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New nanofiltration technology successfully removes heavy metals in water

(*Nanowerk News*) The methods traditionally used to remove heavy metals from wastewater have limitations because they only withdraw a certain percentage and the remaining amount is very difficult to remove. This motivated a young graduate researcher at the National Polytechnic Institute (IPN) in Mexico, Gabriel Ramirez Monter, to create a technology capable of removing such contaminants at low cost and with an efficiency that surpasses existing technologies.

According to Monter Ramirez, this project led him to design some structures called dendrimers, which are highly branched molecules with shape similar to a shrub or a tree with multiple branches.

"Dendrimers adhere and spread on a microfiltration membrane; ie, thin sheets of porous material that are not normally capable of retaining heavy metals due to its pore size. Once placed, it achieves total removal of heavy metal ions in the same way a marine anemone would act, using tentacles to concentrate and catch food; in this case, the branches of the dendrimers capture pollutants, "says the researcher.

He explains that through dendrimers the team converted a microfiltration membrane into a nanofiltration one. "Another advantage of these structures is that they can be washed and reused, plus the captured metals are removed without problem."

Highlighting his business plan, which he called "Nanoestructurados Bromelia", it integrates his master's work, led by Dr. Irina Victorovna Lijanova attached to the Centre for Research and Technological Innovation (CIITEC) of the IPN, which has optimized technologies for removal of heavy metals.

Currently, the entrepreneurial project is linked to the company "Nanotecnología México" that specializes in nanomaterials with applications for the environment and is a leading provider of Mexican Oil (Pemex) in the refining area for sewage cleanup. "The firm was interested in the development of this technology and its commercialization," said Monter Ramirez.

"In Mexico, the problem of heavy metals is associated with industrial progress and important economic activities such as mining or even the oil industry, in both refining and petrochemicals; those are the markets we want to focus on," he stresses.

Source: *Investigación y Desarrollo*

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