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CULTIVATION OF AQUATIC PLANTS IN THE WASTEWATER OF THE REPUBLIC OF KARAKALPAKSTAN AND THEIR USE IN VARIOUS SECTORS OF AGRICULTURE

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ANNOTATION:

This study is devoted to the study of the possibilities of growing aquatic plants in the wastewater of the Republic of Karakalpakstan and their application in various fields of agriculture. The study examines in detail the processes of wastewater treatment and enrichment using aquatic plants, as well as their subsequent use to improve soil fertility, water conservation and pollution control in agriculture.

Key words: Cultivation of aquatic plants, wastewater, Republic of Karakalpakstan, agriculture, water purification, soil fertility.

Introduction:

The Republic of Karakalpakstan is facing the problem of wastewater pollution, which has a negative impact on the environment and agriculture. The use of aquatic plants for wastewater treatment and their subsequent use in various sectors of agriculture can be an effective and environmentally friendly solution.

In the modern world, the problem of water pollution is one of the most urgent and urgent. The Republic of Karakalpakstan, located in conditions of urbanization and intensive agricultural production, faces serious problems in providing clean water for various sectors, including agriculture. Wastewater treatment and increasing its productivity for agricultural use are key tasks that require innovative and sustainable approaches.

The use of aquatic plants as a biological means of wastewater treatment and their habitat is becoming an increasingly promising and effective method. In addition, such practices can help improve soil quality, conserve water resources and combat pollution in the agricultural sector.

This study is aimed at studying the potential of using aquatic plants for wastewater treatment in the Republic of Karakalpakstan and their subsequent use in various sectors of agriculture. The results of the study are expected to shed light on

new methods and technologies that can contribute to the sustainable development of agriculture in the region, taking into account environmental protection and optimal use of resources.

The use of aquatic plants for wastewater treatment and their further application in agriculture represents an innovative approach to solving environmental pollution problems and improving conditions for agricultural production. The results of the study can contribute to the development of sustainable and environmentally friendly farming methods in the Republic of Karakalpakstan.

Pistia telorezovidna is widespread in countries of both hemispheres of the earth with tropical and subtropical climates. It can be bred in fish ponds and used as pig food and fertilizer. At the Institute of Microbiology of the Academy of Sciences of the Republic of Uzbekistan, it was found that telorezoid pistia grown on media with a significant content of organo-mineral substances-on wastewater from livestock complexes (poultry farms, pig complexes) and kenafa primary processing plants, etc., gives a large increase in biomass -0.5-1.5 kg/m2 In terms of the content of individual nutrients, telorezoid pistia surpasses many aquatic and terrestrial forage plants. Thus, the biomass of pistia telorezoid grown on wastewater and sewage household waste contains crude protein-27.5-32.75% fat-2.06-5.3% fiber-16.07-18.7% ash 19.3-21.0% carotene-221-396 mg/kg. Ash contains calcium, phosphorus, potassium and other macromicroelements.

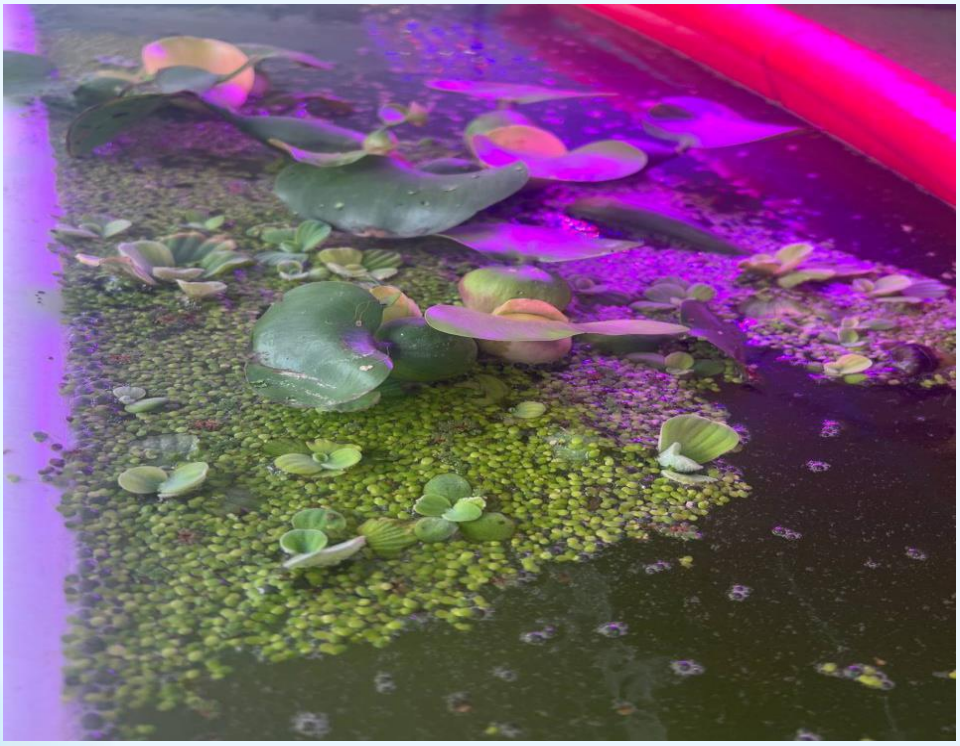
Successful cultivation requires:

