



Short Communication

# Bioremediation of crude oil in synthetic mineral salt medium enriched with bacterial consortium and *sapindus mukorossi*

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## Abstract

Soil pollution with crude oil is one of the major environmental problem today. Crude oil is a mixture of hydrocarbons which leads reduction in soil microflora. Hence, a necessary step has to be taken to remove oil pollutants from the soil. Several assays were performed to reduce crude oil contaminated soil in lab scale. Bacterial consortium along with *Sapindus mukorossi* absorption studies was performed. It has improved the remediation process upto 70%.

**Keywords:** Crude oil, *Sapindus*, Bioremediation.

## Introduction

Hydrocarbon pollution is one of the major energy concerns creating serious environmental problem resulting in decreased agricultural productivity. Bioremediation by microorganisms can be used to degrade the pollutant which is safe and economical.

## Materials and methods

Hydrocarbon degrading strain was isolated from the oil contaminated sites in Sivakasi, Tamil Nadu. The selected strain was subjected into various oil degradation tests and to analyze the biosurfactant property. Microbial degradation of diesel oil detection and screening of biosurfactant producing isolates was followed by Usharani *et al.*<sup>1</sup>. *Sapindus mukorossi* was used as a bioadsorbent.

## Results and discussion

Collected soil samples were subjected to isolate the soil microbes by pour plating technique. The maximum number of hydrocarbon utilizing bacterial population was observed in 10<sup>-2</sup> dilution in polluted soil using mineral salt medium with 1% diesel oil/ml. Among that, B1 strain shows the highest degradation ability (Figure-1). Based on the morphological and biochemical analysis, B1 strain was identified as *Rhodococcus* Sp.

Various screening methods showed *Rhodococcus* strain and *Sapindus* pericarp powder, it has the ability to produce biosurfactants (Table-1). Compared with chemical surfactant Sodium Dodecyl Sulphate.

Based on FTIR analysis (primary amides), the intensity of the peak is high in *Sapindus* along with *Rhodococcus* (93) than the

*Rhodococcus* alone medium (53). In future analytical studies the degradation level of hydrocarbon will be more get improved.

**Table-1:** Evaluation of Biosurfactant activity.

Experimental substances	Drop collapse assay	Oil displacement assay	Emulsification index
Distilled water	Negative	Negative	----
SDS	Positive	Positive	+++
<i>Rhodococcus</i>	Positive	Positive	+++
<i>Sapindus</i>	Positive	Positive	+++

---- : Negative, +++ : High emulsification

*Rhodococcus* organism produce biosurfactants which degrades hydrocarbon effectively<sup>2</sup>. 65% of trapped oil was removed by *Rhodococcus*, hence utilized for oil recovery<sup>3</sup>. *Sapindus* is used as a natural surfactant 80% of the emulsification activity was observed by *Rhodococcus* in the present study<sup>4</sup>.

## Conclusion

The present investigation indicates that the *Sapindus mukorossi* pericarp along with *Rhodococcus* strain showed greater oil degradation activity.

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