

EFFECT OF SODIUM ALGINATE - RICE BRAN ENCAPSULATION ON VIABILITY AND STORAGE STABILITY OF *LACTOBACILLUS RHAMNOSUS* GG IN COLD BAEL (*AEGLE MARMELOS* L. CORREA) FLOWER DRINK

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Plant-based probiotic drinks have recently been developed for vegetarians and people with lactose intolerance, and dairy allergy. They provide health benefits due to the presence of both probiotics and phytochemicals. The availability of anti-microbial and antioxidant properties in herbal drinks reduces the viability of probiotics and microencapsulation can be used to improve the probiotic survival in herbal drinks. The study intended to investigate the impact of Sodium Alginate encapsulation with rice bran extracts including *Kalu Heenati*, *Rathu Nadu* (BG406), and *Sudu Nadu* (BG94/1), on the viability of *Lactobacillus rhamnosus* GG (LGG) in a cold Bael flower beverage. The encapsulation efficiency, size, shape, and bulk density of the encapsulated LGG were investigated. Then Bael flower drink was developed by incorporating encapsulated LGG (SA+2% BG406) with the highest encapsulation efficiency. The probiotic potential of the selected encapsulated LGG (SA+ 2% BG406) was determined after freeze-drying and when exposed to simulated gastrointestinal conditions. Color, total phenolic content, total antioxidant capacity, tannin content, total plate count, and viability of encapsulated LGG of herbal drinks were performed weekly over 21 days at 4°C. Sensory attributes were evaluated by using the same/different test. SA+ 2% BG406 beads had shown a reduction in 1.79 log cycles after freeze-drying. When exposed to simulated gastrointestinal conditions, 2.43 log cycles were reduced. The encapsulation efficiency and diameter of the beads were increased, while the sphericity and bulk density were reduced when concentrations of rice brans were increased. Results of the properties of Bael flower drinks suggested that there was significantly higher preservation in color ($\Delta E^*=2.5$), total phenolic content (116.47 ppm), total antioxidant capacity ($0.00151 \text{ molL}^{-1}$), and tannin content (1017.52 ppm) in drinks with encapsulated LGG compared to the drinks with non-encapsulated LGG during storage ($p < 0.05$). The viability of encapsulated LGG in the Bael drink had remained at a beneficial level (7.18 log CFU/mL) while the drink with non-encapsulated LGG had viability in 4.88 log CFU/mL. Encapsulated LGG did not exert any negative impact on the sensory attributes including colour, taste, and appearance of the Bael flower drink. This study shows that the application of encapsulated LGG with Sodium Alginate and rice bran could be a promising strategy for developing an herbal probiotic drink.

Keywords: *Encapsulation efficiency, encapsulated LGG, Bael Drink, Rice bran, Sodium alginate*