Journal of Bioremediation & Biodegradation
ISSN: 2155-6199
Perspective Open Access

Isolation, Characterization, and Assessment Bioremediation Potential of Hydrocarbon

Manvi Gupta*
Department of Physiology and Biophysics, University of Ningbo, China

Abstract

Oil pollution is currently a global problem. However, microorganisms that can consume petroleum oil and utilise hydrocarbon for their development, nourishment, and metabolic activities are enriched in oil-contaminated environments. In the current work, bacteria from oil-contaminated soil were isolated using the enrichment culture method using Minimal Salt media supplemented with diesel oil and burnt engine oil as the only carbon source. The isolated bacteria were examined for morphology and biochemistry, and they were then identified using a molecular tool and the cycle sequencing approach. Three isolates were identified as being gram-negative, cocci-shaped, and closely related to Pseudomonas species, Acinetobacter species, and Enterobacter species, respectively, according to 16S rRNA sequence analysis. The ideal growth environment was at and temperature. Every isolate was vulnerable.

Keywords: Bioremediation and degradation; Burned engine oil; Petroleum oil

Introduction

A number of antibiotics, and they have no negative effects on the helpful microorganisms in soil [1]. Three isolates were grown in two different diesel oil and burnt engine oil concentrations, respectively [2]. According to the study, all of the isolates' growth rates reduced as the amount of diesel oil in the media increased [3]. In contrast, when the concentration of burnt engine oil increased, the growth rates of all three isolates increased [4]. In our testing, every isolate demonstrated its ability to degrade in diesel oil and 8% v/v engine oil [5]. Therefore, our research unequivocally demonstrates that the isolates may be employed for bioremediation to clean up petroleum-polluted areas. Over the past few decades, there has been a dramatic rise in the use of petroleum products [5]. The world's most popular primary energy sources of biological origin are petroleum products, which are mostly sourced from crude oil [6]. The problem of oil spills is particularly acute in the maritime environment in developing nations with lax environmental laws [7]. The incorrect channelling and discharge of used engine oil into open water is contributing to an increase in environmental contamination day by day [8]. This typically leads to severe ecosystem disruption for both biotic and abiotic environments. Accidental spills and leaks are a common problem that may happen during the manufacturing, refining, transport, and storage of petroleum and petroleum products [9]. The health of plants is also at risk from these hydrocarbon contaminations [10]. Affect the health of humans and animals that are carcinogenic, mutagenic, and have strong immunotoxin effects Vasudeva and Raja ram, Zhou, and Crawford Hydrocarbon pollution of the soil has a significant effect on the local ecosystem since the buildup of pollutants in plant and animal tissues can result in mutated or dead organisms [11].

Discussion

If they are not dealt with right away, the discharge of such petroleum into the environment might result in lasting damage [12]. Local microorganisms in contaminated environments are abundant and can participate in biodegradation [13]. An excellent and efficient method for speeding up the cleanup procedures to repair the polluted environment is biodegradation [14]. Microorganisms that are native to each polluted location exist [15]. Numerous bacterial isolates have the ability to breakdown hydrocarbons, making them sources of carbon and energy. Biological approaches are said to be more affordable than physical and chemical ones for reducing hydrocarbon. Desai and Banat, Hummel, 1997; NE, 1996) generate surface-active agents, such as biosurfactants, which may emulsify hydrocarbons in solution. Biosurfactants facilitate the direct cell biodegradation of hydrocarbons by enhancing their bioavailability. Because biosurfactants make the molecules more accessible to the microbial enzyme system for consumption, long chain hydrocarbons are crucial for microorganisms. Petroleum pollution and oil spills are currently two of the main reasons for environmental vulnerability, and Bangladesh has been particularly badly struck by these issues. As a result of an incident involving an oil tanker and a cargo ship on the On December, Bangladesh had its worst oil leak catastrophe in Shela River in the Sundarbans. Some microbes, including bacteria, may use hydrocarbons as a source of carbon after developing tolerance to them. The bioremediation of oil pollution can make use of certain bacterial strains. Consequently, concentrating on the biodegradation process would be an efficient, affordable, and long-lasting strategy to deal with oil spills or oil pollution in nations with poor incomes like Bangladesh.

