ANTIMICROBIAL PROPERTIES OF WHEY PROTEIN/GLYCEROL EDIBLE FILMS INCORPORATED WITH ORGANIC ACIDS SALTS

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The use of edible films to release antimicrobial constituents in foods is a form of active packaging that contributes to extend the shelf-life of a product providing microbial safety for consumers. Potassium sorbate (PS), sodium benzoate (SB) and sodium propionate (SP) have been widely used as safe food preservatives to control growth of food pathogens. In this study, 0.25%, 0.50%, 0.75% and 1.0% of the organic salts were incorporated into whey protein concentrate (WPC)/glycerol (Gly) edible films obtained at pH 5.2. Films biocide properties against \textit{Escherichia coli} O157:H7 ATCC 43895 were evaluated using the diffusion agar test and two barrier tests (qualitative and quantitative). The relationship between films antimicrobial properties and bacterial concentration was also evaluated, using low and high inocula. The diffusion test showed that PS and SB incorporation into WPC/Gly films reduced or inhibited the growth of the \textit{E. coli} on Mueller-Hinton agar, except when PS content was 0.25%. These effects were higher as the organic salt concentration increased and more evident as the bacteria inocula decreased. No inhibition was observed when films were incorporated with SP. Results of the quantitative barrier test showed that PS and SB provided excellent barrier properties at concentrations above 0.50 and 0.25%, respectively. The results of the qualitative and quantitative barrier tests were in agreement with the diffusion agar assay. In conclusion, acidic WPC/Gly edible films incorporated with PS or SB may be useful to inactivate post-processing contaminants on foods, suggesting promising applications in the food packaging industry.