



Assessing oxygen consumption in an agricultural soil amended with two different wood ashes.

Juan Antonio Campos (1), Ascensión Ines Gómez (1), Jose Angel Amorós (1), Caridad Pérez de los Reyes (1), Francisco Jesús García-Navarro (1), Marta María Moreno (1), and Anselmo Acosta (2)

(1) UCLM, Dpto. Producción Vegetal y Tec.Agr. Ciudad Real, Spain (juanantonio.campos@uclm.es), (2) UCLM, Dpto.Química-Física. Fac. de Químicas. Ciudad Real, Spain

Recently it has become a common practice to return wood ash from biomass incineration plants into the natural cycle of matter both in natural environments as in agricultural lands. Wood ash contains most of the major nutrients (especially K, Mg and Ca) with the important exception of the nitrogen. P and microelements are present in smaller and variable amounts. Beside the nutrients, pollutants are also found in the ashes; the concentration of heavy metals may vary greatly, depending on type of incineration, etc. Wood ashes also have a high pH (ranging from 9 to 13) (Stokinger, et al, 2006). The element content of ashes suggests that they can be used as fertilizers and may be a useful material to be applied but only if the conditions of soil make it suitable. Wood ash application can improve the nutritional characteristics of the soil and, at the same time, soften some physical conditions, but also, some kind of ecological risk assessment have to be made since they also contain xenobiotics compounds and heavy metals (Kuba et al, 2008). Prior the application we have to make sure that the addition of ashes will not have detrimental results, especially on the microflora implied in organic matter mineralization, since microorganisms are very sensitive to chemical changes. The evaluation of the effect of ash application on the oxygen consumption in soil may be a method to determine the potential capacity of the ashes to improve the soil conditions.

The purpose of this study was to determine the total oxygen consumption curves in a standard agricultural soil of our area and to assess the effects on them of two wood ashes obtained by burning the material resulting from the pruning of olive trees and vineyards. For each wood ash, two different percentages of presence on the ground (5 and 10 %) were evaluated. The experiment was carried out with soil treatments incubated at 20 °C in Duran jars (Oxitop-WTW sensors) during a period 22 days. The experiment was done twice with two replication treatment in each one. The respiration curves were depicted and they showed that oxygen consumption was enhanced by the addition of wood ashes, especially those from olive trees at 5 % in soil. Soil microbial activity was not harmed in any treatment with wood-ash.

References:

Kuba, T.; Tschöll, A.; Partl, C.; Meyer and Insam, H. 2008. Wood ash admixture to organic waste improves compost and its performance. *Agriculture, Ecosystems and Environment*. 127:43-49.
Stockinger, M., Kuba, T., Plank, R., Meyer, K., Insam, H., 2006. Die Verwertung von Holzaschen-ein loßbares Problem? *OÖ sterreichische Forstzeitung* 117, 20-21.