The effect of sodium fluoride on soil microbial activity during organic matter decomposition – A calorimetric approach

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Results and Discussion

Soils exposed to intensive emissions from phosphoric fertilizers and aluminum industries or other fluoride sources have high fluoride concentrations [1]. Fluorides found in soil can affect its microbial activity which can be measured using calorimetric methods [2]. Soil samples were collected at the Agricultural Station of the University. During successive experiments, at 0; 0.05; 0.1; 0.25 and 0.55 % fluoride content and 1 mg glucose in 1g of soil changes in microbial activity were investigated by the calorimetric method. Soil moisture corresponded to 60 % of the maximum water-holding capacity. The changes in the rate of heat production, peak time, total heat effects and the apparent rate constant parameters were used to characterize the glucose biodegradation processes in soil. Sodium fluoride introduced into the soil in the amount corresponding to 0.25 and 0.55 % of fluoride ions decreased the rate of glucose biodegradation. The total heat effects of the studied processes were higher in the presence of fluorides in comparison with soil samples containing no sodium fluoride. The obtained results suggest that despite the reduced rate of glucose biodegradation in the presence of higher doses of sodium fluoride, this compound contributes to an increase in the bioavailability of soil organic substrate for microbial decomposition,

[1] Ozsvath (2009) Fluoride and environmental health: a review. *Rev. Environ. Sci. Biotechnol.* **8**, 59-79. [2] Barros *at al.* (2007) Calorimetry and soil. *Thermochim.* Acta **458**, 11-17. 50.