

spp., this could indicate that the solarization process is an effective process for its elimination.

Keywords: manure, vermicompost, food safety, macro-nutrients

Financial support: None

(4889 - 1310) Influence of a afisol's microbial activity under incorporation of ryegrass, white clover or poultry litter.

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The incorporation of residues and waste in the soil, practice widely used in conservationist agriculture, impacts on the physical, chemical and biological properties of the soil. Microbial respiration is a suitable parameter to be used as an indicator of soil microbial activity and determine effects caused by different soil management. We evaluate the microbial activity during 30 days of incubation of ryegrass, white clover or poultry litter, determining carbon evolution, at the 2nd, 3rd, 4th, 7th, 9th, 11th, 14th, 18th, 21st, 24th, 28th and 30th days of incubation experiment. Each treatment showed different behavior of microbial activity throughout the experiment. This Afisol had low content of Soil Organic Matter and therefore was very sensitive to the applied management practices. The behavior of CO₂ release in the treatments with cover crops was very similar, presenting a peak on the 4th day of incubation, however, the incorporation of poultry litter showed a different behavior, increasing rates of CO₂ release and overcoming the microbial activity comparing the other treatments after the 18th day of incubation. The CO₂ evolution was used to adjust equations to evaluate patterns of all treatments. The linear model was the best choice all treatments except the treatment of soil with ryegrass, which the logarithm model was the best fit. This suggests that the time of this experiment wasn't enough to observe microbial activity at the stage where the microbial community uses recalcitrant fractions of organic matter, however, the adjusted equations allowed to calculate the time to consume 50% of C available which showed that the mineralization of poultry litter regarded was twice times slow comparing to the ryegrass addition. The highest rates of mineralization were ryegrass, white clover, control, and poultry litter.

Keywords: Respirometry, Cover Crops, Soil management

Financial support: CAPES and CNPq

(9605 - 2840) Nepheline syenite rock powder as source of potassium to corn

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This work aimed to measure the supply of potassium (K) by nepheline syenite rock powder to dry matter of corn cultivated in dystrophic oxisol and to calculate its efficiency against the potassium chloride (KCl). Nepheline syenite is a plutonic rock characterized by 7.3% of K₂O, supplied by a mining company located at Lavrinhas, Sao Paulo state in Brazil. The application of rock powder to soil presents itself as an alternative to synthetic sources, taking advantage of its slow chemical dissolution what makes it less susceptible to lixiviation and a source of multiple minerals. The rock powder was applied raw (R) to the soil and after heating (H) in calcination oven mixed with calcium chloride (55%-45%) at 900 °C for 30 minutes. A 3x2+2 factorial experiment desing was set fractionating the rock powder into the granulometric ranges small (s) or below 0.053 mm, medium (m) or between 0.053 and 0.149 mm and large (l) or above 0.149 mm. A positive control treated with KCl and a negative control without any K

source were set. The soil was incubated for 94 days and wet with distilled water up to 70% of its field capacity. Corn was cultivated thrice, 33 days each time. The dry matter masses, the K levels in soil and the K concentration in the plants were determined per treatment. The K contents were determined by the multiplication of the dry matter mass by its K concentration. The data obtained were submitted to analysis of variance and Tukey test at a confidence level of 5%. The agronomic efficiency was estimated comparing to the KCl treatment. The heating treatments Hs, Hm and Hl showed significant effects on the K levels in soil (P < 0.01) and on the concentration of K in the dry matter of the first cultivate (P < 0.01). The treatment Hs showed a significant effect on the total content of K in the dry matter (P < 0.01). Has been concluded that after heating the nepheline syenite rock powder acted closer to KCl as a fast dissolution fertilizer while the raw rock powder did not or did not have enough time to dissolve and supply potassium to the corn.

Keywords: rock for crops, calcination, oxisol

Financial support: Mineração Rio do Braço

(4326 - 1047) Nitrogen mineralization and nitrous oxide emissions in a sandy soil amended with low-phosphorus broiler litter.

