BIOTECHNOLOGICAL ADVANCES TO REMOVE SULFIDES FROM VARIOUS ENVIRONMENTS

Nicuşor Vatachi
"Dunărea de Jos" University of Galaţi

ABSTRACT

A great number of industries generate waste streams sulfide-containing. It is emitted into the environment as disolved sulfide (S^{2-} and HS^{-}) in wastewaters and as H_2S in waste gases. Due to its corrosive nature, biological hydrogen sulfide removal processes are being investigated to overcome the chemical and disposal costs associated with existing chemically based removal processes. The nitrogen and sulfur metabolism interacts at various levels of the wastewater treatment process. Hence, the sulfur cycle offers possibilities to integrate nitrogen removal in the treatment process, which needs to be further optimized by appropriate design of the reactor configuration, optimization of performance parameters, retention of biomass and optimization of biomass growth. The present paper reviews the biotechnological advances to remove sulfides from various environments.

REFERENCES

[1] Cha, J.M., Cha, W.S., Lee, J.H., "Removal of organo-sulphur odor compounds by Thiobacillus novellas SRM, sulphur-oxidizing microorganisms", Process Biochemistry, 34(6-7):659-665, 1999.
[2] Gabriel, D., Deshusses, A.M., "Retrofitting existing chemical scrubbers to biotrickling filters for H2S emission control", Proceedings of the National Academy of Science of the United States of America, 100(11): 6308-6312, 2003.
[3] Kim, H., Kim, J.Y., Chung, S.J., Xie, Q., "Long-term operation of a biofilter for simultaneous removal of H2S and NH3", Journal of the Air and Waste Management Association, 52:1389-1398, 2002.
[4] Mathioudakis, V.L., Vaiopoulou, E., Aivasidis, A., "Addition of Nitrate for Odor Control in Sewer Networks: Laboratory and Field Experiments", Conference on Environmental Science and Technology, September 1-3, 2005. Rhodes, Greece.
[5] Melidis, P., Vaiopoulou, E., Aivasidis, A., "Autotrophic Denitrification for Hydrogen Sulfide Removal from Pet-rochemical Wastewater", 10th World Congress of An-aerobic Digestion, Montreal, Canada, 2004.
[6] Oyarzún, P., Arancibia, F., Canales, C., Aroca, G.E.,"Biofiltration of high concentration of hydrogen sulfide using Thiobacillus thioparus". Process Biochemistry, 39(2):165-170. 2003.
[7] Sercu, B., Núñez, D., Langenhove, V.H., Aroca, G., Verstraete, W., "Operational and microbiological aspects of a bioaugmented two-stage biotrickling filter removing hy-drogen sulfide and dimethyl sulfide", Biotechnology and Bioengineering, 90(2):259-269, 2005.
[8] Vaiopoulou, E., Melidis, P., Aivasidis, A.,"Sulfide re-moval in wastewater from petrochemical industries by autotrophic denitrification", Water Res., 39(17):4101-4109, 2005