

Bioencapsulation by compression coating of probiotic bacteria for their protection in an acidic medium

Abstract

Compression coating was demonstrated as a novel encapsulation method for improving cell survival when cells were exposed to an acidic medium. Sodium alginate, which can form gels after being hydrated, has been exploited as the prime coating material. Probiotic cell containing powders were first compressed into a pellet, which was then encapsulated with the coating material by further compression. Results indicated significant improvement in survival of encapsulated cells when exposed to acidic media of pH 1.2 and 2. The encapsulated cells showed 10⁴–10⁵-fold increment in cell survival when compared to free cells under the test conditions. The formation of a hydrogel barrier by the compacted sodium alginate layer has shown to retard the permeation of the acidic fluid into the cells. This contributed to the enhanced cell survival. In addition, it could be deduced from in vitro tests that the release of encapsulated cells in the human digestive tract could occur near the end of the ileum and beginning of the colon. The mechanism of cell release is primarily due to the erosion of the alginate gel layer.