



DEVELOPMENT OF NOVEL PACKAGING SOLUTIONS BASED ON PLA NANOCOMPOSITES

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During the last years, there has been a great interest in the reinforcement of polymers using clays to obtain nanocomposites with increased mechanical and thermal properties, and low permeability. In addition to this, market is demanding a change in materials used moving to more sustainable raw materials. Biodegradable materials are being gradually introduced in the packaging market, for different applications. For food packaging applications the use of biopolymers makes necessary an improvement of properties, that can be achieved with the preparation of biopolymer nanocomposites. Most of this research has been carried out using layered silicates like montmorillonite. Montmorillonite is one of the most interesting layered silicates since it is easy to functionalize its surface due to the high Cation Exchange Capacity (CEC), and surface area. Cation exchange processes are carried out easily and therefore modified montmorillonites are obtained. When these clays are used for food packaging applications special concern should be taken into account with the selection of modifiers. In this work, sodium montmorillonite is used for its functionalization for with food compliant modifiers. Clays obtained are characterized, and differences are evaluated. After that, different biodegradable nanocomposites based on PLA have been developed with the clays prepared. Nanocomposites have been characterised comparing the results with the nanocomposites prepared with unmodified clays and raw PLA. Finally, prototype packages have been produced in order to evaluate the properties achieved, and to corroborate their suitability in food packaging application considering also food safety issues.