13

INFLUENCE OF GAS FLOW RATE AND INLET LOAD ON THE REMOVAL OF ETHYLBENZENE VAPORS FROM AIR IN A PEAT BIOFILTER

C. Gabaldon[1], **V. Martínez-Soria**[1], M. Martín[2], P. Marzal[1], C. Royero[1]

[1]*Department of Chemical Engineering, University of Valencia, Dr. Moliner, Burjassot, Spain*

[2]*Department of Hydraulic and Environmental Engineering, Polythecnic University of Valencia, Valencia, Spain*

Air biofiltration has been shown as a clean, low-cost competitive alternative to the physico-chemical treatment technologies to remove volatile organic compounds (VOCs) from industrial air emissions. In order to investigate the performance of this growing technology, two identical biofiltration units at laboratory scale were operated for continuous removal of ethylbenzene vapors over 3 months. Commercially conditioned peat was used as support material. At star-up, the biofilters were inoculated with a two-months conditioned culture seeded with activated sludge from an industrial wastewater treatment plant. The moisture content of the filter material was adjusted to approximately 80-85% (wet basis). Nutrients were added periodically to the medium. Temperature was kept on 24-28 ºC. The influence of ethylbenzene inlet concentration and gas flow rate on the biofilter performance were studied and nearly complete removals were obtained. In the best performing biofilter, ethylbenzene inlet concentration was raised stepwise to 4.8 gm-3, using a constant flow rate of 0.4 m3h-1 (2 minutes of empty bed residence time). Maximum removal efficiency was found in 117 gm-3h-1, and near complete removal of ethylbenzene was reached for inlet loads up to 100 gm-3h-1. Inlet gas flow rate was varied from 0.4 m3h-1 to 2.6 m3h-1 showing that empty bed residence times < 60 s lowered the removal efficiency. In the other biofilter, 4 min of empty bed residence time was needed to reach satisfactory elimination capacities, showing that greater contact times allow to treat inlet concentrations of ethylbenzene up to 5.6 gm-3.