details on the vegetation growing in the proximity and at some distance of the charcoal burning site. A brief outlook of archaeological studies made at this site is also provided

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B17: Extractants and availability of micronutrients in Central Amazonian Dark Earth soil

A. Moreira[1], W.G. Teixeira[2], G.C. Martins[2]

[1]Department of Soil Science, Embrapa Cattle Southeast, São Carlos, Brazil;
[2]Department of Soil Science, Embrapa Western Amazon, Manaus, Brazil

Amazonian Dark Earths (ADE) are differentiated from surrounding soils by their darker colour, higher pH, organic matter, P, Ca and Mg, but does not studies about micronutrients available. The objective of this work was to compare extractants solutions (Mehlich 1 and DTPA-TEA) evaluating the availability of Cu, Fe, Mn and Zn in ADE soils with higher fertility occurring in scattered patches throughout the Amazonian, called Terra Preta do Índio (TPI). Three replicates of sixteen samples of different depths were taken from ten archeology sites, and five representatives soils classes of the region (Oxisol, Inceptsol, Ultisol, Entisol and Spodsol) were used. The DTPA-TEA solution extracted more Cu and Fe available, while Mehlich 1 solution extracted more Mn and Zn available. In the edaphoclimatic conditions studied, the Mehlich 1 extractant showed better sensibility than DTPA-TEA extractants. The best coefficients between extractants were observed with: Cu (DTPA-TEA), Fe (Mehlich 1 and DTPA-TEA), Mn e Zn (Mehlich 1). The use of ranges higher, middle and lower originary in others regions can lead to incorrect interpretation of diagnoses on availability of the micronutrients in ADE soils (Table 1).

Table 1. Distribution of the analytical results of samples of Amazonian Dark Earth (ADE) and other soil classes of Amazonian. Level of interpretation for micronutrients (Mehlich 1 and DTPA-TEA extractants) in Brazil.

Elements	Mehlich 1 mg dm^{-3}	% ADE	Others soils	DTPA-TEA mg dm^{-3}	% ADE	Others soils
Copper						
Lower	≤ 0.71	25.0	80.0	≤ 0.20	-	-
Middle	0.71 – 1.20	31.3	-	0.21 – 0.80	-	80.0
Higher	> 1.20	43.7	20.0	> 0.80	100.0	20.0
Iron						
Lower	≤ 18.0	-	20.0	≤ 4.0	-	-
Middle	18.1 – 30.0	31.2	-	4.1 – 12.0	-	20.0
Higher	> 30	68.8	80.0	> 12	100.0	80.0
Manganese						
Lower	< 5	12.5	80.0	< 1.20	-	40.0
Middle	5.1 – 6.0	6.3	-	1.21 – 5.00	12.5	20.0
Higher	> 6.0	81.2	20.0	> 5.00	87.5	40.0
Zinc						
Lower	< 1	-	80.0	< 0.50	-	60.0
Middle	1.1 – 1.5	12.5	-	0.51 – 1.20	-	20.0
Higher	> 1.5	87.5	20.0	> 1.20	100.0	20.0

B18: ^{13}C-NMR Spectroscopy Evaluation of Different Pyrolysis Feedstock

E.H. Novotny[1], [2], G.A. Romeiro[3], M.K.K. Figueiredo[3],
J.D. Rocha[4], E.R. deAzevedo[5], T.J. Bonagamba[5], M.H.B. Hayes[2]

[1]Embrapa Solos, Rio de Janeiro-RJ, Brazil;
[2]Chemical and Environmental Sciences, University of Limerick, Ireland;
[3]Universidade Federal Fluminense, Niterói-RJ, Brazil;
[4]Embrapa Agroenergia, Brasília-DF, Brazil;
[5]Instituto de Física de São Carlos - USP São Carlos-SP, Brazil

Different feedstocks and different pyrolysis processes produce carbonized materials (biochar) with different properties. The properties of these materials are very important when considering their agricultural uses. The technique of ^{13}C Nuclear Magnetic Resonance (^{13}C-NMR) is a very powerful tool for the characterization of the complex products, especially when aided by multivariate statistics, such as Principal Component Analysis (PCA). In this work, a series of feedstocks, embracing agro-industrial residues (sugarcane straw, orange bagasse, grass straw, soybeans, castor oil and Jatropha cake), urban residues (sewage sludges) and industrial residues (blended refuse) were submitted to two different fast pyrolysis processes, said processes 1 and 2. The main difference between these processes is that while process 1 is carried out under N^2 atmosphere, uses a slow heating of the feedstock (15 °C min 1) and a lower final temperature (380 °C), process 2 is done in the absence of oxygen and it occurs in a fluidized bed at 450 550 °C. The resulting biochars were analyzed by solid state ^{13}C NMR and the spectra by PCA and Multivariate Curve Resolution.

Although more alkyl groups remain, the thermal alteration of feedstock is greater in Process 1, as indicated by the upfield shift of the aryl resonance, typical of charred residues attributable to polycyclic aromatic structures. On the other hand, the feedstocks richer in oil (sewage sludge, soybean, castor oil, and Jatropha), presented a higher content of long chain amorphous alkyl groups, probably derived from fatty acids. This finding indicates that it may be possible to extract more fuel from that biochar. The acid groups (carboxyl and phenolic), important for a soil amendment, were very low in all the products studied.

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