European Journal of Interdisciplinary Research and Development
Volume- 31 September- 2024
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

EXPLORING THE HEALTH IMPACT OF CHEMICAL INDICATORS IN AMARANTH PRODUCTS

Mohidil Abduvalieva
Student of the Department of Food Technology,
Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: mohidil7521@gmail.com

Dilyora Khomidova
Student of the Department of Food Technology,
Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: mohidil7521@gmail.com

Dilshod Shodiev
Fergana Polytechnic Institute
Assistant, Department of Food Technology,
Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: d.shodiyev@ferpi.uz

Abstract
The cultivation of amaranth in Uzbekistan presents a promising opportunity for its widespread application across various sectors, including agriculture, medicine, and environmental management. This resilient plant plays a vital role in addressing contemporary challenges such as soil degradation and energy shortages. Amaranth thrives in saline soils with NaCl concentrations up to 10 mM, yielding high outputs even in such adverse conditions. Remarkably, after 2-3 years of growth in saline environments, the soil becomes suitable for wheat cultivation. Additionally, amaranth withstands high temperatures of 45-50°C, promoting the activity of nitrogen-fixing microorganisms and enhancing soil quality. Its robust root system improves soil porosity and contributes to humus restoration, making it an affordable and efficient green manure. Furthermore, as a phytoremediator, amaranth aids in the detoxification of soils by removing heavy metals, radionuclides, and pesticides. This versatile plant offers a sustainable solution to ecological and agricultural challenges in Uzbekistan.

Keywords: amaranth, chemical, vitamin, amaranth oil, malofene, squalene, protein, vitamins, biologically active substances, diseases.

Introduction

Amaranth (Amaranthus spp.), an ancient crop with a rich history of cultivation, has recently gained renewed attention for its remarkable adaptability and wide range of applications. In Uzbekistan, the growing interest in this plant stems from its potential to address critical challenges in agriculture, environmental sustainability, and medicine [1,2]. As the country

faces issues such as soil degradation, salinization, and food security, the cultivation of amaranth offers a promising solution [3].

Amaranth's ability to thrive in saline soils with NaCl concentrations of up to 10 mM makes it an ideal crop for regions where soil salinity limits agricultural productivity. Its capacity to improve soil health through nitrogen fixation and organic matter restoration further enhances its value [4]. In saline environments, amaranth not only produces high yields but also conditions the soil for subsequent crops like wheat, transforming once-barren land into productive farmland. Furthermore, the plant's resilience to extreme temperatures—up to 45-50°C—makes it a reliable crop in arid regions prone to harsh climates [5,6].

Beyond its agricultural benefits, amaranth serves as an effective phytoremediator, capable of absorbing and removing heavy metals, radionuclides, and pesticides from contaminated soils. This function highlights its potential as a key player in ecological restoration and environmental protection. Moreover, its nutritional and medicinal properties have been extensively studied, revealing numerous health benefits that make it a valuable addition to the fields of nutrition and medicine [7,8,9].

In light of these factors, the cultivation of amaranth in Uzbekistan offers a strategic advantage in addressing environmental degradation, improving soil fertility, and contributing to food security. This introduction highlights the significance of further research into the chemical indicators of amaranth plant products and their effects on the human body, with the goal of unlocking its full potential for both the national economy and public health [10,11,12,13].

The main part

The amaranth plant is one of the most urgent issues that our government is paying special attention to today, increasing the efficiency and productivity of animal husbandry, poultry, and fishing, and ultimately providing the population of Uzbekistan, whose number is increasing, with cheap, high-quality meat, milk, eggs, fish, etc. it is also of particular importance in terms of providing food products [14-19].

Amaranth is a useful fodder for pets and poultry. If 25% of amaranth blue mass is added to their feed, lambs and calves grow 1.5-2 times, nutria and rabbits 2-3 times faster, milk yield and fat content of cows increase dramatically. Piglets fed with amaranth have been tested in practice to gain 60 kg of live weight in 4 months.

The high level of vitamin C and carotene in amaranth is an important factor in the health of animals and poultry.

Amaranth attracts the attention of agricultural workers, and practitioners-researchers due to its rich protein content, high productivity, many vitamins and mineral salts. It is considered a leading raw material not only for food and fodder but also as an invaluable medicinal plant [20-23].

