Perspective
Volume 9:11, 2022

Journal of Environmental Analytical Chemistry

ISSN: 2380-2391 Open Access

Biodynamic Nutrient Management Utilization through Fact Related to Compost

Jimson Ferns*

Department of Analytical Chemistry, Czech University of Life Sciences Prague, Praha, Czech Republic

Introduction

Soil organic matter quality is critical for soil structure, carbon sequestration, and pollutant immobilisation. Field experiments at ten experimental sites in Central Europe were conducted to investigate the effect of 16-23 years of fertilisation on the quality of soil organic matter. Following the harvest of barley in 2016, soil samples were collected. Six crops were rotated: peas, canolas, winter wheat, spring barley, beets, potatoes, and spring barley. Unfertilized control, mineral fertilisation (NPK), farmyard manure, farmyard manure + NPK, straw incorporation, and straw incorporation + NPK were the six treatments investigated. Although carbon input had no significant correlation with any of the soil organic carbon fractions, the C/N ratio of applied organic fertilisers had a significant correlation with the content of hemic acid carbon (C-HA), the C-HA/C-FA ratio, and the soil mummification index. The mixture of farmyard manure and NPK. Compared to NPK, straw return, and the combination of straw return + NPK, resulted in higher hemic acid carbon content in soil, mummification rate, and mummification index. Although straw return resulted in a lower E4/E6 (A400/A600, Q4/6) ratio than farmyard manure application, the C-HA/C-FA ratio remained constant between these treatments. When compared to straw return with and without NPK, the application of farmyard manure with and without NPK resulted in higher values of carbon sequestration efficiency in soil [1].

Organic manure additions increase the organic matter content of the soil. Many studies have found that this increases water holding capacity, porosity, infiltration capacity, hydraulic conductivity, and water stable aggregation while decreasing bulk density and surface crusting. The primary method of crop straw treatment is a straw return. However, the commonly used straw return method has many negative effects on the levels and improvement of soil fertility and crop yield. The use of mineral fertilisers also increases the amount of organic matter returned to the soil.

There are two ways to increase organic matter content in soils: increase organic matter gains or additions to the soil and decrease organic matter losses. Soil organic carbon storage is a balance of carbon additions from non-harvested crop parts and organic amendments versus carbon losses, primarily from organic matter decomposition and the release of respired CO_2 to the atmosphere. Many different organic compounds are present in organic matter returned to the soil, whether directly from crop residues or indirectly as manure. Some of these are quickly digested by soil microorganisms. As a result, microbial compounds and body structures form quickly, which is important for holding particles together to provide soil structure and limit erosion [2].

***Address for Correspondence:** Jimson Ferns, Department of Analytical Chemistry, Czech University of Life Sciences Prague, Praha, Czech Republic, E-mail: jimsonferns87@gmail.com*

Received: 02 November, 2022, Manuscript No: jreac-23-85976; **Editor Assigned:** 04 November, 2022, PreQC No: P-85976; **Reviewed:** 16 November, 2022, QC No: Q-85976; **Revised:** 21 November, 2022, Manuscript No: R-85976; **Published:** 28 November, 2022, DOI: 10.37421/2380-2391.2022.9.400

Description

The favourable humus quality influences the stabilisation of water-stable soil aggregates, which are the fundamental units of soil structure. As a result of soil cultivation, macroaggregates are broken down into micro aggregates that are primarily stabilised by humic acid carbon and highly condensed and stabilised macromolecules. Humic substances are a significant stable component of soil organic carbon and play an important role in soil carbon accumulation. Humification is affected by soil organic matter content and the C/N ratio of a specific fertiliser. Continuous application of farmyard manure to field soils generally results in a higher humic acid content than mineral fertiliser application alone. Furthermore, incorporating rotted or composted farmyard manure into the rotation can boost soil organic matter [3].

Both humic and fulvic acids have a high sorption capacity for many contaminants, including heavy metals, which can result in their immobilisation and, as a result, protection of food and groundwater. The increase in water-soluble sugars, "unmatured" lignin, and fulvic acids indicates a labile system with a rapid course of change and a longer period of stabilisation or acquisition of dynamic equilibrium in the mineralization and humification process. Furthermore, the high humic acid to fulvic acid ratio may explain why plant metal concentrations are low. In their study on nanoparticles, they describe this phenomenon; fulvic acid molecules only form a salt with heavy metal ions, whereas the conformation of humic acid molecules is responsible for metal ion capture [4].

