Encapsulation efficiency and *in vitro* gastrointestinal survival of *Lactobacillus reuteri* immobilized in alginate-cashew gum blends.

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Abstract: By definition, probiotics are bacteria or yeast that, when administered in adequate amounts, confer health benefits to the host. Although widely used, these microorganisms have limitations due to decreased cell viability after exposure to extrinsic environmental factors. Therefore, probiotic encapsulation techniques are used to provide protection during storage and adverse conditions. The aim of study was to improve the encapsulation efficiency (EE) and the protective effect under simulated gastric and enteric conditions of *Lactobacillus reuteri* ATCC 23272 immobilized in polymeric blends based on cashew gum and alginate. Obtained by extrusion in $CaCl_2$ solution (20 g/L), the beads were constituted of alginate 15 g/L (C) and blends maintaining the alginate concentration and varying cashew gum in 5 (AJ05), 10 (AJ10) and 15 (AJ15) g/L, containing approximately 9 log CFU/g of *L. reuteri*. Compared to C (< 90 %) the EE was significantly ($p \leq 0.05$) improved using cashew gum (> 96 %). Under simulated gastric (using pepsin 3 g/L and lipase 0.9 mg/L) and enteric conditions (using bile 10 g/L and pancreatin 1 g/L), AJ10 improved protection on cells ($p \leq 0.05$), maintaining the viability of immobilized probiotic at 7.20 log CFU/g, a reduction of only 1.39 log after simulated digestion, while AJ05 and AJ15 decreased by 1.81 and 1.74. In contrast, the reduction in the number of free *L. reuteri* cells and the cells immobilized with no cashew gum (C) after exposure to simulated gastric and enteric juices was 5.36 and 2.21 log CFU/g, respectively. The use of alginate is related with the formation of higher porosity beads, making them more permeable and decreasing the protection of encapsulated cells, therefore, cashew gum addition may influence in greater uniformity of the particles obtained, improving the entrapment of *L. reuteri* into the beads and reduce the loss of cell viability during simulated gastric and enteric conditions.

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