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Prospective on the use of bacterial cellulose as an antimicrobial edible film

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Food and beverage packaging has been the target of an intensive conceptual revolution in the past twenty years, moving further away from the mere passive barriers highly dependent on petrochemical-based raw materials. The recent trends of the state of the art food packages consist of smart packages that are preferentially *green* manufactured due to environmental concerns, and edible, making it more practical to consume and simultaneously minimizing the resultant waste. Some of these smart packages are able to diagnose and inform "in real-time" the consumer/retailer of the encased food's quality (*intelligent packaging*). Other packages are responsible for an active interaction with the food or food's atmosphere increasing the products shelf life, improving its organoleptic and/or health properties (*active packaging*). The food and beverage packaging market is estimated to represent 1 trillion dollars by 2015 in the United States alone, making this field of research an interesting area to explore.The main goal of this work is to produce a novel edible packaging film with antimicrobial properties. The purpose of including a food grade antimicrobial compound is to delay the growth of microbial flora and thus increasing the food's safety and delaying its spoilage. For the packaging main raw material we have chosen the bacterial cellulose, which may represent an interesting alternative to the classic plastic casings, since this natural biopolymer possess a high toughness (Young's modulus of approx. 15 - 35 GPa), a low density (1.25 g cm^{-3}), a high crystallinity (95%), it is biocompatible, is highly pure (total absence of hemicelluloses and pectin's), provides a high surface area for modification (37 m^2g^{-1}), and finally, its low cost. As food-grade antimicrobial compound we selected the lactoferrin, a bilobar iron binding glycoprotein with a widely reported bactericidal effect. Different approaches are being used to covalently bind the protein onto bacterial cellulose. The preliminary antimicrobial effectiveness of the modified bacterial cellulose films is assessed by inhibition halo tests.