Its trunk, leaves and grain husk are used as valuable fodder in livestock farming. The large number of useful unique elements and the record level of protein in the composition ensures rapid and healthy growth of lambs, calves and chicks, sharply increases the fattening process of animals, and increases the amount of cow's milk and the level of fat in it. Amaranth is well-ensiled together with corn, which solves the problem of fodder throughout the year. The high amount of sugar in corn pulp and protein in amaranth makes silage more nutritious.

Another noteworthy point is that after extracting the oil from the seeds of this plant, the prospect of obtaining pectin substances as a high-quality biologically active additive from the remaining waste is very high.

A number of studies are being carried out on the extraction of oil and squalenes, pectin substances in amaranth plant varieties grown in the conditions of Uzbekistan.

Amaranth is an effective stimulator in the technology of obtaining biogas, it accelerates the fermentation process of organic mass and increases the amount of biogas. The amount of biogas obtained from silage is 3 times more effective than that of cattle manure.

Although it is known that biogas can be obtained from organic matter obtained voluntarily, the effectiveness of some of them in this field is the basis of scientific research. The process of obtaining biogas is very complicated, and its amount depends on the composition of the substrate. Biogas catalysts have been thoroughly studied by the scientific group of the Kazan Institute of Fine Chemical Technologies named after A. Arbuzov in order to dramatically increase biogas production. They took as a basis the green mass of the amaranth plant and the drug Malofen, which ensures rapid growth of the plant [24,25,26].

Stomach swelling due to accumulation of gas in cattle fed with amaranth was observed. It is this phenomenon that gives hope that there is a possibility of getting gas from amaranth. The results of scientific research entered the science system in a new direction - studying the possibilities of obtaining biogas from amaranth green mass or using it as a stimulant in this process. It turns out that adding amaranth increases the amount of methane in the gas released by 10 times or more. Amaranth porridge (jom) is a valuable substance, which has been found to increase gas production.

Due to such unique properties of amaranth, it is boldly entering the agricultural sector of Uzbekistan as a new promising culturally and economically effective plant.

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 a number of 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 kunjara reaches 42%, and Professor S. D. Gusakova of the Institute of Plant Substances of the Russian Federation considered this a discovery.

Amaranth oil grown in Andijan was checked by gas chromatography method 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.

Conclusions

The cultivation of amaranth in Uzbekistan holds considerable promise, not only for its agricultural benefits but also for its potential contributions to environmental sustainability and public health. As a highly adaptable plant, amaranth demonstrates exceptional resilience to saline soils and extreme temperatures, making it a valuable crop for improving soil fertility in regions affected by salinization. By planting amaranth for just 2-3 years in degraded soils, farmers can restore the land’s productivity, allowing for the cultivation of crops like wheat.

Amaranth's role as a phytoremediator further emphasizes its ecological importance, as it helps cleanse soils of harmful substances such as heavy metals, radionuclides, and pesticides. This function aligns with the broader goal of enhancing soil health while simultaneously addressing pollution concerns. Additionally, its potential applications in the energy sector, along with its nutritional and medicinal benefits, make it a multipurpose plant with significant value to the national economy.

In conclusion, the widespread cultivation and utilization of amaranth in Uzbekistan present a viable path forward in tackling key agricultural, environmental, and health challenges. Future research and development in this area could unlock even greater potential, positioning amaranth as a crucial element in the country's sustainable development efforts.