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Recurrent land application of broiler litter in regions with a high concentration of poultry farms result in soils with phosphorus (P) far beyond the agronomic requirement of crops. A new waste treatment technology developed by USDA-ARS, called "Quick Wash", chemically extracts and recovers P from broiler litter while leaving most of the nitrogen (N) and carbon (C) in the low-P treated litter. The low-P treated litter can then be either safely land applied at agronomic N rates. A laboratory test was performed to evaluate the N mineralization and nitrous oxide (N₂O) emissions in a Norfolk soil (Fine-loamy, kaolinitic, thermic Typic Kandiodults) amended with low-P litter. Two sets of undisturbed soil cores (15 cm x 5 cm diameter) received the following treatments applied onto the soil surface in triplicate: un-amended soil (control), untreated litter, pelletized untreated litter, loose low-P litter, and pelletized low-P litter. All cores were adjusted to 60 % water-filled porosity and incubated at 25°C for 68 days. Soil from one set of cores was sampled on a weekly basis. Soil samples were extracted with 2 molar potassium chloride and analyzed for ammonium (NH₄) and nitrate (NO₃) to estimate the net N mineralization (Nm) rate of each poultry litter amendment. Another set of cores were enclosed in plastic jars having a gas sampling port for periodic N₂O emission measurements by gas chromatography. The Nm rates were in the range of 4.0 to 5.7 mg/kg of soil/day for untreated litter, pelletized untreated litter, and loose low-P litter while pelletized low P-litter and the unamended soil control were significantly lower, in the range of 1.7 to 2.0 mg/kg soil/day. The cumulative N₂O production from the pelletized raw, loose raw, loose low-P, pelletized low-P litter, and un-amended soil were 1261, 894, 407, 287, and 80 µg N₂O-N/kg soil, respectively. Therefore, percent of N₂O losses from the total applied N were 1.4%, 1.0%, 0.5%, and 0.3% for pelletized untreated litter, untreated litter, loose low-P litter, and pelletized low-P litter, respectively. Since the treated pelletized low-P litter also had the lowest nitrification rates, it appears as an efficient solution to conserve N and mitigate losses by N₂O emissions or NO₃ leaching after soil application.

Keywords: organic nitrogen, nitrification, manure, mineralization, sustainability

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(5325 - 657) Organic Matter and Physical Attributes of the Soil with Underground Barrage in Agroecological Transition

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Underground barrage consist of a technique for capturing and storing rainwater to ensure agricultural production during the dry season. The accumulation of water in the catchment area of the barrage has demonstrated positive and negative aspects in the chemical, physical and biological attributes of soils. The difficulties of underground barrage are the result of several factors, including the use of conventional management techniques that can lead to soil erosion. The objective of this work was to evaluate the physical attributes and the organic matter of the soils with underground barrage in the Brazilian semiarid, comparing with areas of conventional system and native forest. The study was carried out in two properties of the State of Bahia, both under semiarid climate. Property 01, which is located in the city of Serrolândia (latitude 11° 25' 7" S, longitude 40° 17' 40" W, at 447 meters altitude), property 02 is located in the city of Canudos (latitude 09° 53' 48" S, longitude 39° 01' 35" W, at 402 meters altitude). Sampling for the physical analysis was performed at the beginning of the rainy season, and obtained through a sample composed of each environment, collected in ten points in the zigzag direction, and in three depths, 0-10 cm, 10-20 cm and 20-40 cm. It's verified that of all studied areas the organic matter was higher in the environment of native forest, when compared to the other environments. The removal of the caatinga, together with the long periods of drought, causes marked physical, chemical and biological degradation in these environments, in relation to the soils, these characteristics can be more accentuated, because it leaves them totally discovered and exposed to the climatic factors. Soil density in agroecosystem 01 was higher when compared to agroecosystem 02, due to soil particle density related to high sand content (in agroecosystem 01) and clay (in agroecosystem 02). These relationships in the formation of macro and micro pores of the soil can be observed in the porosity, which was higher in the agroecosystem 02 due to the clay and organic matter contents. It's concluded that both properties are still slowly moving towards a more sustainable agroecosystem, overcoming the environmental limitations of the Brazilian semiarid region, placing the underground barrage as a technology with potential to perfect and balance the productive process, promoting greater stability of agroecosystems.

Keywords: Ecological management of the soil; Sustainable agriculture; Captation and storage of water in the semiarid.

