PLA nanocomposites with antimicrobial action, based on encapsulated natural extracts for food packaging applications

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Composite packaging can take many different forms, and its use is increasing the last years; a tendency largely due to the many cost and efficiency benefits that can be offered in the supply chain. The potential use of composites based on PLA in packaging applications exhibiting antimicrobial action, has been investigated in recent years, as presented by Tawakkal (2014) et al. and Becerril et al. (2020) in their reviews [1, 2]. Generally, polymeric composite materials can be fabricated with various techniques including printing and roll-milling techniques. In this work, a roll-mill system was employed, a technique allowing the easy and effective mixing ~~of materials,~~ in order to get composite materials. The composite materials were produced by mixing encapsulated natural extracts with polylactic acid (PLA) in a pellet form. The composite materials were characterized using SEM, XRD and Raman spectroscopy and their antimicrobial activity was evaluated using a modified Kirby-Bauer methodology. The antimicrobial efficiency of the composite materials was found quite effective; ~~and~~ depending on the type and the concentration of the active material.

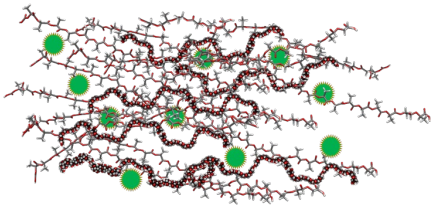

Figure 1: Schematic representation of PLA-encapsulated natural extracts composite material

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