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Network Coordinator: José Martinez, Cemagref, Rennes (France)

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University of Veterinary Medicine  
Research Institute of Veterinary Medicine  
Hlinkova 1/A  
040 01 Košice  
Slovak Republic

## COMPARISON OF THE EFFECT OF MUNICIPAL COMPOSTS AND MICROBIAL FERTILIZERS FROM LIVESTOCK WASTES

*Janna P. Popova*

*Institute of agricultural microbiology, sh. Podbelskogo 3, Pushkin, St. Petersburg, 196608, Russia, tel: 007-812-4763017, fax: 007-812-4761610; E-mail: bamil@atlant.ru*

At present time one of the promising developments in the utilization of municipal wastes, livestock effluents and poultry dung is microbiological destruction and the production of fertilizers for agriculture on their basis.

At the Institute of Agricultural Microbiology an original production technology has been developed for a new type of microbial fertilizers. The fertilizers are produced by aerobic fermentation of pig farm wastes (Bamil) and poultry litter dung (Omug).

Microbial fertilizers are ecologically safe, are described as ones with high content of nutrients, satiated with useful microorganisms and their metabolites; contain plant growth promoters and are able to suppress phytopathogens.

Microbiological treatment of organic fraction of municipal wastes is also of great interest. Biofermentation of composted fraction of municipal wastes allows one to reduce their amount considerably and provides organic substrate preservation in contrast to incineration. Biocomposts from municipal wastes free from toxic compounds are successfully used in a number of countries as fertilizers.

The aim of this work is to estimate comparatively the effect of various types of microbial fertilizers.

Microbial fertilizers Bamil and Omug with N content 5.9-33%, P content 2.4-1.4% and K 0.3-1.4%), and municipal composts from Russia, Sweden, The Netherlands and Czechia (N-from 0.8 to 1.9%, P- from 0.07 to 0.45; K-from 0.3 to 1% were tested. The effect of fertilizers was evaluated in a pot experiment with ryegrass according to their influence on the growth promotion, crop physiological state, nitrogen consumption and crop yield. All tested additives were applied at the rate of 200 mg total N to 1 kg soil.

Experimental evaluation of studied fertilizers showed that the most efficient fertilizers (even in comparison with cattle manure) were microbial fertilizers from livestock wastes and dung. The highest yield increase was 148-130% as against control (PK); 20-22% as against mineral nitrogen; and 10-13% in comparison with cattle manure. Nitrogen losses with the yield have increased by 25-35%. Simultaneously, an increase in biosynthesis of photosynthetic pigments in the leaves was noted, which testifies to an improvement in the plant's physiological state.

Municipal composts are inferior to microbial fertilizers in their effect, nevertheless their positive influence on the yield is obvious. Ryegrass yield increase after their application (except homemade compost) was 65-90% as compared with a fertilizer-free variant.

Municipal composts were inferior to cattle manure only by 13-25% and mineral nitrogen by 5-18%. The most close effect to NPK and cattle manure was demonstrated by the Dutch and Swedish composts produced by the fermentation of municipal wastes with the microbial community of active sludge.

The Russian municipal compost produced at the Plant for Wastes treatment in Saint-

Petersburg appeared to be toxic and caused the yield reduction by 50% in comparison with control. This fact proves the necessity to remove toxic components, especially heavy metals, during the sorting of municipal wastes.

The research demonstrated that studied biofertilizers and composts effected the yield positively and are valuable fertilizers of complex action. It was found out that the effect of the fertilizers was firstly determined by the level of their availability and their various influences on soil-microbiological processes.