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Choline chloride and citric acid mixture- A green alternative for the preparation of chitosan based films

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Non-biodegradable plastics are one of the top environmental threats faced by terrestrial and marine ecosystems. In the field of food packaging, alternative bio-based plastics have been deeply researched because of their good biodegradability, biocompatibility and the abundance of biomass resources. In this sense, polysaccharides such as starch, cellulose and chitosan are the main polysaccharides used for the manufacture of bioplastics and as such, can be used as barrier materials in food packaging. In the particular case of chitosan biofilms, an important drawback is their high moisture sensitivity and its impact on the packaged foods. Efforts to solve this issue (e.g. addition of plasticizers, use of chemically-modified chitosans, etc.) led to poorer biodegradability, potential food contamination, and/or degradation of the mechanical properties.

We present an innovative and to the best of our knowledge, unexplored approach based on the use of environmentally friendly low-melting mixtures recently referred to as Natural Deep Eutectic Solvents (NADES) which are expected to play the role of biodegradable "plasticizer". Specifically, we report on mixtures of chitosan / choline chloride / citric acid (CHIT/ChCl/CA) for the fabrication of transparent films by compression molding. Formulations were optimized for best mechanical properties. The plasticizing capacity of the selected eutectic mixturewas evaluated by assessing the mechanical, water resistance, microstructure properties of the films and comparedwith films prepared using just CHIT/CA in the formulation at optimized processing conditions. As results, CHIT/ChCl/CA films were significantly different from those using just CA. Brittle structure of chitosan/CA films was improved by ChCl incorporation in the polymer blend.

Biography

Hiléia K S Souza received her PhD from the Chemistry Department of the Faculty of Sciences, University of Porto. Currently she is a Research Assistant at the REQUIMTE- Laboratório Associado para a Química Verde, Tecnologias e Processos Limpos at the University of Porto. Her main research interests now are centered on the study of biomolecules (polysaccharides and proteins) with interest for the food industry. She has published more than 25 papers in international peer reviewed journals. She presented her results in many scientific meetings in the form of poster or invited talks.

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