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Nationality: Spanish

Orientation: Sustainable Use of Marine Resources
Specialization Area: Transformation and Valorization
Research Area: 2.16 New products of marine origin

PhD project: **Extraction of lipases from thermophiles and halophiles using ionic liquids**

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Summary: Currently, a great academic and industrial interest has been devoted to the finding of new sources of lipolytic enzymes, since they are the third most important group of biocatalysts after proteases and amylases. The reason behind this interest is their versatility to be applied in a plethora of fields such as the detergent, oil, food and pharmaceutical industries. Lipase-catalyzed are often carried out under extreme operating conditions (pH, T, salt concentration, etc.), so the search of new extremophilic strains showing high lipolytic activity levels is an issue in the limelight. In this sense, the implementation of greener processes for the production of this kind of enzymes is the focal point around which the whole thesis is planned. Thus, the use of ionic liquids, emerging neoteric solvents with promising potential in different sectors, as potential extraction solvents for the downstrean stages has been proposed in this work. There are a number of recent research works that refer to the activity and stability of commercial lipases in various ionic liquids, and it has been reported that most hydrophilic ionic liquids cause considerable enzyme deactivation.
Then, we have hypothesized that the use of enzymes from extremophilic microorganisms (both thermophilic and halophilic) could be more suitable to operate under the presence of these molten salts. Once the production process has been optimized, the effect of ionic liquids (including conventional families, like imidazolium, pyridinium, pyrrolidinium and phosphonium, and third generation ionic liquids such as ammonium) at a structural and biocatalytic level will be tackled.