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The aim of the work is to realize an alternative processing of toxic industrial waste into surfactants by strains *Rhodococcus erythropolis* IMV Ac-5017, *Acinetobacter calcoaceticus* IMV B-7241 and *Nocardia vaccinii* IMV B-7405 for remediation of environment.

The studied strains were grown in liquid media containing such sources of carbon as waste (fried) sunflower oil, technical glycerol (by-product of biodiesel production), and aromatic compounds. The synthesis of surfactants was evaluated by emulsification index, conditional concentration of surfactants and concentration of extracellular surfactants, which was determined gravimetrically after their extraction from supernatant by the mixture of methanol and chloroform. The concentration of oil in water and soil was analyzed by gravimetric method after extraction with hexane.

It was shown that with increasing concentration of the inoculum up to 10–15% and two times increase of nitrogen source content in medium containing 7–8% (v/v) of crude glycerol, concentration of surfactants synthesized by *R. erythropolis* IMV Ac-5017, *A. calcoaceticus* IMV B 7241 and *N. vaccinii* IMV B-7405 was 3.4; 5.0 and 5.3 g/l, respectively, that is 1.6–1.7 times higher as compared with values on basal medium with the same content of substrate. The maximum concentration (3.9–4.3 g/l) of surfactants synthesized by *A. calcoaceticus* IMV B-7241 on fried sunflower oil (4%) was achieved by using the inoculum grown on refined oil. The ability of *R. erythropolis* IMV Ac-5017, *A. calcoaceticus* IMV B-7241 and *N. vaccinii* IMV B-7405 to decompose aromatic compounds (phenol, naphthalene, toluene, hexachlorobenzene, benzoic and N-phenylanthranilic acid) with simultaneous synthesis of extracellular metabolites with surface-active and emulsifying properties was established. In the presence of surfactants in the form of culture liquid (5–10%), the degree of degradation of complex oil with heavy metal (Cu
Bioconversion of industrial waste into surfactants for environmental technology allows recycling toxic waste, reducing costs of microbial surfactants and provides double effect of environmental purification, which is achieved in the production and use of microbial surfactants.

**Key words:** industrial waste, microbial surfactants, environment remediation.

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{spoiler title=References}


3. **Haritash A.K, Kaushik C.P.** Biodegradation aspects of polycyclic aromatic hydrocarbons


10. Usman MMOL, Dadrasnia A, Lim K.T., Fahim A. Application of biosurfactants in environmental biotechnology; remediation of oil and heavy metal. 
AIMS Bioengineering, 2016, 3(3), 289–304. 
https://doi.org/10.3934/bioeng.2016.3.289

https://doi.org/10.15407/biotech8.04.021

https://doi.org/10.1007/s10438-005-0010-z


21. Saravanan V., Subramaniyan V. Production of biosurfactant by *Pseudomonas aeruginosa*
PB3A using agro-industrial wastes as a carbon source.  
_Malays. J. Microbiol_  
. 2014, 10(1), 57–62.

_Front. Microbiol_  
. 2014.  
[https://doi.org/10.3389/fmicb.2014.00697](https://doi.org/10.3389/fmicb.2014.00697)

_J. Cent. South Univ_  

_Bioresour. Technol_  
[https://doi.org/10.1016/j.biortech.2010.04.054](https://doi.org/10.1016/j.biortech.2010.04.054)

25. Masakorala K., Yao J., Cai M., Chandankere R., Yuan H., Chen H. Isolation and characterization of a novel phenanthrene (PHE) degrading strain _Pseudomonas_ sp. USTB-RU from petroleum contaminated soil.  
_J. Hazard. Mater_  
[https://doi.org/10.1016/j.jhazmat.2013.10.007](https://doi.org/10.1016/j.jhazmat.2013.10.007)

netobacter
strain USTB-X.
https://doi.org/10.1007/s11356-013-2221-9

https://doi.org/10.1016/j.biotechadv.2010.05.013

https://doi.org/10.3389/fmicb.2016.01718

https://doi.org/10.1007/s11356-014-2872-1

https://doi.org/10.3103/S1063455X1605009X


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