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Modification of the activity of some C cycle hydrolases in soils afforested with *Populus alba* L. Preliminary results

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Since 1992 a large part of the agricultural land in Galicia (NW Spain) has disappeared as a result of the EU policy of providing grants and aid for transforming marginal land into forest terrain. In Galicia, this policy (EU Regulation 2080/1992) has mainly been applied to good quality agricultural land rather than to marginal land. As a result, the land has undergone a change in use, so that previously good quality agricultural land is now planted with various species of trees, usually of young age. Despite the large area of land transformed, until now the environmental cost of such changes has not been evaluated. Taking into account that one of the possible environmental effects derived from land transformation is changes in emissions of CO_2 (a major greenhouse gas), it is therefore essential to evaluate any possible modifications undergone in such soils, with special attention given to biochemical properties, i.e. the properties that determine edaphic metabolism. With this aim, we are currently investigating the effect of afforestation on diverse biochemical properties, including the activity of hydrolytic enzymes involved in the C, N, P and S cycles, in a large number of afforested soils, planted with different trees and located in different areas throughout Galicia. In each case, an agricultural soil located close to the afforested soil, but under the original land use (usually maize cropped soils or pasture soils), is also collected and analysed, and the results obtained for afforested soils compared with those for the corresponding agricultural soils.

Here we report some preliminary results on modifications in the activities of some C cycle hydrolases in six soils now planted with poplars, *Populus alba* L, but originally cropped with maize. Samples of all soils were collected in autumn, after harvesting and before any other agricultural activities were carried out. In all cases, the upper 10 cm of the soils were collected. The soils were sieved (4 mm) prior to analysis for ß-glucosidase, invertase and CM-cellulase activity. The main physical and chemical properties of the soils were also determined (total C and N contents, pH in water and in KCl, texture, etc) and the apparent density measured to enable the results to be expressed per unit of weight as well as per unit of volume.

The mean values of total C and N in the afforested soils were slightly higher than in the cropped soils, independently of whether the results were expressed relative to weight or volume. The differences were not significant in any of the cases. Afforestation appeared to cause small increases in ß-glucosidase and invertase activities, but a decrease in CM-cellulase activity. Again the same results were obtained independently of whether the values were expressed per unit of weight or volume. The same was also found when the values were expressed relative to the N content of the soils, but when the values were expressed relative to the total C content, the ß-glucosidase activity was found to be the same in afforested and cropped soils. The greater availability of plant remains as the result of the change in land use may have favoured increased activity of enzymes that act on the most readily decomposable substrates (ß-glucosidase and invertase), which in turn would generate an increase in the substrates available for microorganisms, and possibly contribute to the higher respiratory activity observed in these soils (García-Campos et al., 2010, EGU General Assembly, Session 13).

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