

Leaf Exudates of Bean Plants Cultivated with EM

R. R. Medeiros, S. Z. Filho and S. Kinjo

Center for Development of Kyusei Nature Farming, Mokichi Okada Foundation Ipeúna, SP, Brazil

Background

Plants under conditions of active growth normally exude a variety of metabolites from both roots and leaves. These exudates include sugars, amino acids, organic acids, growth regulators, vitamins, and phenolic substances which are utilized advantageously, either directly or indirectly, by indigenous microorganisms in the rhizosphere (root surface) and phyllosphere (leaf surface). Management practices, environmental conditions, climatic factors, and the plant cultivar can affect the composition of these exudates which, in turn, can affect a soil's chemical and physical properties and its microbiological balance as well.

Experimental Procedure

A greenhouse study was conducted to determine the nature of changes in the leaf exudates of bean plants grown in soil treated with a) chemical fertilizer, b) organic fertilizer and c) organic fertilizer + EM. EM was applied at planting and at 6, 14, and 21 days after emergence. Exudates were collected periodically during the growth cycle by washing the leaf surfaces with distilled water.

Preliminary Results

Preliminary results and observations include the following:

1. leaf exudates from plants treated with organic fertilizer had a higher concentration of free amino acids after 26 days of growth compared with those that received chemical fertilizer;
2. after 44 days of growth, the concentration of free amino acids and soluble sugars in the exudates was highest for the organic fertilizer + EM treatment;
3. the electrical conductivity of exudates from plants treated with organic fertilizer + EM was higher than those from organic fertilizer without EM;
4. the growth and yield parameters of plants treated with organic fertilizer + EM were superior to those treated with chemical fertilizer and organic fertilizer without EM.

Additional studies are being conducted to verify these results and to determine the nature of the mechanisms involved.