DOI: https://doi.org/10.5281/zenodo.14502213

AMARANTH GRAIN FAT CONTENT

Inagamova Nargiza Furqtovna [1],
Allanov Xolik Keldiyarovich [2],
Charshanbiev Umurzoq Yuldashevich [2]
1Doctoral student of the Scientific Research Institute of Plant Science and Genetic Resources
2Tashkent State Agrarian University 100140 Tashkent, Uzbekistan

Annotation: *This article is given about the importance and beneficial properties of the oil content in the amaranth (Amaranthus) plants in its human life and the method of extracting oil from amaranth seeds experimental laboratory conditions is scientifically based.*

Key words: *amaranth, seeds, oil, 96% alcohol drive, scales, liquid N_2, development, propria, Kolba, oil drive car.*

Introduction: The world's population reached 0.5 billion only by the middle of the 17th century, and in the middle of the 19th century, almost 200 years later, it reached 1 billion. formed the total world population is 1 billion. 1,000,000 years were necessary for its formation, and 2 billion for 80 years, 3 billion 30 years, 4 billion for 15 years, 5 and 6 billion it took 13-12 years [9,10].

According to the UN Food and Agriculture Organization, the list of amaranth-producing countries is expanding every year.

Considering that the population of the Republic of Uzbekistan is increasing by 650-670 thousand people per year, it may reach 47 million by 2026, which indicates a several-fold increase in the population's demand for agricultural products [1,4,7,8].

In Uzbekistan, amaranth plants are an ancient crop that has become popular as a useful and powerful product in recent years, and abundant harvests are being obtained from it. Today, amaranth, which is one of the main food products of the peoples of the world, is an agricultural crop with a high nutritional value, and it has been determined that the protein content in it is more than almost all plant foods [2,3,5].

Amaranthus is a member of the Amaranthaceous family. Annual herb growing 2-3 meters tall. The thickness of the stem is 8-10 centimeters, the leaf is elongated and elliptical and is arranged in a row with a long band. The flowers are small, inconspicuous, and form a broom-like flower cluster up to half a meter long. The seed is small spherical, brown or yellow in color, and the weight of 1000 seeds is 0.4-0.6 grams. One root plant can produce up to 0.5 kilograms of seeds. The bottom of the seed is shiny [1].

Amaranth oil contains 77% unsaturated fatty acids, 50% of which are linoleic and linolenic acids. Vitamin E in the form of tocopherols in oil has an antioxidant effect, has the property of reducing the amount of cholesterol in the blood [8]. The oil also contains rutin and vitamin R, has antimicrobial and fungicidal properties [3,4]. Since 2013, scientists from Andijan began to study this unique medicinal plant in detail by order of the Science and Technology Development Coordination Committee under the Cabinet of Ministers. Various varieties of amaranth available in Uzbekistan and imported from abroad were tested and the most effective ones were selected. The research conducted in cooperation with the scientists of the Institutes of Bioorganic Chemistry and Chemistry of Plant Substances of the Republic of Uzbekistan proved that the content of amaranth grown in the conditions of Uzbekistan is richer in useful elements. Imported from Germany, "AEN Engineering GmbH & Co. KG" company’s special cold pressing equipment extracted oil from locally grown amaranth grains and found that the oil contained high levels of squalene and several other beneficial substances. Preliminary studies have shown that the amount of squalene in Uzbekistan amaranth oil is 8-10 times higher than that of shark liver. It was found that the oil contains 12% squalene, and a number of other useful substances listed above. Most interestingly, it was found that the amount of squalene enriched in oilcake is 42%, and S. D. Gusakova, professor of plant substances of the Academy of Sciences of the Republic of Uzbekistan, assessed this as a discovery. Amaranth oil grown in Andijan was checked by gas chromatography and found to be rich in Omega-3 and Omega-6 unsaturated fatty acids. This determines the prospects for the use of locally produced amaranth oil as a unique medicinal substance in medicine [1,3,5,11].

Research method: The experiment was carried out at the Scientific Research Institute of Plant Genetic Resources in 2023-2024. Studying the composition of amaranth grain obtained as a result of conducting field experiments and determining the level of moisture was determined based on the method of the institute.

1st table

Experience system

Options	Type of plant	Planting time	Planting scheme	Planting depth	Fertilizer standard
1.	Gultojikhoroz "ICBA-TSAU 2"	01.04.	70x15-1	0,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
2.		10.04.	70x20-1	1,0 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
3.		20.04	70x25-1	1,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
4.	Gultojikhoroz "ICBA-TSAU 1"	01.04.	70x15-1	0,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
5.		10.04.	70x20-1	1,0 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
6.		20.04	70x25-1	1,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
7.	Giant (Russia)	01.04.	70x15-1	0,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
8.		10.04.	70x20-1	1,0 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga
9.		20.04	70x25-1	1,5 cm	N-150, P-100, K-50 kg/ga, Compost-10 t/ga

Research results and its discussion: To determine the composition and fat content of amaranth grain, Gultokhoroz "ICBA-TSAU 1", Gultokhoroz "ICBA-TSAU 2" and Gigant (Russia) varieties were taken. To determine the amount of oil in amaranth grain, extraction was carried out in laboratory conditions using a special (BIOBASE FH1200 (X)) SOXHLETTE apparatus (Table 1).

