RESEARCH PROJECT

Valorization of seashell wastes by mechanical, physical and chemical treatments.

Seashells consist mainly of calcium carbonate (CaCO3, > 95 wt.%) and are one of the most abundant by-products of the food industry, with generally little or no commercial value [1,2]. The valorization of these residues could represent an interesting platform in circular economy system for the development of high added value compounds with sanitary, financial and environmental advantages [3-5]. For instance, the valorization of seashells will help to decrease the disposal costs of the fishery industry by-products [6-7], as well as to mitigate the pollution problems related to the illegal dumping of unmarketable seashells in open seas [8,9].

In this respect, the objective of the present project is to produce CaCO3-based materials from the circular economy of seashells, that could be used for different applications, such as:

* Technical ingredients for personal care capable of replacing synthetic polymers
* Fillers in synthetic and natural polymers and/or other category of materials
* Natural and advanced materials for application in the conservation and restauration of cultural heritage
* Materials for paintings and coatings
* Liming agent and soil amendant for agronomic applications

To achieve this goal, within the project will be developed green and easily scalable methods for the extraction of CaCO3 from seashells and for the tailoring of the physical-chemical properties of the materials in view of each application. Different synthesis and characterization techniques including, but not limited to, wet precipitation and sonochemical synthesis, acid etching, ICP-OES, XRD, TGA, DLS and IR, will be employed.

The majority of the research activity will be performed at the Institute of Science and Technology for Ceramics (ISTEC) in Faenza (Ra).

References:

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