

**FERTILIZERS USED IN CULTIVATION OF MEDICINAL AMARANTH  
PLANT AND NATURAL SOURCES ENRICHED WITH COMPOUNDS  
OBTAINED FROM CHICKEN EGG SHELLS AS NATURAL BIOACTIVE  
FERTILIZER.**

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**Abstract:** In this article, calcium and micro- and macroelements from hen's egg shells as various fertilizers and bioactive compounds in the discovery of high-efficiency fertilizers for the cultivation of the medicinal plant amaranth for widespread distribution on the surface of the earth, in medicine and it is reported that it is a unique raw material in agro fields and is used in the cultivation of the Amarantha plant.

**Keywords:** Amaranth plant, Inorganic and Organic fertilizers, Egg shell, Calcium, Micro and Macro elements, Calcium carbonate.

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## INTRODUCTION

Today, due to the growing population in the whole world, the demand for quality food and medicine is also increasing sharply, and for this, creating natural medicinal plants and natural conditions for their cultivation is one of the urgent problems. It's no secret that it's taking place.

Currently, there is no country that does not use chicken eggs as a food product. That's why a huge amount of waste of this product is released around the world every year. Its purposeful use, along with being a source of cheap raw materials, is also important in mitigating the current ecological crisis. Eggshells have been used for many purposes so far. For example, this product can be used to purify wastewater from heavy metals, prepare fungicides, obtain natural calcium compounds, and increase soil fertility. Egg shells used in soil enrichment serve to increase soil nutrients.

Currently, the part of the egg shell, which is considered a waste product, is a natural source of calcium and phosphorus. It is used as a 5% additive to the feed of animals (cattle, chickens) in agriculture to start getting calcium from it, to produce calcium water. In some places, crushed holly is used as a fertilizer for gardens (mainly tomatoes and house flowers).

Eggshell is a natural product. The main element of the eggshell is calcium carbonate, which is about 90% of the eggshell. The rest of the egg shell consists of

more than 30 microelements, the most useful for humans are phosphorus, iron, sulfur, silicon, zinc, manganese and molybdenum, amino acids lysine, methionine, and cystine.

The chemical composition of the egg shell consists mainly of Ca calcium, as well as P phosphorus, Fe iron, K potassium, Mg magnesium and Si silicon, and the percentages are as follows: water-1.6%, nitrogenous substances -3.3%, fat and inorganic substances - 95.1%. The nitrogenous substances of the shell are presented mainly as collagenous protein. The proportion of inorganic substances is calcium carbonate 97.6%, magnesium carbonate 1.6% and phosphorus salts of calcium magnesium 0.8% [1].

Amaranthus, like a number of other vegetables, requires soil with a high organic content and adequate nutrient reserves for best yields. Therefore, organomineral fertilizer N<sub>2</sub> appears to be a reliable organic source of nitrogen, with relatively large amounts of nitrogen N<sub>2</sub> required for amaranth cultivation. Many researchers have pointed out that the free use of organic fertilizers can give desirable higher sustainable yields than the sole use of inorganic fertilizers [1, 9, 10]. Therefore, the aim of this study is to determine the effects of inorganic, organic and organomineral fertilizers on the growth and yield of *Amaranthus caudatus*, as well as its residual effects [2].

The difference between eggshell lime and commercial lime is that the fruits of plants grown in commercial lime-enriched soil have a higher naturalness, that is, the taste and the taste is significantly different, and the shelf life of these fruits is also longer.

Nowadays, the use of eggshells, a natural product that is a waste product of the poultry industry, as a natural fertilizer in the agricultural sector is not only a cheap raw material, but also a waste-free environment, clean and fresh air. is also important in providing

Using the above information, soil was selected for the cultivation of *Amaranta* plant in order to study the property of increasing soil fertility for the experiment. This plant is light-loving and drought-resistant, and does not develop well in shade and wet soils. Considering these characteristics, shade and moist soil were selected for cultivation. To start the experiment, the sample area was divided into 3 parts. First of all, they were treated with organic fertilizers. Then, when the first part was divided and fed with organic fertilizer, the other two parts were fed with biohumus, and it was observed that the development of the plant was much more advanced. Later, in order to further improve the development of this sun-loving plant, we added water-soluble powders of chicken egg shells to the biohumus. We can see from the 1st pictures below that the growth process of the plant is much better than the rest of the land and the growth is very different.

Figure 1



Region 1

Region 2

Region 3 [3].

In order to further strengthen our research works in these literatures, the territory of the Namangan State University was introduced to the territory of this plant planted with local and, in addition, widely spread varieties of this plant in European countries.

The plants in the planted area were treated in the same way as above. It is worth noting only one thing that the soil is more fertile than before and the sun's rays get better. In monitoring this process, in addition to nitrogenous, organic and humus, special bioactive compound mixtures prepared from eggshells were separated into regions. The results showed that the use of humic fertilizers mixed with bioactive compounds made from natural eggshells has a much higher efficiency for the active growth and development of the plant among all three minerals. Another information we can say is that the use of urea  $(\text{NH}_4)_2\text{CO}$  is not an effective method when growing *Amaranta* plant in relatively shady areas. The reason for this is that the shade with high humidity can cause an increase in soil moisture. Depending on the condition of the soil, for example,  $\text{NaNO}_3$ ,  $\text{KNO}_3$ , that is, nitrates can be used as inorganic fertilizers in such places. The view of the research process carried out in the territory of Namangan State University is presented in Figure 2 below.

Figure 2



Region 1

Region 2

Region 3

In this picture 2, the same situation as the activity in picture 1 was carried out, only it was sunny and the land situation was slightly better. Now the work is being developed and continued to improve this method and find a more optimal solution.

### **Conclusion**

From the conducted research, it can be concluded that the amaranth plant, along with its medicinal properties, is adaptable to various conditions, that is, resistant to heat and drought, but it is known that it does not like too much shade and too much moisture. Based on this, efforts are being made to grow it widely in all areas, and the composition of fertilizers used for it is of great importance in ensuring its growth in such conditions.

For this purpose, it is necessary to choose the most favorable fertilizers, taking into account the condition of the soil. Therefore, we used different types of fertilizers, and in this process, it is important to use fertilizers with bioactive additives, which serve to absorb the rays coming to the plant, even if the shadow is less than the sun. Based on this, we tried to make the following selection, chicken egg is not only food, but also its shell is a unique raw material, which can be widely used in the above-mentioned fields. It is rich in calcium compounds and can be used to improve soil fertility, bone diseases, and increase the absorption of vitamin D absorbed from sunlight, and for plant development, sunlight improves photosynthesis and soil porosity. however, we decided to use it in the agricultural sector as well, and you can conclude it yourself from the information and pictures presented in the experimental processes in both cases above. If this process continues to be developed, it shows that it can solve another problem of agriculture in the future.

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