2nd table

Amaranth grain fat content

№	Type of plant	Repetitions	Amount of oil obtained from 100 grams of seed weight (gr)	The amount of oil %
1.	Gultojikhoroz "ICBA-TSAU 2"	1	10,582	10,6
2.		2	10,685	10,7
3.		3	9,532	9,5
Average:			**10,266**	**10,3**
4.	Gultojikhoroz "ICBA-TSAU 1"	1	9,809	9,8
5.		2	12,408	12,4
6.		3	12,532	12,5
Average:			**11,483**	**11,5**
7.	Giant (Russia)	1	10,424	10,4
8.		2	12,582	12,6
9.		3	11,424	11,4
Average:			**11,477**	**11,5**

The following results were obtained in laboratory studies based on the specified options. Gultokhoroz "ICBA-TSAU 2", Gultokhoroz "ICBA-TSAU 1" and Giant amaranth varieties were carried out.

In "ICBA-TSAU 2" amaranth, oil separation was performed in 3 repetitions, and in the first repetition, 10,582 grams (10.6%) of oil was extracted from 100 grams of seeds. In the second return, this indicator was 10.685 g (10.7%), and in the third return it was 9.532 g (9.5%).

When the amount of oil was determined in 3 returns of the "ICBA-TSAU 1" plant, 9.8 g (9.8%) of oil was obtained in the first return. 12.4 g (12.4%) was found in the second return, and 12.5 g (12.5%) in the third return.

In the giant amaranth plant, the amount of oil was determined in 3 returns. 10.4 g (10.4%) oil was obtained in the first return. 12.6 g (12.6%) of vegetable oil was extracted in the second extraction, and 11.4 g (11.4%) in the third extraction (Table 1).

Conclusion: 1. Amaranth seed oil contains squalene, tocotrienols and Omega-3, 6, 9, etc., and its use in medicine gives good results in the treatment of many diseases.

2. In the separation of amaranth oil, Gultojikhoroz "ICBA-TSAU 1", Gultajkhoroz "ICBA-TSAU 2" and Giant plants are taken, in which up to 0.95-2.97 grams, Gultajkhoroz "ICBA-TSAU 1" It was found that 0.98-1.25 grams of oil can be extracted from Giant amaranth and 1.04-1.25 grams of oil.

3. It is recommended to isolate oil, vitamins, protein and carbohydrates from amaranth plant grain in laboratory conditions and to use it in the food, pharmaceutical industry in the production of various medicines and cosmetology products.

REFERENCE LIST:

[1] Allanov H.K., Sottorov O.A., Normurodova M. 2021 Amaranth cultivation technology *AGRO ILM* 2(72)

[2] Abdullaev M.Sh. 2021 Sprinkler irrigation of amaranth plants in the conditions of Uzbekistan *Universum: technical sciences: electron scientific journal* 5(86)

[3] Artamonov E.I., Zhiltsov S N, Kotov D N 2013 The influence of the uniformity of sowing with a cellular disc sowing machine on the yield of panicled amaranth *Agronomy*

[4] Borodycheva E.I., Shults I.A. 2008 Agrotechnics of cultivation of purple amaranth for seeds in the lower Volga region 21-22

[5]. To‘xtaboyev N.X. Amarant (Amaranthus hybridus L.) moyi ajratib olishdagi chiqitdan pektin moddalari ajratib olish kimyoviy-texnologik ko‘rsatkichlarini

o‘rganish. Farg‘ona vodiysi o‘simlik, hayvonot dunyosi va ulardan oqilona foydalanish muammolari. Regional anjuman materiallari. Andijon, 26-yanvar 1999. 117-bet

[6] Olowoake A A 2014 Influence of organic, mineral and organomineral fertilizers on growth, yield, and soil properties in grain amaranth (Amaranthus cruentus L.*) Journal of Organics* 1(1) 39-47

[7]. Xoshimjonova N., To‘xtaboyeva F., Mo‘minov M., To‘xtaboyev N.X. Amarantdan shifobaxsh moy ajratib olishni joriy qilish istiqbollari. “Farg‘ona vodiysi biologik xilma-xilligi: dolzarb muammolari va ularning yechimi” respublika ilmiy anjumani materiallari to‘plami. 78-80 betlar. Andijon, 2015

[8]. To‘xtaboyev N.X., Rustamova G., Ismoilova N., Xoshimjonova M. Amarant kunjarasidan pektin moddalari ajratib olish istiqbollari “Tovarlar kimyosi muammolari va istiqbollari” V Respublika ilmiy-amaliy konferensiya materiallari. Andijon, 2018 yil 4-5 sentabr. 77-78 b.

[9]. Sagdullaev Sh.Sh., Gusakova S.D., Khidoyatova Sh.K., Rakhmanberdieva R.K., Malikova M.Kh., Sanoev A.I., Mukarramov N.I., Muminov M.M. Modern technologies for raw materials processing by the example of amaranth // Abstract CCS 12th National Symposium on Natural Organic Chemistry July 28-31, 2018, Kunming (China). P.32

[10]. Умарова Ф., Собиров О., Тўхтабоев Н. Использование Амарантового растения как источник кальция. Вклад Абу Али ибн Сино в развитие фармации и актуальные вопросы фармакологии. Межд.Конф.Ташкент 2018 стр. 37-39.

[11]. Charshanbiyev U.Y., Allanov Kh.K., Safaraliyev L.H., Berdiboev E.Y. The effect of organic fertilizer application in growing amarant (amaranthus) plant. ICECAE 2022, IOP Conf. Series: Earth and Environmental Science 1140 (2022) 013005, IOP Publishing. Doi:10.1088/1755-1315/1140/1/011021.