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Improvement of antimicrobial activity of edible films with celery essential oil

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Kefiran is a water-soluble microbial polysaccharide produced by microorganisms present in kefir grains, with several health promoting properties. In the present work, the effects of incorporation of the celery essential oil on kefiran edible-film properties were evaluated. The use of protective edible films on the surface of food products represents a new approach to solving these problems. Currently, they are applied onto various food products to prevent or delay microbial growth, enzymatic and oxidation processes, moisture loss and thus, to extend their shelf-life. Bioactive compounds can be incorporated into edible films to improve the food sensory attributes, functionality, storage stability, and safety. The obtained kefiran films were transparent, brittle and their surfaces were smooth without pores. New edible films containing celery essential oil showed higher antibacterial activity. The minimum inhibitory concentration method was used to determine the antibacterial activities of kefiran edible films against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella typhimurium* and *Enterococcus faecalis*. The kefiran films were more effective ($p < 0.05$) against three of the five tested bacteria. The obtained kefiran edible films incorporated with celery essential oil showed great potential to be used for active food packaging due to its excellent antibacterial activity.

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