# Enhanced Performance of pilot-scale Biofilter for the treatment of malodorous compounds using combined Rock wool and woodchip media

Wook-Jin Chung*, M.M. Galera*, Sang-Gue Jeong*, Dang Viet. Lam*,
Eun-Mi Gwon*, Youngsook Oh, and Ji-Hyun Song**
*Department of Environmental Egineering and Biotechnology, Myongji University, San 38-2 Nam Yongin, KOREA, 449-728
(E-mail: wookjin@mju.ac.kr, Tel: +82-31-330-6687, Fax.: +82-31-337-2902)
**Department of Civil and Environmental Engineering, Sejong University, 98 Kunja-dong, Kwangjin-gu, Seoul 143-747 KOREA

## Abstract

A novel two-step bio-filtration containing rock wool and wood chip has been operated on a pilot scale (4 $m^3$/min) for the treatment of odors emitting from a composting facility during 230 days. Wood chip, a natural organic matrix containing 6 % of earthworm cast was packed in the first-layer of the system with enriched activated sludge and ammonia, sulfur, and VOCs-degrading strains. A mixture of a fibrous inorganic-based rock wool and consortium of pollutants-degrading strains was paced on the second and third layers. 50 l/day of tap water was sprayed only on the first layer, in order to minimize compaction and clogging problems. The experimental results showed more than 98 % of ammonia removal at even 16 seconds of empty bed residence time. During 230 days of operation, $H_2O$ pressure drops for the biofilter has been maintained less than 30 mm $H_2O$. More than 95 % of removal rate for various odorous gases such as aldehydes, alcohol, and VOCs was completely removed during 8 months of operation in a field-scale experiment.

**Key words**

Ammonia; hydrogen sulfide; field-scale bio-filtration; odor removal; rock wool; wood chip

**References**

1. Kim, N.-J., Hirai, M. and Shoda, M. (2000), Comparison of organic and inorganic packing

materials in the removal of ammonia gas in biofilters, *J. Hazardous Materials*, **B72**, 77-90.

2. Malhautier, L., Gracian, C., Roux, J.-C., Fanlo, J.-L., and Le Cloirec, P. (2003), Biological treatment process of air loaded with an ammonia and hydrogen sulfide mixture, *Chemosphere* **50**, 145-153.
3. McNevin, D. and Barford, J. (2000), Biofiltration as an odour abatement strategy, *Biochemical Engineering J.* **5**, 231-242.
4. Nicolai, R. and Janni, K. (2001), Biofilter media mixture ratio of wood chips and compost treating swine odors, *Water Science and Technology* **44** (9), 261-267.
5. Sheridan, B., Curran, T., Dodd, V., and Colligan, J. (2002), Biofiltration of odour and ammonia from a pig unit-a pilot-scale study, *Biosystems Engineering* **82** (4), 441-453.