



Conferencia "Biofiltration VOC Removal Technology"



Algunos de los integrantes de la ASCE y el Prof. Ayala



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Bio-filtration: New Technology for the Control of Volatile Organic Compound (VOC)

Bio-filtration is a relative new air pollution control technology. It consists of removal and oxidation of compounds from contaminated air using microorganisms. The bio-filtration process is effective in treating volatile organic compounds (VOC), as well as inorganic compounds. A bio-filter contains filter materials (compost, peat, bark or wood chips) on which microorganisms (mainly bacteria) are immobilized to form a bio-layer. When waste gases pass through the reactor, target pollutants diffuse to the bio-film as adsorption and instantaneous aerobic biodegradation occurs. For aerobic biodegradation, the principal products are carbon dioxide, water vapor, and organic biomass. In general, natural filter materials provide sufficient inorganic nutrients for microorganisms; therefore addition of nutrients is not required.

The following factors must be studied to consider the bio-filtration process as a control unit: pollutant concentration, moisture level, nutrient, the residence time, and specific physical characteristics of the pollutants. Compounds with complex bond structure generally require more energy to be degraded, and this energy is not always available to the microbes. Hence, little or no biodegradation of those types of compounds occurs. Organic compounds such as alcohol, aldehydes, ketones, and some simple aromatics demonstrate excellent biodegradability. Some compounds that show moderate to slow degradations include phenols, chlorinated hydrocarbons, polyaromatic hydrocarbons and

highly halogenated hydrocarbons. Inorganic compounds such as hydrogen sulfide and ammonia are also biodegraded well.

Bio-filtration has been used widely for odor control units at wastewater plants, and in the wood and fragrance industries. The most promising application of bio-filtration technology is the removal VOC from a gas stream for pharmaceutical processes, chemical manufacturing processes, print shops, coating processes, food processing, livestock farms, and site remediation. Bio-filtration has been validated as an advantageous air pollution control technology for the purification of waste gases with large volume and low pollutant concentrations (1-5 g/m³), compared to other conventional physical chemical methods such as incineration, scrubbing, and activated carbon adsorption. The advantages include: low capital investment and operating costs, operational stability, and high destruction efficiency of pollutants (80-99% removal efficiency) without additional pollutants formed. If you need more information, please contact Edwin A. Ayala, Ph.D.Candidate at eayala@pupr.edu