B-Glucosaminidase Activity and Nitrogen Mineralization in Soils under Different Cropping Systems. (S03-tabatabai140354-Poster)

Authors:

- M.Ekenler* - *Iowa State University*
- M.A.Tabatabai - *Iowa State University*

Abstract:

(Beta)-glucosaminidase (EC 3.2.1.30) or (beta)-hexosaminidase (EC 3.2.1.52) is the enzyme that catalyzes the hydrolyses N-acetyl-(beta)-D-glucosamine residues from the non-reducing ends of chitooligo-saccharides. It is involved in C and N cycling in soils. We studied the impacts of cropping systems (crop rotations and N fertilization) on the activity of this enzyme and its correlation to N mineralization in soils of two long-term field experiments initiated in 1978 at the Northeast Research Center (NERC) and in 1954 at the Clarion-Webster Research Center (CWRC) in Iowa. Surface soil samples (0-15 cm) were taken in 1996 and 1997 in corn, soybeans, oats, or meadow (alfalfa) plots that received 0 or 180 kg N ha-1 before corn. The activity of this enzyme was assayed at optimal pH (acetate buffer, pH 5.5); and N mineralization was studied in leaching columns under aerobic conditions at 30 oC for 24 weeks. The activity of this enzyme was significantly affected by crop rotation and by plant cover at sampling time ($P<0.001$) and N fertilization ($P<0.01$), and was significantly correlated with organic C ($r> 0.70$***), organic N ($r> 0.75$***), microbial biomass C ($r> 0.64$***), microbial biomass N ($r> 0.33$*), and with N mineralization in the 1996 samples ($r >0.84$*** and >0.79***) at the NERC and CWRC sites, respectively.

Corresponding Author Information:

M. A. Tabatabai
Iowa State University
Department of Agronomy, Iowa State University
Ames, IA 50011-1010

phone: 515-294 7848
fax: 515-294 3163
e-mail: malit@iastate.edu

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