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CLOSTRIDIUM PASTE URIANUM IN INCREASING NITROGEN NUTRITION IN THE SOIL

Yusupov Ibragim Mirsaydalievich
Kokan State Pedagogical Institute, Faculty of Natural Sciences
Doctor of Philosophy in Agricultural Sciences (Ph.D.) Associate Professor

Mashrabjonov Xudoyorbek Muxtorjon o'g'li
Student of the 202nd Biology Course

Abstract
This article deals with soil organic matter in agriculture, the role of microorganisms in them, their activity, microbiological processes in the soil, Nitrogen-accumulating microorganisms found in the soil and methods of their study, study of soil fertility using selective culture of Clostridium pasteurianum bacteria from free-living nitrogen-fixing microorganisms is widely covered.

Keywords: Activity of microorganisms, Soil microorganisms, Nitrogen fixation process, biological transformation of nitrogen substances, Free-living nitrogen fixers, Mechanism of molecular nitrogen fixation, nitrogenase enzyme, importance of nitrogen fixation, Fatty acid curing process.

The importance of nitrogen fixation in agriculture. The assimilation of atmospheric nitrogen by microorganisms has a great influence on the total amount of biologically accumulated crops on the surface of the earth. Therefore, the study of biological assimilation of atmospheric nitrogen is one of the most important problems for agriculture and biology.

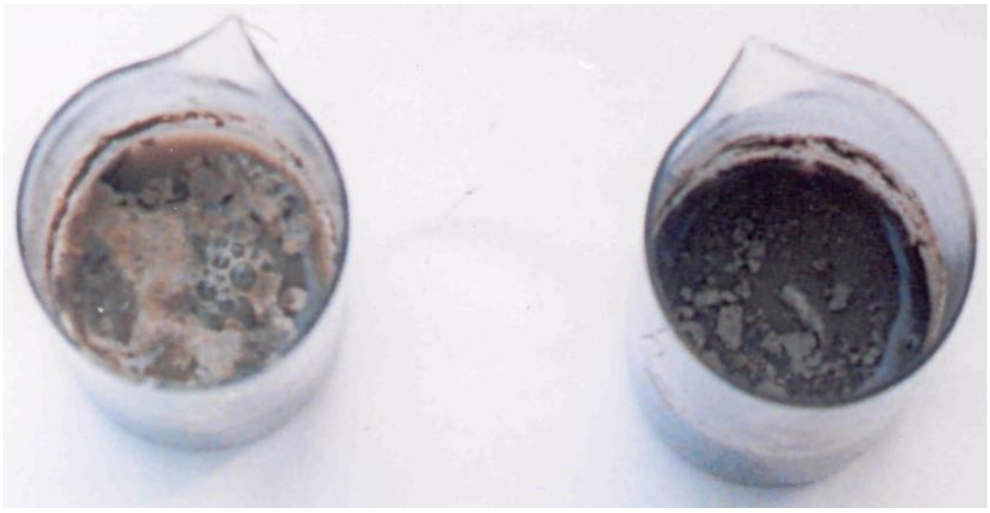
The annual need of plants on earth for nitrogen is large, and according to estimates, plants on earth require 100-110 million tons of nitrogen per year. And with mineral fertilizers, only 30% of nitrogen falls into the soil.

Nitrogen collectors themselves absorb atmospheric nitrogen and synthesize proteins. These proteins are in turn degraded by putrefactive bacteria. Denitrifiers return nitrogen to the atmosphere by breaking down nitrates. Thus, nitrogen circulates in nature[1].

For two years, we carried out our research on the use of Clostridium pasteurianum bacteria as an indicator to determine how fertile the soil is for plants according to Yusupov Ibragim Mirsaydalievich's method.

Yusupov Ibragim Mirsaydalievich method. To do this, 100 g of soil is added to 50 ml of water in which 1 g of glucose is dissolved, and mixed until it becomes clay. This mixture is scooped into a Petri dish, covered with a smooth surface, and then stored in a warm thermostat at 30°C for several weeks. Then the lid of the petri dish is opened and the mixture is smelled. If it has an unpleasant smell, it means that fatty acid has formed in the mixture. Due to the release of gases (CO_2, H_2) during the oil acid cooking process, the mud foams. Clostridium is a spore-forming rod-shaped bacillus, and during the spore-forming stage, its vegetative cell resembles a pod. It stimulates fatty acid fermentation under anaerobic conditions. We studied this method on soils with two different compositions, i.e., for many years, only organic fertilizers were applied and only mineral fertilizers were applied. As a result, very reliable evidence was obtained. That is, in the soil where only organic fertilizer was applied, the

process of fertilization was strongly realized[2-3]. But on the contrary, it was possible to see that in the soil where only mineral fertilizer was applied, the germination process was very weak (Fig. 1).



a b

Figure 1. Detection of Clostridium pasteurianum (Clostridium pasteurianum) by the method of "preparation of clay": a - the clay is foaming due to the strong fermentation process in unmineralized soil; b - there is no foam because the process is weak in mineralized soil.

In 1814, the German scientist Chevrel discovered that fatty acid was formed under natural conditions [4]. Louis Pasteur proved in 1861 that living organisms participated in the formation of fatty acid in the process of fatty acid fermentation and that this is a biological process [5]. This process is based on the following equation:

$$C_6H_{12}O_6 \rightarrow CH_3CH_2CH_2COOH + 2CO_2\uparrow + 2H_2O + 17\ kcal$$

fatty acid

In addition to these, lactic and acetic acids, ethyl and butyl alcohols, acetone and methane (CH_4) are also released in the process of fatty acid tanning.

Most of the oleic acid-causing bacteria produce powerful enzymes into the environment. Cells are hydrolyzed (broken down) by the action of these enzymes. Simple sugars formed by the breakdown of fiber and starch are fermented by fatty acid fermentation bacteria according to the above formula.

Bacteria involved in fatty acid fermentation cannot live in oxygen conditions, that is, they belong to the group of anaerobic bacteria. These bacteria are widespread in nature and can be found in contaminated water, milk, cheese, soil and various other environments. They are spore-forming, and their spores remain viable even after boiling for 1-2 hours.

Oil-acid tanning process is beneficial on the one hand, but harmful on the other. **The advantage is that** this process produces fatty acids, butyl and ethyl alcohols, acetone and other products. Some types of bacteria, including Clostridium pasteurianum (Slostridium pasteurianum), absorb molecular nitrogen. This process plays an important role in the accumulation of nitrogen compounds necessary for agricultural plants. **On the harmful side,** if butter, cheese, milk, and other products are

contaminated with fatty acid spoilage bacteria, the quality of the products will decrease due to the fatty acid and other compounds formed in them. This form of fatty acid tanning process is very harmful for the economy [6].

Using the method of Yusupov Ibragim Mirsaydalievich, Usmanova Gulshodakhan Ikromjon daughter is conducting scientific research on the soil of the farmer's field. A sample of soil taken from 5 places at the same distance from the farmer's 5 ha land area was studied by the " Diagonal " method.

Control - soil with organic fertilizers, from the appearance of the IMYusupov method, the process of fertilization in the soil was strongly realized. In the remaining samples, the curing process did not take place at all.

In conclusion, it was found that there is very little organic matter in the sampled field of the farmer. Microbiological processes do not take place here, the moisture retention property of the soil decreases, nutrients necessary for plants do not accumulate in the soil, as a result, the fertility of the soil decreases, and the yield of crops is low and of poor quality.

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