1.Water temperature range from 22 degrees Celsius

2. Mineral-rich water, waste from livestock complexes is ideal, or it is possible to enrich the water with mineral fertilizers to obtain high productivity and yield.

3. Photosynthesis, requires sunlight for high productivity. 4. Constant monitoring of water quality, sanitary analysis of the resulting biomass harvest

Fig. 1. Feasibility study of the project



Duckweed are autotrophs, whose food source is exclusively the inorganic environment surrounding them. These organisms have the ability to synthesize all

their constituent complex organic compounds (carbohydrates, proteins, fats) from inorganic substances. They use carbon dioxide from the air as a carbon source in the synthesis of organic matter. Autotrophic organisms receive the energy necessary for the synthesis of organic compounds from inanimate nature [3].

Phytoremediation technologies for wastewater treatment based on the use of aquatic plants represent an environmentally effective complement, and in some cases an alternative to traditional technologies. Industrial wastewater contains a relatively large amount of biogenic elements: nitrogen, phosphorus and potassium, which are necessary for the cultivation of microalgae biomass. Therefore, industrial wastewater can be used as a basis for creating a nutrient medium for the cultivation of microalgae.

The rapid growth of human consumer activity is the main reason for the increasing pollution of the environment. Wastewater is formed as a result of household and industrial human activities. They somehow get into the waters of closed reservoirs, rivers, seas and oceans, where they concentrate all the variety of harmful substances. Due to the increased anthropogenic impact on the hydrosphere, the task of national importance is to ensure the preservation of the quality of water resources [1, 3]. The most important directions in maintaining the quality of water resources are improving the efficiency of wastewater treatment and quality control. To assess the level of contamination of wastewater with toxic substances in many countries (Poland, Germany, Czech Republic, USA), along with quantitative

chemical analysis, biotesting is used, which should be considered as a comprehensive analysis of wastewater [3, 8].

Based on the results of elemental analysis, it was found that the analyzed water contains salt (NaCl) and a small amount of salts of other metals. Using a Chromatek-Crystal 9000NP gas-liquid chromatograph, testing was carried out to identify residual amounts of pesticides that were not detected (Fig.2).

