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## MICROBIOLOGICAL METHOD FOR RECULTIVATION OF INDUSTRIAL WASTE DUMPS

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The method developed in the USSR for a microbiological recultivation of industrial waste dumps is available under licence.

The method is intended for an accelerated soil-formation on waste rock dumps of coal mines with a view to landscaping them.

The method resides in that levelled dumps are treated with a communal sludge and then with a humic preparation containing a culture of a mold fungi Aspergillus niger.

Thereafter plowing is performed and the dump surface is sown with seeds of perennial herbs (legumes and cereals). The sown dump surface is inoculated with a bacterial preparation containing a culture of ammonifying and nitrifying bacteria recovered from the dumps and thus adapted to the conditions thereof. During sprouting of the plants and tillering thereof the dump surface is inoculated with a bacterial preparation containing a culture of Azotobacter and phosphate-dissolving bacteria.

A rapid process of soil-formation occurs already on the second year and a soddy layer is formed on the dump surface to a depth of from 10 to 15 cm. The height of the plants on the sown area is 100-120 cm and the amount of biomass - 1.9 metric tonnes/ha. The number of bacteria taking part in the soil-formation is increased. Under the effect of metabolism of the microorganisms agrochemical characteristics of the rock are improved. pH of the aqueous extract is increased from 3.0 to 7.0 (on acidic rocks and the total of exchange bases) up to 49.4 mg-equiv/100g. Increased amount of mobile phosphorus and potassium, as well as the tendency towards accumulation of nitrogen and humus point to the origination of the principal property of the newly-formed soil - fertility. In addition to the sown grass, other plants including wood and shrub varieties appear on the recultivated areas. The results of investigation of the recultivated regions have shown that out of the plants habituated on the dump 90% are perennial varieties and about 10% are one-year and biannual cultures.

In contrast to the conventional methods of recultivation, carried out by deposition of natural humus layer removed from other fertile areas onto the dump surface, the proposed method of recultivation of industrial waste dumps calls for substantially smaller investments, while the formation of the soil layer occurs 2-3 times faster.

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The bacteria employed for the preparation of bacterial compositions are recovered from the rock of the recultivated waste dumps, which enables elimination of a long (2-3 year) process of their adaptation. The recovery of the bacteria is effected by a specially developed procedure noted for simplicity, availability of the materials and low capital investments.

The proposed method for microbiological recultivation of industrial waste dumps is being patented in the US, FRG, France, Great Britain and Canada.

All technical inquiries regarding the acquisition of the licence should be addressed to the USSR Ministry of Mining, 23 Prospekt Kalinina, Moscow, 121910, USSR.