

EFFECT OF ENCAPSULATION ON VIABILITY OF PROBIOTIC BACTERIA  
(*Lactobacillus plantarum*) DURING SPRAY DRYING OF  
SWEETENED YOGHURT

**ABSTRACT**

In this era of functional foods, Probiotics are increasingly gaining scientific and commercial interest as self care and complementary medicine. In this context *Lactobacillus plantarum* MTCC 6160 which is one of the beneficial probiotic was used for the study. Most of the probiotic are ephemeral & fail to survive the adverse condition of processing parameter together with that of certain *in vivo* conditions as a result the viability decreases and the consumer fail to achieve the fruit from it. To increase the viability of the probiotic, encapsulation was done with 15 various combination of binding material (sodium alginate) and prebiotic, which act as a chrysalis that encompass the organisms and protect them from unfavorable condition. After encapsulation the survivability of the organisms was increased by approximately 3-4 log cycle in various conditions such as low pH 2, bile salt concentration (1%), heat resistance (80 & 90 °C for 120 ~~sec~~) together with depolymerisation of beads in buffer solution. To incorporate this during spray drying of yoghurt, the various process variables such as inlet air temperature (135-175°C), feed rate (10-16.20 ml/min) & pressure (0.4-1.0 MPa) was optimized. Different responses such as moisture content (wb%), survivability of free probiotic cell, bulk density of yoghurt powder and for rehydrated powder consistency, cohesiveness, firmness, syneresis, acidity, work of shear & color change are observed. RSM was used for optimizing the process parameters with 15 different experimental runs with the help central composite rotatable designs (CCRD). ANOVA was used to check the adequacy of fitted model. Significant differences were found in responses with varying factors. The optimized values for inlet air temperature, feed rate & pressure are optimized to be 166 °C, 15.29 ml/min (19 rpm) & 0.5 respectively. Due to incorporation of encapsulated probiotic the viable count of probiotic was maintained up to certain extent as compared to that of free probiotic. Rehydration was achieved by mixing of powder and water in moiety which maintaining the physic-chemical properties of reconstituted yoghurt as compared to that of fresh dulcet yoghurt.

Key words: Encapsulation, probiotics, *L. plantarum*, RSM, optimization, rehydration.