

RESULTS OF EXPERIMENTAL STUDY TO INVESTIGATE THE EFFECT OF FERTILIZERS WITH ENZYME-ACTIVE STRAINS OF MICROORGANISMS IN BIOLOGICAL REHABILITATION OF MINING PROJECTS IN GOBI REGION OF MONGOLIA

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ABSTRACT

Mining extraction operations of bigger mining projects in the Gobi region are causing significant environmental pollution including soil erosion and degradation in the surrounding areas of the mine sites. Therefore, there is a crucial need for soil rehabilitation and re-vegetation of native/aboriginal plants when efforts are made to rehabilitate mines and restore them to comparable natural pristine conditions.

KEYWORDS: *mining, pollution, fertilizer, soil, microorganism, biological rehabilitation*

GOAL AND OBJECTIVES OF THE RESEARCH

The goal of this study was to experiment the effect of two different fertilizers with enzyme-active strains of micro-organisms on the growth and

yield of some native plants in the Gobi region and the soil fertility level.

ADVANTAGE AND NEW ASPECT OF RESEARCH

A total of four mining projects, including one coal mine, one copper-molybdenum, gold and silver mine, one gold mine, and one spar and fluoride mine project in South-Gobi and Middle-Gobi aimags were involved in the present experimental study.

In the framework of the field experiment, there were 2 different types of fertilizers (namely, a bio-preparation manufactured utilizing 'Effective Microorganisms'/EM Technology, and an organic fertilizer Eco Compost) used for experiments on native perennial and annual plants in Gobi soil with irrigation, at the selected mines' fertile soil

tailings deposits. The experimental plot size was 10 m². A total of 3 boxes were used for the experiment; two boxes of soil with different versions of fertilizers, and one box of control soil. Weekly measurements and observations were conducted during the whole period of the experiment.

1. In the bio-preparation by EM technology including an isolating stock culture of *Saccharomyces*, *Lactobacillus*, *Streptococcus lactis*, *Pseudomonas*
2. Isolation of *Saccharomyces*, *Lactobacillus*, *Pseudomonas*, *Penicillium* /Mould/

RESULT OF THE RESEARCH

1. First, germination and panicle initiation of plants were recorded after 4-5 days of cultivation in soils with fertilizers and 10-14 days for plants in soils without fertilizers at Oyu Tolgoi mine's fertile soil tailings deposits.
2. Compared to Eco Compost fertilizer, bio-preparation manufactured using EM technology was more effective in accelerating the growth of experimental native plants and therefore improved soil development. The average height/growth of plants using EM technology bio-preparation was recorded at 20-30 cm comparing to the average height of plants at 10-12 cm, where Eco compost fertilizer was applied. These tendencies were also observed from the growth of plants in the experimental plots of Erdenes Tavan Tolgoi coal mine tailings deposits.
3. EM technology bio-preparation had a better effect on soil development and plant growth compared to Eco Compost fertilizer. Germination and panicle initiation of plants were first recorded after 4-5 days of cultivation in soils with fertilizers, whereas this indicator was 7 days for plants in soils without fertilizers at Olon-Ovoot gold mine's fertile soil tailings deposits. The average height of plants using EM technology bio-preparations was recorded at 16.2-21 cm, compared to the average height of plants at 17.8-18 cm where Eco compost fertilizer was applied, and 14-18 cm for control plots.
4. The measurement results illustrated that the experimental plots at the spar and fluoride mine tailings deposits fertilized with EM technology bio-preparations had better growth (4-5 cm higher per every 10 days) and a greater variety of plants compared to the plots fertilized with Eco Compost.

CONCLUSION

1. Plant survival rate was significantly improved when Gobi native plants were cultivated and grown using bio-preparations containing soil-improving enzymes in combination with regular irrigation.
2. Bio-preparation fertilizer manufactured using EM technology had a better effect on soil development and plant growth compared to Eco Compost fertilizer.

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