

ABSTRACT

Bacillus subtilis was nano-encapsulated using chitosan as probiotic bacteria. To learn more about the bacterial cell ability to survive in the gastrointestinal tract, in vitro tests were carried out. The outcomes showed that increasing the concentration of chitosan from 0.05g to 0.5 g/ml caused the size of chitosan nanoparticles to considerably increase. The cells which were encapsulated showed more retention of probiotic strain as was compared to free cultured cells. On the other hand, there was a marked reduction in the survival of free cell after 120 mint with the colony count of 3.30 to 3.02 log CFU/ml as compared to the encapsulated probiotic cells which showed the reduction from 3.278 to 3.230 log CFU/ml in simulated gastric acid condition. Excellent probiotic stability and viability was achieved through nano-encapsulation of *Bacillus subtilis* in simulated intestinal conditions. In this condition, the cell number of initially encapsulated cells were 3.27 log CFU/mL which after placing in biliary salt condition for 120 min, it reached to 3.23 log CFU/ml. While free probiotic bacterial cells count decreased from 3.30 to 2.977 in simulated intestinal conditions. Hence, the encapsulation contributes a remarkable role in promoting the survival and viability of probiotic bacteria in gastro-intestinal conditions.