

Keywords: HydrmT TJ0 Tw (-)Tj0.01 Tw 0 -1.08 Td[(ra)-5 (l h)2.9 (a)8 (b)12 (i)12 (t)-5.9 (a)19 (t w)-3 (i)12 (t)-6 (h h)23 (y)8 (dr)13 (o)-9

tainer which was then transported to the laboratory for microbial analysis.

Isolation, characterization and identification of isolates

10 fold serial dilutions were used to isolate hydrocarbon utilizing bacteria. The bacterial isolates were characterized based on colonial and cell morphology, growth on differential/selective media and biochemical tests which include Gram's reaction, indole tests, methyl red, Voges-Proskauer, citrate utilization, Urea test, utilization of different types of sugars, oxidase and catalase tests. Pure cultures of bacterial isolates were identified on the basis of their colonial morphology, cellular morphology and biochemical characteristics according to the taxonomic scheme of Bergey's Manual of Determinative Bacteriology, as reported by [7].

Determination of the effect of temperature on biodegradation of spent motor oil

The influence of temperature (20°C, 30°C, 40°C, 50°C) on degradation of spent engine oil by bacterial isolates was studied. Each strain was incubated in mineral salts media supplemented with 5% spent motor oil. The bacterial culture was inoculated in conical flasks containing 100 mL of broth oil mineral salts media. Control conical flasks containing the same amount of MSM and spent engine oil but without bacterial culture were prepared. All flasks were incubated for 14 days. N-hexane was used to extract the residue oil. The optical density was read at 620 nm wavelength with UV-Visible spectrophotometer [8].

Determination of the effect of pH on biodegradation of spent motor oil

The effect of hydrogen ion concentration (pH) on growth and degradation of 5% spent motor oil was studied. Mineral salts medium with spent motor oil was prepared adjusting the pH at 5.5, 6.5, 7.5 and 8.5 using 1 N HCl/1 N NaOH. Each strain was incubated in mineral salts media supplemented with 5% spent motor oil. 2% (v/v) of the bacterial culture was inoculated in two conical flasks containing 100 mL of broth oil mineral salts media at different pH (5.5, 6.5, 7.5 and 8.5) set in triplicate. Control conical flasks containing the same amount of MSM and crude oil but without bacterial culture were prepared. All flasks were incubated at 37°C in an orbital shaker at a speed of 200 rpm for 14 days. The residual crude oil was extracted with 50 ml n-hexane. The optical density was read at 620 nm wavelength with UV-Visible spectrophotometer.

Result and Discussion

Isolation, characterization and identification of isolates

Results from the biochemical characteristics of the isolates shows that a total of seven isolates were obtained belonging Phits f

Effect of temperature on biodegrading activities of the bacteria isolate

Ecological factors have been stated to effect the degradation of contaminants by microorganisms [11]. Temperature influences hydrocarbon degradation by affecting the physical and chemical structure of the oil, rate of uptake of hydrocarbons by microorganisms and composition of the microbial community [5]. (Figure 2) [12] Reported that at low temperatures, the viscosity of the oil is increased, alkanes volatilization reduced, and also decreased in water solubility, thus delaying and decreasing the commencement of biodegradation. Hydrocarbon degrading bacteria grow optimally in a range of temperature ranging from 27°C to 37°C. Growth decreases intensely at higher temperature. In this study, the degrading activities of the isolated bacteria as shown in Figure 1, alongside and showed high growth at 30°C, While Bacillus showed maximum growth at 40°C whereas the bacteria isolates shows less growth at low temperature 20°C as well as high temperature 50°C [13]. Reported that high temperatures increase the rates of hydrocarbon uptake to a maximum in the range of 30 to 40°C. Above the temperature of 40°C, degradation of hydrocarbons decreased, which may be attributed to membrane toxicity of hydrocarbons. Extreme Temperature can render microorganisms inactive. The optimum temperature for effective hydrocarbon degradation is normally within the range of 20°C-40°C. Higher temperatures cause proteins denaturation and alter the organism's membrane permeability [13,14].

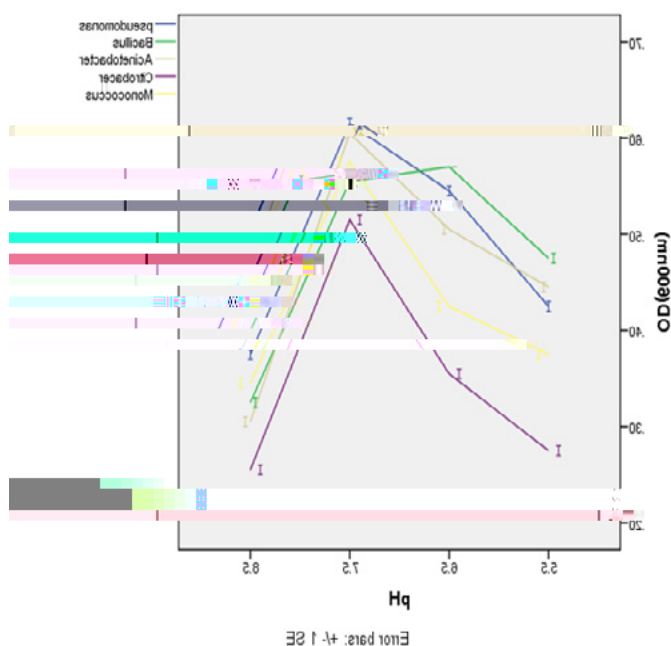


Figure 2: Effect of pH on Biodegrading activities of Isolated Bacteria Strain.

