Gulf of Mexico has greater-than-believed ability to self-cleanse oil spills

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The Gulf of Mexico may have a much greater natural ability to self-clean oil spills than previously believed, according to Terry Hazen, University of Tennessee-Oak Ridge National Laboratory Governor's Chair for Environmental Biotechnology.

The bioremediation expert presented his Deepwater Horizon disaster research findings at the 245th National Meeting and Exposition of the American Chemical Society (ACS), the world's largest scientific society.

Hazen conducted research following the 2010 Deepwater Horizon disaster, which is estimated to have spilled 210 million gallons of oil into the Gulf of Mexico. His research team used a powerful new approach for identifying microbes in the environment to discover previously unknown and naturally occurring bacteria that consume and break down crude oil.

"The Deepwater Horizon oil provided a new source of nutrients in the deepest waters," said Hazen. "With more food present in the water, there was a population explosion among those bacteria already adapted to using oil as a food source. It was surprising how fast they consumed the oil. In some locations, it took only one day for them to reduce a gallon of oil to a half gallon. In others, the half-life for a given quantity of spilled oil was six days."

This data suggests that a great potential for intrinsic bioremediation of oil plumes exists in the deep sea and other environs in the Gulf of

Mexico. Oil-eating bacteria are natural inhabitants of the Gulf because of the constant supply of oil as food.

Hazen's team used a novel approach for identifying previously recognized kinds of oil-eating bacteria that contributed to the natural clean up of the Deepwater Horizon spill. Instead of growing the microbes in a laboratory, the team used "ecogenomics." This approach uses genetic and other analyses of the DNA, proteins and other footprints of bacteria to provide a more detailed picture of microbial life in the water.

"The bottom line from this research may be that the Gulf of Mexico is more resilient and better able to recover from oil spills than anyone thought," Hazen said. "It shows that we may not need the kinds of heroic measures proposed after the Deepwater Horizon spill, like adding nutrients to speed up the growth of bacteria that break down oil or using genetically engineered bacteria. The Gulf has a broad base of natural bacteria, and they respond to the presence of oil by multiplying quite rapidly."

More information: Abstract

Deepwater Horizon oil spill: A systems biology approach to an ecological disaster

The explosion on April 20, 2010 at Deepwater Horizon drilling rig in the Gulf of Mexico resulted in oil and gas rising to the surface and the oil coming ashore in many parts of the Gulf, and in the dispersment of an oil plume 4,000 feet below the surface of the water. Despite spanning more than 600 feet in the water column and extending more than 10 miles from the wellhead, the dispersed oil plume was gone within weeks after the wellhead was capped – degraded and diluted to undetectable levels. Furthermore, this degradation took place without significant

oxygen depletion. Ecogenomics enabled discovery of new and unclassified species of oil-eating bacteria that apparently lives in the deep Gulf where oil seeps are common. The results provide information about the key players and processes involved in degradation of oil, with and without COREXIT, in different impacted environments in The Gulf of Mexico.

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