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Alginate Based Nanocomposite for Microencapsulation of Probiotic: Effect of Cellulose Nanocrystal (CNC) and Lecithin

Tanzina Huq¹, Carole Fraschini², Avik Khan³, Bernard Riedl⁴, Jean Bouchard², and Monique Lacroix^{1*}

¹Research Laboratories in Sciences Applied to Food, Canadian Irradiation Centre (CIC),

INRS-Institut Armand-Frappier, 531 Boulevard des Prairies, Laval, Québec, H7V 1B7, Canada

²FPIInnovations, 570 Boulevard St. Jean, Pointe-Claire, Québec, H9R 3J9, Canada

³Limerick Pulp and Paper Centre, Department of Chemical Engineering, University of New Brunswick, Fredericton, NB, E3B 5A3, Canada.

⁴Département des sciences du bois et de la forêt, Faculté de foresterie, géographie et géomatique, Université Laval, Québec, G1V0A6, Canada

Highlights

- The nanocomposite microbeads were prepared by ionotropic gelation method.
- Addition of CNC improved the viability of probiotic during freeze drying.
- CNC increased the tensile strength of alginate microbeads.
- The optimized microbead improved the viability of probiotic during gastric passage.

Abstract: Probiotic (*Lactobacillus rhamnosus* ATCC 9595) was encapsulated in alginate-CNC-lecithin microbeads to produce nutraceutical microcapsules. Addition of CNC and lecithin in alginate microbeads (ACL-1) was improved the viability of *L. rhamnosus* during gastric passage and storage. The compression strength of the freeze-dried ACL-1 microbeads improved 40% compared to alginate microbead alone. Swelling studies revealed that addition of CNC and lecithin in alginate microbead decreased (around 47%) the gastric fluid absorption but increased the dissolution time by 20 min compared to alginate microbeads (A-0). During transition through the gastric passage, the viability of *L. rhamnosus* in dried ACL-1 microbeads was increased 37% as compared to A-0 based beads. At 25 and 4°C storage conditions, the viability of *L. rhamnosus* encapsulated in ACL-1 microbeads decreased by 1.23 and 1.08 log respectively, whereas the encapsulation with A-0 microbeads exhibited a 3.17 and 1.93 log reduction respectively.

KeyWords: Cellulose Nanocrystals; ; ; , Probiotic, Microcapsule, Alginate, Freeze Drying.

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