In humic acids, the E4/E6 ratio is inversely related to the degree of condensation of the aromatic network. A low E4/E6 ratio indicates a high degree of aromatic constituent condensation, whereas a high ratio indicates a low degree of aromatic condensation as well as the presence of relatively large proportions of aliphatic structures. As a result, the humic to fulvic acid ratio increases while the E4/E6 ratio decreases in the visible spectrum range.

Although the correlation was weak, the E4/E6 ratio correlated significantly with the humic to fulvic acid carbon (CHA/CFA) ratio. Although the E4/E6 ratio was moderately correlated with carbon input in organic fertilisers, the CHA/CFA ratio was significantly correlated with the organic fertiliser C/N ratio (weak correlation). Both the CHA/CFA and the E4/E6 ratios were moderately correlated with the long-term annual average of precipitation amount and air temperature. Under conditions of lower precipitation and higher air temperature, the CHA/CFA ratio increased while the E4/E6 ratio decreased. The CHA/CFA ratio was found to have a stronger correlation with CHA content than with CFA content.

Our research did not support the findings of, which claimed that mineral fertilisation increased CFA content in soil compared to organic fertilisation. However, after 13 years of experiments, there was no difference in CFA content between mineral fertilisation and straw return with the addition of mineral fertiliser, which is consistent with our findings. When we compared mineral fertilisation with deep incorporation of maize straw, we found no significant difference in CHA content between the NPK and the STRAW/BT treatments. The findings of lower CHA content in mineral treatment compared to straw return with the addition of mineral fertilisers were also not confirmed [5].

Conclusion

There was no significant correlation between the E4/E6 ratio and soil organic carbon fractions, mummification rate, or humification index. Furthermore, no significant relationship was discovered between the carbon input used in fertilisers and the organic carbon fractions of the soil. The weighted average of the C/N ratio in organic fertilisers, on the other hand, was negatively correlated with the hemic acid carbon, humification index, and CHA/CFA ratio. Although straw return resulted in a lower E4/E6 ratio than farmyard manure application, the CHA/CFA ratio remained constant among these treatments. When compared to the application of mineral fertilisers alone, only the combination of farmyard manure and mineral NPK resulted in a higher humification index, humification rate, hemic acid carbon content, and filmic acid carbon content.

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest by author.

References

1. Aher, Satish Bhagwatrao, Brij Lal Lakaria, Swami Kaleshananda and Amar Bahadur Singh. "Concentration and uptake of micronutrients (Fe, Zn, Cu and Mn) in soybean and wheat under organic, biodynamic and inorganic nutrient management in semi-arid tropical conditions of Central India." *Commun Soil Sci Plant Anal* 53 (2022): 2229-2244.
2. Basak, B. B., R. S. Jat, N. A. Gajbhiye and Ajoy Saha, et al. "Organic nutrient management through manures, microbes and biodynamic preparation improves yield and quality of Kalmegh (*Andrograghis paniculata*), and soil properties." *J Plant Nutr* 43 (2020): 548-562.
3. Bargaz, Adnane, Karim Lyamlouli, Mohamed Chtouki and Youssef Zeroual, et al. "Soil microbial resources for improving fertilizers efficiency in an integrated plant nutrient management system." *Front Microbiol* 9 (2018): 1606.
4. Aher, Satish Bhagwatrao, Brij Lal Lakaria, Swami Kaleshananda and Amar Bahadur Singh. "Yield, nutrient uptake and economics of soybean–wheat cropping system under organic nutrient management in Central India." *J Plant Nutr* 45 (2022): 904-919.
5. Ngosong, Christopher, Mareike Jarosch, Joachim Raupp and Elke Neumann, et al. "The impact of farming practice on soil microorganisms and arbuscular mycorrhizal fungi: Crop type versus long-term mineral and organic fertilization." *Appl Soil Ecol* 46 (2010): 134-142.

How to cite this article: Ferns, Jimson. "Biodynamic Nutrient Management Utilization through Fact Related to Compost." J Environ Anal Chem 9 (2022): 400.