Natcha Vannapruk 2008: Heat Protection of *Lactobacillus reuteri* KUB-AC5 by Encapsulating with Calcium Alginate used as Pelleted Feed Additives and Their Fluidized-Bed Drying. Master of Science (Biotecnology), Major Field: Biotecnology, Department of Biotecnology. Thesis Advisor: Assistant Professor Pakamon Chitphasert, Ph.D. 91 pages.

The encapsulation of *Lactobacillus reuteri* KUB-AC5 with calcium alginate was conducted to increase the survival of the probiotics from pelleting process. In this study, the encapsulating factors including of the concentration of $CaCl_2$ (0.05, 0.10 and 0.20 M) and mixing speed (200, 250 and 300 rpm) were investigated. The results showed that the optimal conditions giving the desirable bead size range of 400-1200 μm were 0.05, 0.10 and 0.20 M $CaCl_2$ and 200 rpm, providing 60.83, 60.47 and 60.74% yield, respectively, which were not statistically different ($p>0.05$). The heat protection ability of the gel beads tested by incubating the samples in the water bath at 75°C revealed that the survival of the encapsulated cells was significantly higher than that of the free cells ($p\leq0.05$). At the longest incubating time (100 s), the remaining free cells were 1.16×10^6 CFU/g, while those of encapsulated cell with 0.05, 0.10 and 0.20 M $CaCl_2$ were 5.61×10^6, 1.32×10^7 and 7.95×10^7 CFU/g, respectively. When the free cells and encapsulated cell were subjected to the pelleting process at 75°C for 25-35 s, the remaining cells were 2.93×10^5 CFU/g. and 3.23×10^6 CFU/g from the initial cells of 2.30×10^9 CFU/g and 1.85×10^9 CFU/g, respectively. To increase the shelf life of the probiotic beads, the fluidized-bed drying experiment was carried on. The optimal drying condition was the air temperature of 30±2°C, air velocity of 2.25 m/s and drying time of 45 and 60 min for the bead weights of 50 g. For 3 month storage at 4°C, the survived cells of 45 and 60 min drying time were 2.36×10^{10} CFU/g and 7.16×10^9 CFU/g with the moisture contents of 20.16 and 15.59%, respectively. On the other hand, the encapsulated cells without drying were contaminated after 14 days of storage with the survived cells of 1.16×10^{11} CFU/g and the moisture content of 92%. Therefore, the optimal condition of protecting the probiotics from the pelleting process was 0.10 M $CaCl_2$ and 200 rpm, and the shelf life of the fluidized-bed dried beads was at least 3 month period.

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