Biopolymer-based films containing emulsified active ingredients as coatings for cellulosic packaging: a review

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ABSTRACT

Cellulose materials (paper and paperboard) have been gaining prominence and importance in the food packaging scenario. They are from a renewable source, biodegradable, and produced with relatively low cost. However, these materials have a poor barrier and mechanical properties. To overcome these weakness, plastic or aluminum-based coatings have been applied over these materials. Nevertheless, these composite materials are not biodegradable and are difficult to recycle, resulting in greater environmental impact. Motivated by this, researchers have searched by alternative base for coating cellulosic material. An example of this is the application of coatings based on natural biopolymers, which are biodegradables. However, biopolymers are also sensitive to moisture. In an attempt to solve this problem, there is growing interest in incorporating non-polar components and/or nanoparticle fillers into the coating-forming solution and thus developing an active and innovative packaging. Studies have shown that bioactive components, such as essential oils, added after emulsification into biopolymer-based coating solutions applied to cellulosic materials positively improved their moisture barrier and mechanical properties, and antimicrobial and antioxidant activities. In addition, the use of nanocomposites strengthens the biopolymer structure and can offers remarkable antimicrobial functions to cellulosic material. In this context, this paper will review current knowledge of the progress of the application of natural biopolymer-based coatings combined with bioactive components and/or nanoparticle loading on cellulosic packaging. More understanding of how the coating is developed and applied will allow for improvements of this material and extend the shelf life of the food.

Keywords: Paper, paperboard, sustainability, biopolymers, bioactive components.

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