Program

ISETS

International Symposium
on EcoTopia Science
'13

Innovation for Smart Sustainable Society

and

AMDI-4

The 4th International Symposium on Advanced Materials Development and Integration of Novel Structured Metallic and Inorganic Materials

December 13-15, 2013
Nagoya University, Nagoya, Japan

Organized by
Nagoya University
Organizing committee of ISETS '13

EcoTopia Science Institute NAGOYA UNIVERSITY

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ISETS '13 and AMDI-4

International Symposium on EcoTopia Science 2013
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The 4th International Symposium on Advanced Materials Development and Integration of Novel Structured Metallic and Inorganic Materials

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Session 5 Room 014 — Green Production, Recycling, Emission Management and Bioremediation

Time	Presentation No.	Title, Author(s)
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9:30-9:45	15-5-1 (1278)	**A comprehensive insight into the effects of residual moisture on deep dewatered sludge pyrolysis** H.Liu, Q.Zhang, H.Hu, G.Luo, A.Li, H.Yao (State Key Laboratory of Coal Combustion, Huazhong University of Science and Technology)
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10:00-10:15	15-5-3 (1292)	**Electron Transfer from a Graphite Electrode Assisted by Solid-Phase Electron Mediator (humin) Immobilization Enhances Microbial Reductive Dechlorination of Pentachlorophenol** D.Zhang (Nagoya University), C.Zhang, Z.Li, D.Suzuki (EcoTopia Science Institute, Nagoya University), A.Katayama (Graduate School of Engineering, Nagoya University)
10:15-10:30	15-5-4 (1209)	**Characterization of heavy metals in the phosphorus-removal-processing from sludge ash** H.Kim (Niigata University), N.Hayashi, N.Kano, T.Shimizu (Department of Chemistry and Chemical Engineering, Niigata University), Y.Kamimoto (Environ. System and Recy. Sci. Research Department, EcoTopia Science Institute, Nagoya University)
10:30-10:45		**Break**
		Chair: Ryoichi Ichino (Nagoya University)
10:45-11:15	15-5-5 (1398) (Invited)	**Importance of rare metals and advances recycling technologies for recovering rare metals** T.Fujita (The University of Tokyo)
11:15-11:30	15-5-6 (1184)	**Microbial Community Dynamics during Composting Process and Cultivation of Komatsuna** Ni Luh Gede Ratna Juliasih (Toyohashi University of Technology), Lee Chang Yuan, Y.Sago, Y.Atsuta, H.Daimon (Department of Environmental and Life Sciences, Toyohashi University of Technology)
11:30-11:45	15-5-7 (1090)	**Localized Heating in Mixed Powders for Microwave Pig Iron Making** N.Sabelstrom, T.Watanabe, M.Hayashi (Tokyo Institute of Technology), K.Nagata (Tokyo University of the Arts)
12:00-12:30		**Closing Ceremony (Main Hall)**

Microbial Community Dynamics during Composting Process and Cultivation of Komatsuna

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Introduction

Quinone profile has widely used as an effective method for defined of microbial community dynamics [1] [2]. Supercritical fluid extraction (SFE) found to be effective, rapid and quantitative technique to extract quinones from various environmental samples instead of the conventional solvent extraction [2]. In this present work, quinone profile method using SFE was used to monitor microbial community in the composting process and the cultivation of komatsuna.

Experimental Procedures

Microbial community dynamic of industrial compost processes was monitored by quinone profile using SFE and ultra-performance liquid chromatography (UPLC). Subsequently, effect of compost maturity and amount of the applied compost on the microbial communities of soil were investigated by cultivation of komatsuna in different soil conditions; soil with chemical fertilizer, soil with mature compost and soil with immature compost, in 28 days of cultivation. Each condition was fertilized with the same amount of nitrogen (N), phosphorous (P) and potassium (K), according to Aichi Prefecture standard. The growth of komatsuna in each soil conditions was compared by measuring the fresh weight, leaf length, and leaf width. The efficiency of compost usage in cultivation was investigated by comparing the amount of compost usage in each soil; it is 100% (780g/10kg), 50% (390g/10kg) and 0% (0g/10kg).

Results and Discussion

A composting process was explained by monitoring the changing in its microbial communities. Comparisons of quinone profile between immature and mature compost are shown in **Figure 1**. The diversity of quinone profile on immature compost was low (6.9), with a dominant fraction of ubiquinone (UQ)-9 and menaquinone (MK)-7. The diversity of quinone found on mature compost was high (13.4), indicated that the decomposition of organic materials were achieved by the conformation of more complex microbial community. **Figure 2** describes that the growth of komatsuna in soil with chemical fertilizer was equivalent to that in mature compost; this suggested that mature compost could be a substitution for chemical fertilizer. The growth of komatsuna in soil with immature compost was poor; this might be caused by low diversity of microbial communities which might important in the process of plant growth. Furthermore, reduction of compost input will decrease the diversity of quinone profile in soil as well as komatsuna growth (data not shown). In summary, compost can improve the biological properties of soil and growth of plant. In the future study, the microbiological assessment should be more concerned as well as chemical and physical properties of compost to provide the best quality of compost.

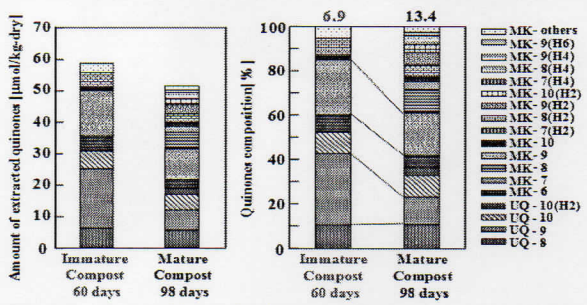

Figure1. Compositions of quinone profile between immature (60 days) and mature (90 days) compost.

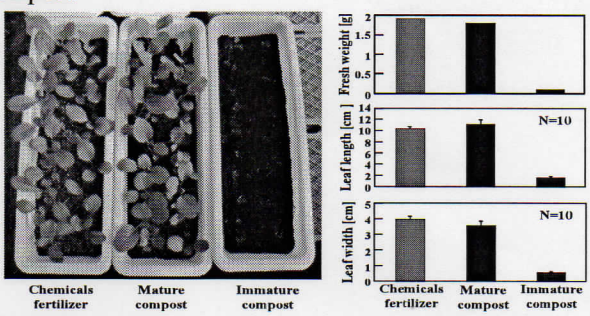

Figure 2. Komatsuna growth's on the different soil conditions.

Acknowledgement

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References

[1] J. C. Tang, T. Kanamori, Y. Inoue, T. Yasuta, S. Yoshida, A. Katayama, Changes in the microbial community structure during thermophilic composting of manure as detected by the quinone profile method, *Process Biochem.*, 39, 1999-2006 (2003).

[2] M. Hanif, Y. Atsuta, K. Fujie, H. Daimon, Supercritical fluid extraction and ultra performance liquid chromatography of respiratory quinones for microbial community analysis in environmental and biological samples, *Molecules, 17*, 2628-2642 (2012).