NANOGOLD PARTICLES AS POTENTIAL INTERFACE AGENTS TO MINIMIZE INTERFACIAL TENSION AND ENHANCE HYDROCARBON DEGRADATION POTENTIAL OF HYDROCARBONOCLASTIC BACTERIA

[1]NARJES H. DASHTI, [2]NEDAA Y. ALI AL-SARRAF, [3]VINEETHA M. CHERIAN, [4]MAGDY S. MONTASSER

[1,2,3,4]Department of Biological Sciences, College of Science,, Kuwait University, P.O. Box 5969, Safat 13060, Kuwai
E-mail: [1]narjes.dashti@ku.edu.kw

Abstract -
Gold nanoparticles (GNPs) have unique properties that allow them to modify surfaces with a variety of functional ligands. This makes them ideal as potential interface agents that can mimic the biosurfactant molecules produced by certain microbes thus reducing interface tension and promoting effective adsorption and degradation of these substrates. At this stage of the study the aim was to determine the effect of GNPs as an interface agent in improving the hydrocarbon utilization abilities by biosurfactant and non-biosurfactant producing bacterial strain isolated previously. Only four isolates were chosen, two from sea water and two from soil. The hydrocarbon consumption capability of the isolates was determined by exposing them to various GNP concentrations. Apparently, GNPs enhanced oil consumption by the four selected bacterial isolates but decreased growth in all except *Shewanellaoneidensis*. GNPs clearly promote oil degradation, that substantiate their role as an interface agent, lowering the interfacial tension of hydrophobic oil and increasing bacterial oil consumption. Moreover, the study of GNPs concentrations influences on the morphological properties of two bacterial isolates using TEM, revealed that cells aggregated together by a sheet film in the biosurfactant *Pseudomonas songnenensis,* but not in the non-biosurfactant producing *Nitratireductoraquimarinus* strain.

Keywords - Hydrocarbonoclastic bacteria, AuNPs, Bioremediation, Hydrocarbon degradation