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## Identification and characterization of Cyanophages in Kuwaiti seawater using polymerase chain reaction (PCR) technology and nanoscopy

Viruses in general and bacteriophages infecting cyanobacteria (cyanophages) in particular, are abundant in the marine environment and are of major ecological significance. Marine phytoplankton's are photosynthetic free floating organisms that are major contributor to primary productivity in marine environment as a part of the balance of the marine ecosystem. Many phytoplankton's can cause occasional blooms (such as red tides caused by dinoflagellates) that might be of harmful effects on the environment, and even have economic effects on fisheries and the fish industry. Such red tides, that kill fish in a huge number, have been reoccurring in Kuwaiti seawater in the past decade and it might be seen again in the future. Viruses are considered to be a major controlling factor for phytoplankton populations and blooming. This cyanophages were successfully detected and phage DNA molecules were isolated by using polymerase chain reaction (PCR) technology in as little as 1 ul of Kuwaiti seawater directly. Specific primers were used in PCR mix, and 6% polyacrylamide gel electrophoresis (PAGE) was used to visualize the amplified phage DNA bands. Nanoscopy was used to detect and study the structure of the isolated phages and it was identified to be a virulent strain of phage, with T4 being the type species of the family of contractile tailed ds DNA phages composing the family *Myoviridae*.

**Figure:** Electron micrographs showing the structure of the cyanophage particles isolated from Kuwaiti seawater (A). Cyanophage particles showing the typical structure of phage composing the family *Myoviridae* (B). Phage particles as viewed in a Jeol JEM transmission electron microscope at 80 kV after negatively stained with 3% phosphotungestic acid solution for 1 min.

## Recent Publications

1. N Dashti, N Ali, M Khanafer, and S S Radwan (2017) Oil uptake by plant-based sorbents, and its biodegradation by their naturally associated microorganisms. Environmental Pollution 227:468-475.

2. N Ali, N Dashti, S Salamah, N A Sorkhoh, H Al-Awadhi and S S Radwan (2016) Dynamics of bacterial populations during bench-scale Batch bioremediation of oily seawater and desert soil bioaugmented with Coastal Microbial mat. Microbial Biotechnology 9(2):157-71.

3. N Ali, N Dashti, S Salamah, H Al-Awadhi, N A Sorkhoh and S S Radwan (2016) Autochthonous bioaugmentation with environmental samples rich in hydrocarbonoclastic bacteria for bench-scale bioremediation of oily sea water and desert soil. Environmental Science and pollution Research 23(9):8686-98.

4. N Dashti, N Ali, M Khanafer, H Al-Awadhi, N A Sorkhoh and S SRadwan (2015) Olive-Pomace harbors bacteria with the potential for hydrocarbon-biodegredation, nitrogen-fixation and mercury-resistance: promising material for waste-oil-bioremediation. Journal of Environmental Management 155:49-57.

## Biography

Narjes H Dashti works as an Associate Professor of Microbiology in the Department of Biological Sciences, Faculty of Science at Kuwait University. She has completed her Bachelor's degree in Soil Microbiology at Kuwait University. Afterwards, she took her Master's degree in the same field at Oregon State University, USA followed by a PhD at McGill University, Canada. Her research interests include plant pathology, virology, soil microbiology, microbial bioremediation and hydrocarbon degradation. She has over 21 publications, 2 chapters Chapter Titled" PGPR to Alleviate the stress of Suboptimal Root Zone Temperature on Leguminous Plant Growth", in the book *"Use of Microbes for the Alleviation of Soil Stress",* volume 1, 2013, Springer, Chapter Titled" Soybean production and suboptimal root zone temperatures" in the book *"Environmental Stresses in Soybean Production"* 2015 Elsevier, academic press, volume 1. She has presented many of her finding in both national and international conferences.

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