Conclusion

Although Bangladesh contains a diverse range of microorganisms, there is very little research on the biodegradation of hydrocarbons there. Therefore, our goal was to find bacteria that could break down diesel oil and burnt engine oil from the polluted location. We next wanted to characterise the bacteria we found and assess how well they could break down hydrocarbons. The usage of these isolates in the A partial identification of the bacterium was made using colony shape and colour. After 48 hours, both spreading and streaking results were seen. Three distinct colonies have been cultivated and identified based

***Corresponding author:** Manvi Gupta, Department of Physiology and Biophysics, University of Ningbo, China, E-mail: ManviGupta34@gmail.com

Received: 02-Feb-2023, Manuscript No. jbrbd-23-86813; **Editor assigned:** 06-Feb-2023, PreQC No. jbrbd-23-86813 (PQ); **Reviewed:** 20-Feb-2023, QC No. Jbrbd-23-86813; **Revised:** 22-Feb-2023, Manuscript No. Jbrbd-23-86813 (R); **Published:** 28-Feb-2023, DOI: 10.4172/2155-6199.1000554

Citation: Gupta M (2023) Isolation, Characterization, and Assessment Bioremediation Potential of Hydrocarbon. J Bioremediat Biodegrad, 14: 554.

on their morphology. The first number was a colony with a yellow colour, the second was a minor colony with a yellow colour, and the third was a colony with a white hue. Gram staining revealed that each and every isolate is gram-negative cocci.

Acknowledgement

None

Conflict of Interest

None

References

1. Austin WH, Lacombe E, Rand PW, Chatterjee M (1963) Solubility of carbon dioxide in serum from 15 to 38°C. J Appl Physiol 18: 301-304.
2. Bauer C, Klocke RA, Kamp D, Forster RE (1973) Effect of 2,3-diphosphoglycerate and H+ on the reaction of O2 and hemoglobin. Am J Physiol 224: 838-847.
3. Buerk DG (1984) An evaluation of Easton's paradigm for the oxyhemoglobin equilibrium curves. Adv Exp Med Biol 180: 333-344.
4. Ellis RK (1989) Letter to the editor: determination of PO2 from saturation. J Appl Physiol 67: 902.
5. Forster RE, Constantine HP, Craw MR, Rotman HH, Klocke RA, et al. (1968) Reaction of CO2 with human hemoglobin solution. J Biol Chem 243: 3317-3326.
6. Hedley Whyte J, Laver MB (1964) O2 solubility in blood and temperature correction factors for PO2. J Appl Physiol 19: 901-906.
7. Hill EP, Power GG, Longo LD (1973) A mathematical model of carbon dioxide transfer in the placenta and its interaction with oxygen. Am J Physiol Cell Physiol 224: 283-299.
8. Huang NS, Hellums JD (1994) A theoretical model for gas transport and acid/base regulation by blood flowing in microvessels. Microvasc Res 48: 364-388.
9. Kelman GR (1966) Digital computer subroutine for the conversion of oxygen tension into saturation. J Appl Physiol 21: 1375-1376.
10. Kelman GR (1966) Calculation of certain indices of cardiopulmonary function using a digital computer. Respir Physiol 1: 335-343.
11. Kelman GR (1967) Digital computer procedure for the conversion of PCO2 into blood CO2 content. Respir. Physiol 3: 111-115.
12. Li Z, Yipintsoi T, Bassingthwaighte JB (1997)Nonlinear model for capillary-tissue oxygen transport and metabolism. Ann Biomed Eng 25: 604-619.
13. Margaria R (1963) A mathematical treatment of the blood dissociation curve for oxygen. Clin Chem 9: 745-791.
14. Margaria R, Torelli G, Pini A (1963) possible mathematical definitions of the O2 dissociation curve from blood or Hb solution. Exp Med Surg 21: 127-142.
15. Riordan JF, Goldstick TK, Vida LN, Honig GR, Ernest JT, et al. (1985) Modelling whole blood oxygen equilibrium: comparison of nine different models fitted to normal human data. Adv Exp Med Biol 191: 505-522.