



Soil application of wheat, corn and alfalfa residues and their influence on microbial biomass and activity

M. Mansorzadeh^{1*}, F. Moosavi¹, S. Jafari¹, M. Boyerahmadi¹ and M. Fereydouni²

1. M.Sc. Student of Shahrekord University

2. Associated Professor of Shahrekord University

In arid and semi-arid soils, the low content of organic matter is one of the factors limiting the activity of soil biota. As a result, the repeated and ample use of organic materials in these soils seems essential for improving soil quality and subsequently achieving agricultural sustainability. On the other hand, the rate and amount of soil microbial activity, as a factor influencing soil quality and fertility, depend largely on the type and quality of organic residues added annually to soil. The aim of this research was to examine the influence of three kinds of plant residues including wheat, corn and alfalfa on soil microbial activity (i.e. respiration) and biomass under the controlled conditions. The experiment consisted of a randomly completed design with triplicates using a clay loam soil. Treatments were wheat, corn and alfalfa residues in addition to glucose amendment as an easily available substrate for more active soil microbes. Furthermore, a soil without substrate addition was considered as the control. After applying the residues, the soil moisture content was adjusted at 70 % of field capacity and the samples were incubated at 25 °C for 94 days. Soil respiration was determined at specified intervals, and microbial biomass was measured using the fumigation-incubation technique at the end of incubation period. Results showed that additions of the plant residues to the test soil increased significantly the overall microbial activity. The highest microbial activity was seen during the first week of the incubation period, and decreased gradually over incubation time. However, it remained relatively constant at the end of incubation period. The maximum microbial activity was observed in the soil amended with alfalfa residue followed by the soil amended with corn and wheat residues. Soil microbial biomass showed the same trend as the total microbial activity. Summarizing, the results of this study display that 1) (utilization of every plant residue stimulates soil microbial activity with a striking effect at the initial stages of incubation and increases microbial biomass, 2) the intensity of soil microbial activity is much dependent on the type and quality of the added substrates (i.e. plant residue). Thus, the long-lasting application of plant residues to the soils poor in organic matter not only stimulates soil microbial activity but it also is a proper approach to recycle and arid.

Keywords: Plant residues; Soil microbial activity and biomass; Soil quality and fertility, Arid and Semi-arid

* Corresponding author

Email: mahshidmansourzadeh@yahoo.com