Northeastern

HUMIC SCIENCE & TECHNOLOGY FOURTEEN

Forefront Humic Science and Biochar Research

Dedicated to Dr. George R. Aiken

United States Geological Survey
Denver, Colorado, USA

Honorary Chair: Prof. Baoshan Xing

University of Massachusetts at Amherst
Amherst, Massachusetts, USA

Maureen and Richard J Egan Research Center
Northeastern University, Boston, MA, USA

March 9-11, 2011

www.hagroup.neu.edu

Organizing Committee

G Davies, Boston, USA (Chair)
EA Ghabbour, Boston, USA (Chair)
D Amarasiriwardena, Amherst, USA
RL Cook, Baton Rouge, USA
CH Langford, Calgary, Canada
JL Pikul, Jr., Brookings, USA
DA Reckhow, Amherst, USA
DK Ryan, Lowell, USA
CEW Steinberg, Berlin, Germany
ME Vozzella, Elliot, USA
DS Walia, Chantilly, USA
MJM Wells, Cookeville, USA
B Xing, Amherst, USA

Honored Guest

Dr Morris Schnitzer, Ottawa, Canada

Dedicatees

AH Khairy, Alexandria, Egypt (1998)
RL Malcolm, Denver, USA (1999)
FJ Stevenson, Urbana, USA (2000)
P MacCarthy, Golden, USA (2001)
Y Chen, Rehovoth, Israel (2002)
FH Frimmel, Karlsruhe, Germany (2004)
L Martin Neto, Brazil (2005)
EM Thurman, Ameria, Spain (2006)
DS Walia, Chantilly, USA (2007)
EW Tipping, Lancaster, UK (2008)
PG Hatcher, Norfolk, USA (2009)
M Jansson, Umeå, Sweden (2010)
GR Aiken, Denver, USA (2011)

Honorary Chairs

RL Wershaw, Denver, USA (1997)
W Ziechmann, Göttingen, Germany (1998)
C Steelink, Tucson, USA (1999)
MHB Hayes, Limerick, Ireland (2000)
CE Clapp, St. Paul, USA (2001)
M De Nobilli, Udine, Italy (2002)
RF Christman, Chapel Hill, USA (2004)
N Senesi, Bari, Italy (2005)
JA Leenheer, Denver, USA (2006)
RS Swift, Gatton, Australia (2007)
DM McKnight, Boulder, USA (2008)
EM Perdue, Atlanta, USA (2009)
CEW Steinberg, Berlin, Germany (2010)
B Xing, Amherst, USA (2011)

ORGANIC RESIDUES COMPOSTS APPLIED TO VEGETAL PRODUCTION AND SOIL FERTILITY: CONVENTIONAL AND SPECTROSCOPIC ANALYSIS

Lívia B. Favoretto Pigatin,[1,2] Wilson T. L. da Silva,[2] Aurélio V. Borsato,[3] Tânia L. de Almeida,[1] Lilian F. de A. Martelli,[1,2] Débora M. B. P. Milori[2] and Ladislau Martin-Neto[2,4]

[1] Embrapa Instrumentation Center, R. XV de Novembro, 1452 São Carlos, Brazil
[2] Institute of Chemistry of São Carlos - USP, Av. Trabalhador São-Carlense, 400 São Carlos, Brazil
[3] Embrapa Pantanal Center, R. 21 de Setembro, 1880 Corumbá, Brazil
[4] Embrapa Labex USA, USDA-ARS-OIRP, 5601 Sunnyside Avenue, Beltsville, MD 20705, USA

Brazil has a strong agricultural sector and it is now the third world major food exporter after the USA and EU. Land and water availability, as well as tropical agriculture technology, offers a huge potential to continuing growth, being one of few countries in the world with conditions to face the challenge of food security within the next decades.[1] These agricultural and agro-industrial productions generate an important amount of organic residues, which are being utilized in large extension in different crops. So there is need of research to support efficient use of organic residues in the country. Also considering that Brazilian soils are dominated by 1:1 clay types with low cation exchange capacity (CEC), soil organic matter plays a crucial role also in the fertility aspect. In this work we evaluated the effect of different organic composts in the medicinal plant *Ocimum selloi* Benth in a sandy latosol (70% sand), compared with conventional mineral fertilizer. Experiments were conducted in greenhouse in Embrapa Center, São Carlos city, central region of Brazil, with factorial 4x3x3 experimental plot. Treatments utilized were: P1 (only garden trimming compost); P2 (garden trimming + cow manure compost); P3 (garden trimming + orange bagasse compost); P4 (garden trimming + filter cake, from sugar-cane mill, compost). P2, P3 and P4 present larger quantities of nutrient elements compared to P1. According to Fialho et al.,[2] due to the raw material, L1 presents characteristics of less humified compost. Equivalent doses of composts were 5, 15 and 30 ton ha^{-1}. Reference pots (MIN) with application of mineral fertilizer (NPK) and other (TEST) with only soil also were established. They were realized measurements of soil fertility and plant nutrients composition, as well as vegetal growth of plants. Spectroscopic analysis of whole soil samples were made by NIRS. Humic acids analyses were made using fluorescence. After 3 months, mean plants height were P2 > MIN > P3, P4 > P1 > TEST, however, leaf dry mass presented the behavior MIN>>P2, P3, P4>P1,TEST. The different amount of applied composts did not influence significantly plants growth as well as nutrient present in the soil and plant mass, a result that must be additionally evaluated. However, the PCA of macro- and micronutrients in plant biomass showed a similarity between MIN and, P2 and P3; and another between TEST and, P1 and P4. NIRS soil samples spectra presented bands close to 7000, 5500 and 4500 cm^{-1} (signed as inorganic and organic – OH, overtones) but no visual qualitative changes were observed comparing all treatments. Due to the large data quantity, PCA analysis was conducted. Results from from soil fertility, plant nutrients composition and NIRS indicated two different groups, one composed by MIN and P2 treatments, and other with TEST and P1, P3 and P4 treatments.

References

1. Ash C, Jasny BR, Malakoff D, Sugden A. Feeding the Future. *Science*, 12 Feb. 2010, 327, 797.
2. Fialho LL, Silva WTL, Milori DMBP, Simões ML, Martin-Neto L. Characterization of organic matter from composting of different residues by physicochemical and spectroscopic methods. *Bioresource Technol.*, 2010, 101, 1927-1934.