

Elaboration of films from plant residues: a more sustainable alternative to the environment

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Traditional food packaging is usually made of petroleum-based plastics and this type of packaging is nonrenewable and nonbiodegradable [1]. Thus, the increase in research involving eco-friendly packaging, such as the production of biodegradable films, has been increasing [2]. Plant agro-industrial wastes, such as peels, stalks and bagasse, have been studied as sources of bioactive compounds to act as antimicrobial, antioxidant, aromatic and/or indicative agents [3], and may also be used as sources of polymeric matrices to develop films.

Thus, the main objective of this work was to develop films using plant biomass residues, obtained from production of eucalyptus, licorice, thyme and sage extracts, as a polymers source. The plant residues were characterized and different films were produced. For this, residues (1%), alginate (1%) and glycerol [1% (v/v)] were used to develop films. Then, the antimicrobial activity of the films was tested against bacterial species *Escherichia coli* and *Staphylococcus aureus*.

The results showed that the residues consist, mostly of insoluble fibers ranging from approximately 55% to 79%, with lignin being the main constituent ranging from approximately 33 to 50%. Furthermore, it was possible to obtain films from plant residues, but the formulations need to be improved to assign better characteristics (physical and mechanical) to the films. The films did not show antimicrobial activity against the tested strains.

Nevertheless, the developed films can be considered potential solutions to be applied as biodegradable active packaging. However, more studies are needed to support this hypothesis, especially with the addition of natural antimicrobials. In addition, the use of these residues for film's production is a more sustainable alternative to the environment than conventional plastics and even adds value to plant agro-industrial wastes.

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