

Dynamic model of humic and fulvic compounds determination in compost

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In this paper, a dynamic model identification humic (HA) and fulvic compounds (FA) concentration was developed using other parameters such as the water holding capacity (WHC), pH, the ammonia concentration. For the creation of dynamic models used the residual analysis technique and to determine the empirical coefficients of the models used the experimental results from samples taken during the composting of solid and liquid waste of three face olive mill [1].

The humic and fulvic substances are the most important elements of organic matter of the soil for their substantial contribution to the protection of the degradation and the contamination [2]. Because of the insolubility of humic compounds, nutrients are absorbed, retained and stored in the root system of plants [3]. They also reduce the need for addition of nitrogen, improves the soil structure and the possibility of water retention [3,4]. The concentration of humic compounds ranges from 0-7g / kg with a correlation coefficient of 84% by following a reverse procedure with respect to that of the FA, which starts approximately of 4 g and the final product reaches a value < 1g. The high concentration of humic compounds is well-connected to the high pH, WHC, NH₄-N and conductivity.

Aim of this research, is to study the kinetics of HA and FA uptake during a batch reactor composting period of a 3-phase olive mill waste. As established, from data collected during the composting time, the concentration rate of humic and fulvic acids follow a first order kinetic form respectively:

$$HA_t = L(1 - e^{-kt}) \quad FA_t = L(1 - e^{-kt})$$

Where L is the maximum concentrations of humic and fulvic acids contents. The analysis of experimental results by Thomas technique revealed the following relation: $k = 26.812 \text{ d}^{-1}$, $L \approx 0\%$ for acid content and $k = 3.494 \text{ d}^{-1}$ where d: days. The experimental results demonstrate that the humic acids are almost increased during the last phase of composting period. Unlike the fulvic acid concentration decrease in the same period.

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