DEVELOPMENT OF *TRICHODERMA HARZIANUM* 128 AT VARIOUS COMPOSTING STAGES OF CHICKEN DUNG

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Over the last decade poultry-farming gained rapid development. This is according to the State Statistics Service of Ukraine. Thus, poultry population increased from 123.3 million in 1998 to 230.8 million in 2014. Such active development of poultry-farming has led to a significant accumulation of waste, including manure – at the level of 1.5 mln tons per year [1]. At the same time, poultry manure is a valuable raw material for the production of organic fertilizers [2]. Today there are several technologies of manure processing that differ in the nature of organic matter fermentation, additional components use, duration of processes, quality of output products. The quality and safety of the final product in most cases is determined by the dominant microbiota, and, unfortunately, no existing technology virtually takes into account the features of microbiological processes that occur during the period of manure composting [3-5]. Along with traditional compost production, promising is considered obtaining bio-fertilizers with the participation of agronomically useful microorganisms introduced to compost mixtures [6-8]. Promising for organic matter composting can be micromycetes of *Trichoderma* genus. Some representatives of this taxonomic group have valuable agronomic properties; in particular, they are powerful biodestructors of organic matter, possess antagonistic properties to a number of pathogens of crops and produce phytohormones [9; 10].

The objective of our research was to determine the optimal introduction period of *Trichoderma harzianum* 128 to organic substrate.

Materials and methods. The research was conducted during the 2013-2014 at the laboratory of soil microbiology of the Institute of Agricultural Microbiology and Agroindustrial Manufacture of NAAS in the conditions of model experiments. As chicken manure has a narrow carbon to nitrogen ratio of 9.6:1, the composting involved preset determination of optimum C:N ratio of 20:1 in

the substrate. Its optimization was performed by mixing manure with peat and straw, as carbon source, in the estimated quantities. Plastic containers were used in the experiment, to which 5 kg of chicken manure with humidity 70% were placed. 0.7 kg of chopped straw and 1.9 kg of peat were added to the manure by mixing. The repetition of the experiment is quadruple. The culture of saprophytic fungus *T. harzianum* 128, selected by the authors as active cellulose-digesting strain, was introduced at various stages of substrate composting according to the scheme of the experiment:

1. Compost mixture without introduction of selected microorganisms (control);

2. Introduction of *T. harzianum* 128 to the compost mixture in the 1st month of composting;

3. Introduction of *T. harzianum* 128 to the compost mixture in the 2nd month of composting;

4. Introduction of *T. harzianum* 128 to the compost mixture in the 3rd month of composting;

5. Introduction of *T. harzianum* 128 to the compost mixture in the 4th month of composting.

The suspension of *T. harzianum* 128 was received by micromycete growing in test tubes on slanted wort agar-agar, followed by rinsing with water. The resulting suspension had a cell concentration of 6.4×10^6 CFU/ml (in conversion that amounted to 128 thousand CFU/g of dry substrate). The suspension was made in the amount of 2% of dry weight of composted mixture.

The account of the number of *T. harzianum* 128 was performed by agar plate method [11].

Thus, the introduction of *T. harzianum* 128 is appropriate in the second month of manure mixture composting with peat and straw; under these conditions, the maximum number of introduced microorganisms was at the level of 9744 thousand CFU/g of dry substrate in the seventh month of composting; in the eighth

month of composting period the number of microorganisms remained high enough (8000-9000 thousand CFU/g of dry substrate), this time coincides with the completion of the process of organic matter composting.

Enriching the composts on the basis of poultry manure with agronomically useful

microorganisms, which include the representatives of *Trichoderma harzianum*, is a promising area of biotechnology that can provide both solving the problem of poultry waste disposal, and a number of issues related to the optimization of crops supply.