

TITLE: *Aschophyllum nodosum* MICROENCAPSULATED SYMBIOTIC WITH LACTIC ACID BACTERIA IN SODIUM ALGINATE MATRIX FOR PISCICULTURE

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ABSTRACT:

Probiotics as Lactic Acid Bacteria (LAB) and prebiotics act as immunostimulants in the host organism. However, the gastrointestinal tract (GIT) of fish because of their intrinsic characteristics provide barriers to the colonization of these bacteria. The technique of microencapsulation arises in the sense of promoting the protection of the contents, like the stomach pH, and to provide a controlled release in the GIT. This work had as objective to elaborate a microencapsulated symbiotic for fish culture in matrix of sodium alginate containing the brown alga *Aschophyllum nodosum* as prebiotic and strains of LAB as probiotic. Two strains of LAB previously characterized for probiotic activity were used. Initially a cell suspension was prepared with two strains (*Lactobacillus plantarum* and *Lactobacillus paracasei*) with 10^{8-9} UFC / mL by volume of 10.0 mL. This was then added to a sterile solution of 2.0% sodium alginate and the algae *A. nodosum* at 3.0% concentration was also added. The microcapsules were prepared by the extrusion method and were then lyophilized and stored. After this process, it was evaluated the yield of retention of cells in the polymer and survival of cells for a period of 60 days. The analysis of the polymer surface was performed by scanning electron microscopy (SEM) to verify the adhesion of the bacterial cells to the polymer and analysis of the structure. The retention rate of the cells post-microencapsulation method was 90.0%. The percentage of retention of bacterial cells has a great variation in the literature and this is due to the diversity of microorganisms, polymers used and microencapsulation methodologies. The entrapment yield is an important parameter in the evaluation of the microspheres, indicating that the product obtained must be strong in structure and easily distributed when it reaches the target. After the lyophilization process, the microcapsules had a probiotic bacterial population of $8.30 \log \text{CFU} / \text{g}$, and there was no significant decrease after 60 days ($10^6 \text{CFU} / \text{g}$). Scanning electron microscopy showed that LAB were firmly adhered to the sodium alginate matrix in a microscopic structure known as the "egg box". With the microencapsulation of the symbiotic it was possible to achieve a product with high yield of cell release for a storage period of 60 days.

Keywords: gastrointestinal tract, *Lactobacillus*, microscopy, microencapsulation.

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