A new analysis system to identify pollutants from cosmetics in seawater

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A University of Cordoba research group has designed a method to detect the presence of pollutants in seawater in a faster and more efficient way, and also at very low concentrations.

Specifically, the focused on several substances used as preservatives in soap, lotion and deodorant, which end up in the sea. Concerns about parabens and triclosan have been voiced from across sectors, and the European Commission has been monitoring these substances and limited their use. Parabens and triclosan keep bacteria and fungi from damaging shampoo and toothpaste, but they become a real problem once they get to the sea, where they affect the marine ecosystem. Identifying their presence contributes to the design of measures that correct their effects. This is the idea behind the work on the system designed by the University of Cordoba.

The key to this new method based on nanotechnology is the system known as Lab-on-Valve, used by the scientific community for sample analysis. More specifically, the research team led by Analytical Chemistry Professor Marisol Cárdenas has added carbon-coated titanium dioxide nanotubes to this system. Previously, the use of nanomaterials in the Lab-on-Valve system was not possible due to their tendency to aggregate in aqueous media. In this case, the University of Cordoba research group was able to synthesize nanoparticles with easy dispersion that were compatible with the Lab-on-Valve system.

The new system was recently described in the journal *Analytical*

Chemistry. The study's primary author, University of Cordoba researcher María Teresa García Valverde, says, "The combination of the Lab-on-valve system, titanium nanotubes modified with amorphous carbon as phase extraction and the measuring tool connected to the system, allows for quantifying parabens and triclosan at very low concentrations." For the most part, these pollutants come from personal hygiene products such as soap, sunscreen, toothpaste and other toiletries. All of them have very negative effects on the environment.

García explained that with the Lab-on-Valve system, the nanotubes are manipulated automatically, which reduces errors in measurement and "their nanometric size makes them more efficient than other adsorbent solid materials on the market." She added, "this method is faster, more practical and more efficient."

Provided by University of Córdoba