

Ca-, Ba- and Al-alginate matrices as the encapsulation material to protect lactobacillus acidophilus in simulated gastric conditions

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Background and Aims: Several materials for encapsulation were used to increase the efficacy of capsules in protecting the encapsulated bacteria under simulated gastric conditions. Lactobacillus acidophilus was coated with alginate in three type's hardening solution. In this work the possibility of Ca-, Ba- and Al-alginate matrices using as coating material for encapsulation of Lactobacillus acidophilus have been examined.

Methods: Lactobacillus acidophilus was encapsulated in calcium alginate with extrusion method. The prepared beads were characterized in terms of size, morphology and surface properties. The survivability of three treated and free cells (unencapsulated) was conducted in 0.5% w/v bile salt solution and simulated gastric juice (pH 1.7) followed by incubation in simulated intestinal juice.

Results: There was significant difference ($p > 0.05$) in the viability of encapsulated cells in three coating material. No differences were detectable in the thickness of the beads with different types of coating material. Using Al-alginate coat produce mechanically unstable beads and decreased the number of bacterial survivors at the end of 2-h incubation in simulated gastric conditions compare with other alginate-ions. These three type microcapsules are different in surface shape and acid servility. Release in simulated colon pH condition is the same.

Conclusions: Three different materials are able to produce microcapsules of small size and uniform shape which are mechanically stable in low pH and maintain the viability of the cells in acid condition.

Keywords: Lactobacillus acidophilus; Ca-, Ba- and Al-alginate matrices; Encapsulation