

## THE USE OF NEW LOW-COST SUBSTRATES FOR BIOSURFACTANT PRODUCTION

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### **Abstract**

In literature, several carbon sources were used for biosurfactant production. Most of these studies are focused on the use of conventional carbon sources such as glucose, fructose, pyruvate, citrate, etc., but there are very few reports on biosurfactants production using inexpensive raw materials as substrates (complex carbon or nitrogen sources) which can considerably reduce production costs in most biotechnological processes. To the best of our knowledge, no data are available on the use of animal by-products as a sole source of nutrient for biosurfactant production. In this study, biosurfactant production by a pure bacterial culture was studied using an agro-industrial waste: prickly pear fruits of (*Opuntia ficus-indica*) peels, and two animal by-products: sardine (*Sardina pilchardus*) heads and chicken (*Gallus gallus domesticus*) feet, since they are discarded as a waste. The fuel-contaminated soil samples used for isolation of microbial strains were collected in five different locations at a gas station located in Boumerdès, Algeria. The bacterial strains capable of producing biosurfactants was isolated by selective enrichment culture technique, which promotes the growth of microorganisms containing in the soil sample by providing them the essential nutrients. To demonstrate the ability of strains to produce biosurfactants, different tests were carried out : test of the emulsification index E<sub>24</sub>, test of the blood agar, test of the drop collapse and test of spreading of the hydrophobic phase. The results showed that prickly pear peels medium yielded the highest biosurfactant production, and gave the highest E<sub>24</sub> and cleaning activity values, while chicken feet gave the highest foaming activity. However, extensive research is needed to establish the suitability of these two low-cost substrates in industrial-level biosurfactant production process.

**Keywords:** biosurfactant; by-products; prickly pear peels; *Pseudomonas aeruginosa*.