Bionanocomposites as sustainable materials for food packaging

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Biodegradable biopolymers are sustainable alternatives to conventional plastics for food packaging applications. To compete with synthetic polymers biopolymers needs to meet the requirements of cost-effective materials ensuring the mechanical and gas barrier characteristics of food packaging. Additionally, it is demanded to step towards active packaging, which means that packaging material need to interact with the food product to enhance its shelf life, contributing to reduce food waste. In this context, polysaccharides have been exploited to develop biodegradable films due to their functional and sustainable characteristics and the use of different fillers, such as clays, metal oxide particles, calcium carbonate, and graphene derivatives, bring great challenges to the field of active food packaging [1].
The combination of the fillers, namely reduced graphene oxide (rGO), multiwalled carbon nanotubes (MWCNT), microalgae biomass, and zinc oxide, to design new formulations based on polysaccharides (starch, alginate and chitosan) allow to produce biomaterials with enhanced mechanical and barrier properties, conferring functional properties as antioxidant capacity, antimicrobial activity and/or electrical conductivity [2-5]. Electrical conductivity is a required property for the processing of food at low temperature using electric fields (Figure 1). Therefore, these bionanocomposites have a great potential as innovative and active food packaging.

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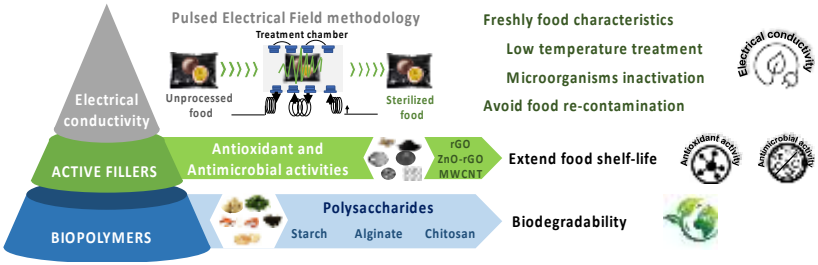

Figure 1: Electrical flexible bionanocomposite development.

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