

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > AS

[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)

AS &gt; Vol.2 No.1, February 2011



## Quantitative and qualitative changes of humus in whole soils and their particle size fractions as influenced by different levels of compost application

PDF (Size: 146KB) PP. 1-8 DOI: 10.4236/as.2011.21001

### Author(s)

Thu Ha Nguyen, Haruo Shindo

### ABSTRACT

Effect of long-term application (ca. 30 years) of compost at different levels on humus composition of whole soils and their particle size fractions in a field subjected mainly to double cropping (barley and paddy rice) was investigated. Soil samples were collected from three plots of different types of management: (a) F plot, only chemical fertilizers containing N, P and K were applied; (b) F+LC plot, both chemical fertilizers and a low level of compost were applied; (c) F+HC plot, both chemical fertilizers and a high level of compost were applied (the amount of compost applied in the F+HC plot was three times larger than that applied in the F+LC plot). Each soil sample was divided into coarse sand- (CSA), medium sand-(MSA) and fine sand-(FSA) sized aggregate, silt-sized aggregate (SIA) and clay-sized aggregate (CLA) fractions by wet-sieving and sedimentation. In addition, the CSA and MSA fractions were sub-divided into " mineral particles" (MP) and " de-cayed plants" (DP) by a density fractionation. Humus composition was influenced depending upon the level of compost applied. The application induced an increase in the amounts of total humus (TH), humic acid (HA) and fulvic acid (FA) in the whole soil and many size fractions, particularly, SIA fraction. The increase was remarkable in the F+HC plot. In the CSA and MSA fractions, the amounts of TH, HA and FA were much larger in the CSA- and MSA-DP fractions than in the CSA- and MSA-MP fractions. The amounts of TH, HA and FA in the SIA fraction were larger than those in the CLA fraction for the F+HC and F+LC plots, and the reverse was true for the F plot. On the other hand, the degrees of humification of humic acids in whole soils and many size fractions, particularly SIA fraction, decreased by compost application. The decrease was markedly in the F+HC plot. These findings suggest that the SIA fraction play an important role in the quantitative and qualitative changes of humus, including HA and FA, as influenced by a long-term compost application.

### KEYWORDS

Paddy and Upland Fields; Straw-Cow Dung Compost; Humic and Fulvic Acids; Humification

### Cite this paper

 Nguyen, T. and Shindo, H. (2011) Quantitative and qualitative changes of humus in whole soils and their particle size fractions as influenced by different levels of compost application. *Agricultural Sciences*, 2, 1-8. doi: 10.4236/as.2011.21001.

### References

- [1] Shindo, H. and Shojaku, M. (1999) Effect of continuous compost application on the activities of various enzymes in soil of double cropping fields. *Japanese Journal of Soil Science and Plant Nutrition*, in Japanese, 70, 66-69.
- [2] Imbrahim, S.M. and Shindo, H. (1999) Effect of continuous compost application on water-stable soil macro-aggregation in a field subjected to double cropping. *Soil Science and Plant Nutrition*, 45, 1003-1007.
- [3] Shindo, H., Hirahara, O., Yoshida, M. and Yamamoto, A. (2006) Effect of continuous compost application on humus composition and nitrogen fertility of soils in a field subjected to double cropping. *Biology and Fertility of Soils*, 42, 437-442. doi:10.1007/s00374-006-0088-3

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[AS Subscription](#)
[Most popular papers in AS](#)
[About AS News](#)
[Frequently Asked Questions](#)
[Recommend to Peers](#)
[Recommend to Library](#)
[Contact Us](#)

Downloads:	145,394
Visits:	251,746

### Sponsors, Associates, and Links >>

- [2013 Spring International Conference on Agriculture and Food Engineering \(AFE-S\)](#)

- [4] Roppongi, K., Ishigami, T. and Takeda, M. (1994) Effects of continuous application of rice straw compost on humus forms of alluvial upland soil. *Japanese Journal of Soil Science and Plant Nutrition*, in Japanese, 65, 426- 431.
- [5] Aoyama, M. and Kumakura, N. (2001) Quantitative and qualitative changes of organic matter in an Ando soil induced by mineral fertilizer and cattle manure applications for 20 years. *Soil Science and Plant Nutrition*, 47, 241-252.
- [6] Watanabe, A., Kawasaki, S., Kitamura, S. and Yoshida, S. (2007) Temporal changes in humic acids in cultivated soils with continuous manure application. *Soil Science and Plant Nutrition*, 53, 535-544. doi:10.1111/j.1747-0765.2007.00170.x
- [7] Cheshire, M.V. and Mundie, C.M. (1981) The distribution of labelled sugars in soil particle size fractions as a means of distinguishing plant and microbial carbohydrate residues. *Journal of Soil Science*, 32, 605-618. doi:10.1111/j.1365-2389.1981.tb01733.x
- [8] Leinweber, P. and Reuter, G. (1992) The influence of different fertilization practices on concentrations of organic carbon and total nitrogen in particle-size fractions during 34 years of a soil formation experiment in loamy marl. *Biology and Fertility of Soils*, 13, 119-124. doi: 10.1007/BF00337346
- [9] Tanaka, M. and Shindo, H. (2009) Effect of continuous compost application on carbon and nitrogen contents of whole soils and their particle size fractions in a field subjected mainly to double cropping. In: *Composting, Processing, Materials and Approaches*, Pereira, J.C. and Bolin, J.L., Eds., Nova Science Publishers, New York, 187-197.
- [10] Kumada, K. (1987) *Chemistry of soil organic matter*. Japan Scientific Societies Press, Tokyo.
- [11] Ikeya, K. and Watanabe, A. (2003) Direct expression of an index for the degree of humification of