

Microbial technology increases by 26% the recovery of hydrocarbons in oil wells

January 26 2016



Doctor in biotechnology Patricia Olgún Lora

Using microbial technology, the Mexican Oil Institute (IMP) aims to increase the hydrocarbon recovery factor in extraction wells.

The technology of hydrocarbons [recovery](#) using microbes (IMP-RHVM) consists of using microorganisms found in [oil](#) samples and which already produce metabolites like carbon dioxide, solvents and acids to increase the recovery factor.

In Mexico, where [hydrocarbon extraction](#) is performed with primary and secondary technologies (corresponding to the natural flow and water injection), about 30 percent of oil is obtained, meaning that 70 percent remains in the reservoir. Hence the importance of such methods, says Patricia Olguin, project leader.

She reports that the research lies in cultivating microorganisms in the laboratory of Biotechnology and Hydrocarbons Recovery at the IMP from samples obtained from wells.

They are adapted to the conditions of the reservoir, temperature, salinity, pH, and the production of metabolites such as [carbon dioxide](#), solvents and acids, which are the precursors for the extraction of oil. Once the appropriate formulation is obtained, simulation models are performed with the well environment.



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Because the technology is based on a specific design for each site in terms of oil type and conditions, studies should be performed to analyze the characteristics of salinity, water and oil type and thus to define the optimal conditions for its application.

"Cultured organisms can withstand temperatures of up to 95 degrees Celsius, salinity from zero to 200,000 parts per million," says the researcher.

This technology is a project of the Research Fund for the IMP, which began in 2006 and is led by biotechnologists Patricia Olguin, Gladys Castorena, Teresa Roldan and petroleum engineer Andrés Moctezuma.



Recovery process

Dr. Olguin says that the formula developed by the IMP to validate and develop the technology, was tested in a Pemex well in the south of Mexico in March of 2015, where increased [oil recovery](#) was observed for three months and a score of 26 percent was obtained.

The test consisted of performing two injections of the formula of a hundred cubic meters each and the production of oil, gas and composition in the well was monitored.

To date, the technology RHVM has registered six patents. Two in Canada, two in Mexico and two in the United States. "Mexican patents

are the first to be authorized in the USA in the area of oil recovery by biotechnological processes," says Patricia Olgúin.

From these patents, one is regarding the development of a biotechnological process for recovering hydrocarbons in low permeability porous media (light oil), and the other regarding heavy hydrocarbons (heavy oil).

Now that the last stage was completed and its effectiveness was proven, researchers seek to transfer the technology to a business to implement it in various fields and thus start its mass production.

Provided by Investigación y Desarrollo

Citation: Microbial technology increases by 26% the recovery of hydrocarbons in oil wells (2016, January 26) retrieved 21 June 2024 from <https://phys.org/news/2016-01-microbial-technology-recovery-hydrocarbons-oil.html>

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