

# DEVELOPMENT OF A NOVEL PROBIOTIC-FORTIFIED SOY ENERGY BAR CONTAINING DECREASED $\alpha$ -GALACTOSIDES

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## ABSTRACT

Soy foods have been recognized as functional, healthful foods. However, the presence of soy oligosaccharides ( $\alpha$ -galactosides) causes intestinal bloating and flatulence, which compromise the favorable properties of soy foods. This research aimed to develop innovative soy energy bars containing functional probiotics. The probiotics are added as an additional health beneficial ingredient and to reduce  $\alpha$ -galactosides upon consumption.

The probiotic bacterium, *Lactobacillus acidophilus* LA-2, when induced by raffinose, produced a high level of  $\alpha$ -galactosidase activity at  $5.0 \times 10^{-3}$  U/mg. Microencapsulation was applied to protect the probiotics, and the combination of  $\kappa$ -carrageenan and inulin with the proportion of 1.9:0.1 (w:w) as capsule wall materials, significantly retained the viability of the probiotics through freeze-drying ( $P \leq 0.05$ ). The microencapsulated cells were subsequently frozen at  $-20^{\circ}\text{C}$  overnight and freeze-dried. Scanning electron microscopic images confirmed that the morphology of the microcapsules was well preserved after freeze-drying.

Further, innovative soy energy bars containing microencapsulated *L. acidophilus* LA-2 were manufactured and their shelf life was analyzed during a ten-week storage under vacuum packaging in the dark at both  $4^{\circ}\text{C}$  and room temperature. Compared with room temperature storage, the  $4^{\circ}\text{C}$  storage condition preserved the soy energy bars with their original properties better.