

Olive-oil industry waste used for countless applications in chemical and food industries

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A team of researchers from the department of Chemical Engineering at the University of Granada (UGR) has successfully used some of the waste produced in the olive-oil industry to elaborate surface active agents, specifically biosurfactants and monoglycerids, which are molecules with countless applications in the chemical and food industries.

It's the first time alperujo has been used for the production of biosurfactants, molecules of biological origin that possess excellent environmental compatibility and have many applications in fields such as cosmetics, medicines, food, detergents and the natural environment.

Surface [active agents](#), or surfactants, are molecules with a liposoluble section and a hydrosoluble section. The partial solubility in both oil and water allows the surfactant to occupy the interface. This reduces surface tension and interface tension between individual molecules, and it has emulsive properties.

Alperujo is the waste generated during olive oil extraction by the two-phase method. Although the implementation of this system has significantly improved the environmental impact associated with the production of olive oil by merging and reducing waste streams, alperujo is still a first-class environmental and management problem for the regions where oil is elaborated, due to its polluting load and the immense quantities in which it is produced.

Used cooking oils are also generated in great quantities in restaurants, hotels and homes. Even when there are companies authorized for its collection, it's difficult to find a use for this contaminating byproduct.

Nowadays, both waste products are being used for energy production, either by direct combustion (alperujo) or by its previous conversion into fuel (cooking oil). Because of that, UGR researchers aim to give them an added value, as mentioned above.

For the conversion, the researchers used biotechnological methods. They fermented alperujo using the same microorganisms used for producing biosurfactants in collaboration with two teams of researchers from Ulster University (North Ireland) and the Regional University of Blumenau (Brazil). The researchers have produced these substances using strains of *Bacillus subtilis* and *Pseudomonas aeruginosa* and alperujo as the source of carbon. This may be a breakthrough for obtaining biosurfactants at a lower cost.

Used cooking oil has been converted into monoglycerides and diglycerides by enzymatic hydrolysis, which offers very light reaction conditions. The process has been carried out in microemulsion, a nanostructured system with high interfacial area, which makes it possible to maximize enzyme action.

Provided by University of Granada

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