Financial support: CNPq, BNB, IFPE

(4882 - 776) Soil microbial groups responses to application of garlic broth, essential oils and *Trichoderma spp.* used to control *Sclerotium cepivorum* Berk

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Argentina is the second largest country in garlic (*Allium sativum* L.) production which is highly affected by the white rot caused by *Sclerotium cepivorum* Berk. This pathogen produce sclerotia that can survive in soil as the inoculum source. We previously demonstrated that applications of garlic broth (GB) obtained by hydrodistillation induced early sclerotial germination reducing the amount of final viable sclerotia. Essential oils (EOs) and *Trichoderma spp.* applications control *S. cepivorum*. The goal of this work was to study the effect of GB, oregano (*Origanum spp. vulgare*) EO, suico (*Tagetes minuta* L.) EO, *T. atroviride* (TA) and *T. harzianum* (TH) applications on final viable

sclerotia and soil microbial groups. Assay was carried out in plots (45 x 45 cm) inoculated with 21 g of sclerotia at 5 cm depth (day 0). The treatments were: no applications (control); GB (80 mL) applied after 20 and 40 days; GB+ EOs of oregano and suico applied separately (1500 ppm applied on the soil surface) after 60 days; GB + individual and combined applications of TA and TH (4x10⁸ spores) after 90 days. Total heterotrophic and nitrogen-fixing microorganisms were determined by colony-forming unit. The most probable number method was used to quantify nitrifying, ammonia-oxidizing and cellulolytic microorganisms. All the groups were quantified after 7 days of each application. At the end of the assay, sclerotia were collected by sifting and quantify the soil samples (100g) using a stereomicroscope. Viability of sclerotia was determined on agar-water (2%). Means were obtained by ANOVA and significant differences were detected using Fisher's LSD test ($P < 0.05$). The number of nitrifying microorganism significantly decreased (9%) after GB applications. Similar results were obtained between GB + suico EO and GB + TA, reducing both the number of nitrifying (83 and 67%, respectively) and ammonia-oxidizing (7 and 12%, respectively). Ammonia-oxidizing microorganisms were also affected by GB+TA+TH (11%). GB+Oregano EO decreased the number of nitrifying and nitrogen-fixing (94 and 5%, respectively). The application of GB+TH had no significant effect on the soil microbial groups. The number of viable sclerotia was increased in control (40%) and reduced with the applications (40%). The greatest reduction was observed in GB + TA + TH (73%). Combined application of TA and TH provide additional control to GB treatment affecting ammonia-oxidizing microorganisms.

Keywords: natural control, integrated pest management, soil microbiology.

Financial support: SECyT, CONICET

(7165 - 3086) Sustainable production of strawberry in Alfisols from coastal rainfed Chile

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The soils of the coastal range of Chile present clay textures and low organic matter contents. This condition leads the soil compaction as a common constraint to establish the strawberries, very important crop for small farmers. In the present study, different organic amendments were applied in two essays (Litueche: Alto Colorado Association, Typic Rhodoxeralf, Paredones: Asociación Curanipe, Typic Kandistalf) to evaluate their effects on soil physical properties and strawberry yield. The treatments consider a control (T0, no amendment), compost (C, 20 Mg ha⁻¹); humic substance 1 (HS1, 100 L ha⁻¹) and humic substance 2 (HS2, 30 kg ha⁻¹), evaluating after 3 and 6 months of the start of the trial: bulk density, pore size distribution, aggregate stability, mechanical resistance and the yield components of the strawberry. The bulk density was not modified by the treatments, although in Paredones tends to decrease by the use of compost. In both essays the coarse porosity increased by the use of organic amendments, but the available water did not change consistently in the time. The aggregate stability increased in Paredones site in C and HS2 treatments, and the mechanical strength remained low in all treatments, but with densified subsoil. The treatment HS1 increased the average weight of the fruit and all amendments increase the °Brix concentrations compared to T0. Finally, the number of fruit per plant, the large and diameter were not affected by the use of organic amendments, but the use of external inputs (fertilizers, agrochemicals, irrigation) decrease with the proposed managements.

Keywords: Compost, humic substances, soil physical properties, *Fragaria x ananasa* Duch.

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