References

1. Шодиев, Д. А. У., & Нажмитдинова, Г. К. К. А. (2021). Специфические аспекты производства продуктов питания. Universum: технические науки, (3-2 (84)), 91-94.
2. Dilshodjon, S., & Hojiali, Q. (2022). Importance of food colourings in the food industry. Universum: технические науки, (11-8 (104)), 23-25.
3. Шодиев, Д. А. (2022). Значение биологических количеств микроэлементов растениями. Formation Of Psychology And Pedagogy As Interdisciplinary Sciences, 1(9), 297-301.
4. Шодиев, Д. А. У., & Курбонов, Х. А. Ў. (2022). Перспективы использования пищевых добавок в пищевой промышленности. Universum: технические науки, (5-7 (98)), 24-26.
5. Шодиев, Д. А. У., & Расулова, У. Н. К. (2022). Значение амарантового масла в медицине. Universum: технические науки, (1-2 (94)), 69-72.
6. Shodiev D., Haqiqatkhon D., Zulaykho A. (2021). Useful properties of the amaranth plant. ResearchJet Journal of Analysis and Inventions. 2(11). pp. 1-4.
7. Shodiev, D., & Hojiali, Q. (2021). Medicinal properties of amaranth oil in the food industry. In Interdisciplinary Conference of Young Scholars in Social Sciences (USA) (pp. 205-208).
8. Шодиев, Д. А., & Нажмитдинова, Г. К. (2021). Пищевые добавки и их значение. Universum: технические науки, (10-3 (91)), 30-32.
9. Холдаров, Д. М., Шодиев, Д. А., & Райимбердиева, Г. Г. (2018). Геохимия микроэлементов в элементарных ландшафтах пустынной зоны. Актуальные проблемы современной науки, (3), 77-81.
10. Kholdarov, D., Sobirov, A., Shodieva, G., Sobirova, A., Abaralieva, S., Ibragimova, S., & Yakubova, N. (2021, July). On general characteristics and mechanical composition of saline meadow saz soils. In Конференции.
11. Dilshodjon, S., & Hojiali, Q. (2022). Nutritional value of food supplements and their impact on the body. Universum: технические науки, (12-7 (105)), 32-35.
12. Dilshod, S., Hojiali, Q., & Gulbakhoroy, S. (2023). Biological properties of medicinal plant amaranth and its significance in the food industry. Universum: технические науки, (3-5 (108)), 19-21.

13. Dilshod, S., & Hojiali, Q. (2023). Chemical analysis of amaranth oil and its beneficial properties. Universum: технические науки, (2-6 (107)), 29-30.
14. Dilshod, S., Hojiali, Q., & Mohidil, A. (2023). The value of compounds that change the color of food raw materials and finished products. Universum: технические науки, (4-7 (109)), 52-54.
15. Dilshod, S., Hojiali, Q., & Mohidil, A. (2023). Features of the use of valuable natural food dyes in the food industry. Universum: технические науки, (5-7 (110)), 56-58.
16. Shodiev, D. A., & Abduvalieva, M. A. (2023). Biological research of local medicinal plants used in animal feeding in agriculture. Biologiyaning zamonaviy tendensiyalari: muammolar va yechimlar, 1(4), 687-689.
17. Shodiev, D., & Abduvalieva, M. (2023). The Value Of Amaranth Food Additives In The Food Industry. Texas Journal of Agriculture and Biological Sciences, 23, 67-71.
18. Ergashov, A. A., & Abrolov, A. A. (2024). Sanoatda ishlatilayotgan adsorbentlar va ulardan foydalanishdagi muammolar. Research and implementation, 2(7), 26-31.
19. Kodirov, Z. Z., & Ahmadjonovich, A. A. (2023). Research and control measures of powdery mildew (oidium) diseases in vine fruit production. European Journal of Emerging Technology and Discoveries, 1(2), 86-92.
20. Adahamjonovich, A. A. (2022). Diarrhea and healing function from watermelon seed. International Journal of Advance Scientific Research, 2(05), 84-89.
21. Nabievna, S. B., & Adxamjonovich, A. A. (2021). The chemical composition and properties of chicken meat. Innovative Technologica: Methodical Research Journal, 2(10), 25-28.
22. Mahammadjon, Q., & Anvar, A. (2021). Bioazot-n biopraparate in agriculture. Innovative Technologica: Methodical Research Journal, 2(11), 101-105.
23. Мадалиев, Т. А., Гоппиржонович, Қ. М., & Абролов, А. А. (2020). Биоразведка бактерий-продуцентов экзополисахаридов из различных природных экосистем для синтеза биополимеров из барды. Universum: химия и биология, (12-1 (78)), 6-9.
24. Қосимов, М. Г., Мадалиев, Т. А., & Абролов, А. А. (2019). Улучшения качества зерна, выращиваемого в условиях ферганской области. Интернаука, (40-2), 28-30.
25. Ибрагимов, А. А., Маматкулов, М. Х., Косимов, М. Г., Мадалиев, Т. А., & Абролов, А. А. (2019). К вопросу о перспективах организации рыбной промышленности в Узбекистане и о рыбохозяйственном освоении водохранилищ Ферганской долины. Universum: технические науки, (12-3 (69)), 21-23.
26. Курбанов, Ж. Х., Давлятова, З. М., Эргашев, А. А. Ў., Абролов, А. А., & Омонбаева, Г. Б. К. (2019). Интенсивность теплообмена при нагреве раствора nh2coonh4 в теплообменнике с высокоэффективными трубами. Universum: технические науки, (12-2 (69)), 24-27.