

Biotechnological Approach for Mitigation Studies of Effluents of Automobile Industries

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- N. N. Bandela (1)
- P. N. Puniya (1)
- Geetanjali Kaushik (2)
- 1. Department of Environmental Sciences, Dr. Babasaheb Ambedkar Marathwada University, , Aurangabad, India 2. MGM's Jawaharlal Nehru Engineering College, Mahatma Gandhi Mission, , Aurangabad, India

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Abstract

Automobile industry effluents are highly contaminated with various heavy metals like Zn, Ca, Pb, Ni, Cr, and Fe, paint particles, coolants, phosphate coating, and oil and grease. The discharge of such toxic effluents without any treatment contaminates natural water bodies. To study the efficiency of biological treatment of the feeding effluent of automobile industries, two pilot plants were set up at a lab scale: one was the conventional bioreactor plant and another was the novel bioreactor with modified design concept. In the novel bioreactor, inside baffles are constructed, and two impellers are used: one at the surface and the other at the bottom. After the comparative study, it was finally concluded that the novel bioreactor efficiency was two times more than the conventional bioreactor. Hence, it is recommended that novel bioreactors can play a vital role in treating the effluent of automobile industries. The microbe of the activated sludge helps to adsorb various heavy metals from the effluent. *Pseudomonas aeruginosa* was found abundant in the effluent of automobile industries.

Keywords

Treatment Automobile industry Heavy metals Bioreactor Reduction This is a preview of subscription content, $\log \underline{in}$ to check access.

References

Abbas A (2006) Biosorption of some heavy metal ions by local isolate of Zoogloea ramigera. Int J Environ Tech Manag 6(5):497-514

<u>CrossRef</u> (https://doi.org/10.1504/IJETM.2006.010481)

Google Scholar (http://scholar.google.com/scholar_lookup?

title=Biosorption%20of%20some%20heavy%20metal%20ions%20by%20local%20solate%20of%20doogloca%20ranigera &author=A.%20Abbas&journal=Int%20J%20Environ%20Tech%20Manag&volume=6&issue=5&pages=497-514&publication_year=2006)

Allard AS, Neilson AH (1997) Bioremediation of organic waste sites; a critical review of microbiological aspects. Int Biodeter Biodegr 39:253-285

CrossRef (https://doi.org/10.1016/80964-8305(97)00021-8)

Google Scholar (http://scholar.google.com/scholar_lookup?

title=Bioremediation%20of%20organic%20waste%20sites%3B%20a%20critical%20review%20oriti

Anderson JG, Smith (1987) Composting. In: Sidwick JM, Holdom RS (eds) Biotechnology of waste treatment and exploitation. Ellis Horwood, Chichester

Google Scholar (http://scholar.google.com/scholar_lookup?

title=Composting&author=JG.%20Anderson&author=.%20Smith&publication_year=1987)

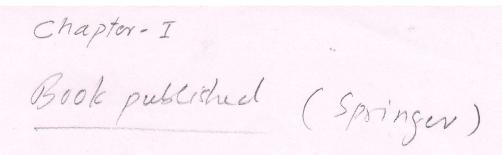
Andrade L, Gonzalez AM, Araujo FV, Paranthos R (2003) Flow cytometry assessment of bacterioplankton in tropical marine environments. J Microbiol Methods 55:841–850

CrossRef (https://doi.org/10.1016/j.mimet.2003.08.002)

Google Scholar (http://scholar.google.com/scholar_lookup?

title=Flow%20eytemetry%20assessment%20of%20bacterioplankton%20in%20tr_peal%comarine%20errnormentents&anttor=L.%20Andrade&author=AM.%20Gonzalez&author=FV.%20Araujo&author=k.~20Paranthos&journal~J%coAherofied%20Methods&volume=55&pages=841-850&publication_year=2003)

Ansola G, Gonzalez JM, Cortijo R, De Luis E (2003) Experimental and full-scale pilot plant constructed wetlands for municipal wastewaters treatment. Ecol Eng 21:43–52



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Abstract

Automobile industry effluents are highly contaminated with various heavy metals like Zn, Ca, Pb, Ni, Cr, and Fe, paint particles, coolants, phosphate coating, and oil and grease. The discharge of such toxic effluents without any treatment contaminates natural water bodies. To study the efficiency of biological treatment of the feeding effluent of automobile industries, two pilot plants were set up at a lab scale: one was the conventional bioreactor plant and another was the novel bioreactor with modified design concept. In the novel bioreactor, inside baffles are constructed, and two impellers are used: one at the surface and the other at the bottom. After the comparative study, it was finally concluded that the novel bioreactor efficiency was two times more than the conventional bioreactor. Hence, it is recommended that novel bioreactors can play a vital role in treating the effluent of automobile industries. The microbe of the activated sludge helps to

N. N. Bandela · P. N. Puniya

Department of Environmental Sciences, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India

G. Kaushik (⊠)

MGM's Jawaharlal Nehru Engineering College, Mahatma Gandhi Mission, Aurangabad, Maharashtra, India