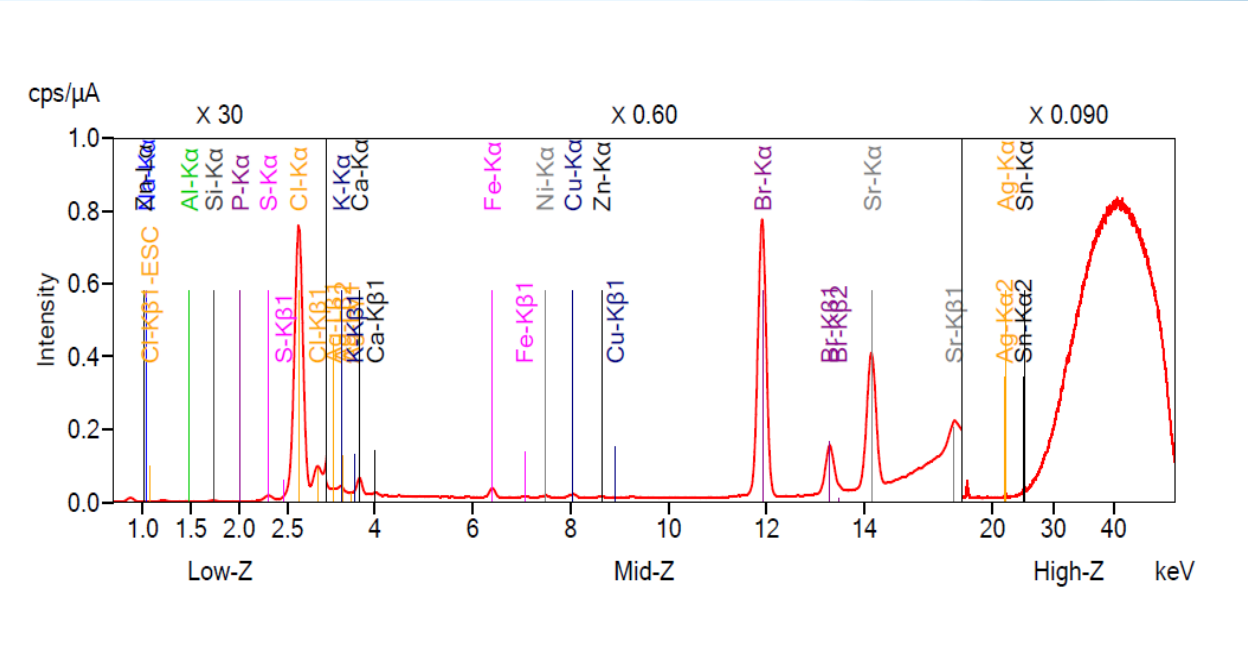


Fig.2. Results of spectral analysis of wastewater quality of the industrial enterprise "Korakalpok suv taminoti MCHJ" (2022)

The bottom line is that not just purified water that meets regulatory requirements should be discharged from wastewater treatment plants, but contaminated water that has undergone biological rehabilitation, since biological rehabilitation is the restoration of the ecosystem to a natural state that is safe for humans and the environment.

Currently, great attention is being paid to the further rise of livestock and poultry farming as the most important sources of meeting the growing needs of the population for food and raw materials. It was noted that the creation of a solid food base is the main condition for the successful fulfillment of tasks for the development of sectors of the national economy of the Republic of Karakalpakstan – fish farming, poultry farming and animal husbandry.

Aquatic plants are rich sources of nutrients - proteins, fats, carbohydrates, and mineral salts. The study of the ecological features of higher and lower aquatic plants (Lemna minor and Chlorella) is of great interest from the point of view of applied ecology.

CONCLUSION:

The introduction of innovative approaches, such as the use of aquatic plants for wastewater treatment and improvement of conditions for agriculture, can have long-term positive consequences for the regional ecology and sustainable development of agriculture in the Republic of Karakalpakstan.

The integration of these practices into agricultural systems can help reduce the negative impact of pollution on the environment, reduce wastewater toxicity and improve soil quality, which in turn will lead to increased yields and efficiency of agricultural production.

Thus, the implementation of programs for the cultivation of aquatic plants in the wastewater of the Republic of Karakalpakstan and their use in various sectors of agriculture is not only an important environmental aspect, but also allows to increase the level of sustainable development of the agro-industrial complex and improve the quality of life of the local population.

REFERENCES:

1. Smith, J., Brown, A. (2018). "Aquatic Plant Phytoremediation." Environmental Science and Pollution Research.

2. Gupta, R., Kumar, V. (2020). "Applications of Aquatic Plants in Wastewater Treatment and Soil Reclamation." Springer.

3. Chaudhary, S., Patel, N. (2019). "Role of Aquatic Plants in Phytoremediation of Contaminated Waters." Journal of Environmental Management.

4. Singh, R., Sharma, S. (2017). "Emerging Trends in Phytoremediation of Wastewater Using Aquatic Plants." Ecological Engineering.

5. Kumar, A., Das, N. (2016). "Phytoremediation Techniques for the Treatment of Industrial Wastewater: A Review." Water, Air, & Soil Pollution.

6. Gopal, R., Singh, S. (2015). "Phytoremediation of Heavy Metals Polluted Water by Aquatic Plants." Journal of Scientific Research.

7. Sharma, P., Singh, A. (2014). "Phytoremediation: A Promising Tool for Cleanup of Metal Contaminated Environment." Agricultural Water Management.

8. Malik, A., Aleem, A. (2013). "Phytoremediation of Soil and Water Contaminants." Springer.

9. Jain, R., Dwivedi, S. (2012). "Role of Aquatic Plants in Phytoremediation of Heavy Metals." International Journal of Environmental Research and Public Health.

10. Hussain, Q., Khan, R. (2011). "Phytoremediation Potential of Aquatic Plants in Removal of Heavy Metals from Wastewater." Journal of Environmental Protection.