika-zobovidnogo-xanthium-strumarium-l-semeystvo-astrovye-slozhnotsvetnye-asteraceae-dumort (date of access: 26.02.2024).

3. Wenxiang Fan, Linhong Fan, Chengyi Peng, Qing Zhang, Li Wang, Lin Li, Jiaolong Wang, Dayong Zhang, Wei Peng and Chunjie Wu. Traditional Uses, Botany, Phytochemistry, Pharmacology, Pharmacokinetics and Toxicology of

Xanthium strumarium L.: A Review, Molecules, №24, 2019., - P. 359-399. Available on: www.mdpi.com/journal/molecules; DOI:10.3390/molecules24020359.

4. A. A. Kalmykova, D. K. Magzanova. Phytochemical analysis of aqueous extracts of common cocklebur (Xanthium strumarium) // Biodiversity, rational use of biological resources and biotechnology: Proceedings of the International scientific and practical online conference, Astrakhan, December 08, 2020 / Comp. N.V. Smirnova, A.S. Baimukhambetova. - Astrakhan: Astrakhan State University, Publishing House "Astrakhan University", 2021. - P. 100-103. - EDN QFPZSZ.

5. M. K. Sidelnikova, A. A. Savina, V. I. Sheychenko et al. Study of the chemical composition of common cocklebur herb (Xanthium strumarium L.). Issues of Biological, Medical and Pharmaceutical Chemistry, 2018, Vol. 21, No. 10. - P. 29-36. – DOI 10.29296/25877313-2018-10-05. – EDN YLZODB.

6. Zh. T. Mynbaeva, O. V. Dryuk. Qualitative analysis of the main groups of biologically active substances and the study of amino-, fatty-acid compositions of the plant Xanthium Strumarium L. // Young scientists and pharmacy of the XXI century: Collection of works of the sixth scientific conference with international participation, Moscow, December 14, 2018. - Moscow: Federal State Budgetary Scientific Institution "All-Russian Research Institute of Medicinal and Aromatic Plants", 2018. - P. 193-199. – EDN YXWSXZ.

7.Rasulova D., Rasulova M. A CLINICAL CASE OF NEURODEGENERATIVE DISEASE OF THE TYPE OF LEWY BODY DISEASE WITH SEVERE COGNITIVE, AUTONOMIC DISORDERS //JOURNAL OF EDUCATION AND SCIENTIFIC MEDICINE. – 2023. – Т. 2. – №. 1. – С. 45-49.

8.Bakhtiyarovna R. M. et al. REHABILITATION MEASURES IN PATIENTS WITH ISCHEMIC STROKE //INTERDISCIPLINE INNOVATION AND SCIENTIFIC RESEARCH CONFERENCE. – 2024. – Т. 2. – №. 20. – С. 268-270.

9.Rasulova D. K., Rakhimbaeva G. S., Rasulova M. B. CLINICAL CASE OF REHABILITATION OF CENTRAL POST-STROKE NEUROPATHIC PAIN-DEJERINE ROUSSY SYNDROME //British Medical Journal. – 2023. – Т. 3. – №. 1.

10.Rasulova D. et al. Dynamics of restoring motor functions in post-stroke. – 2023.