

Encapsulation of *Lactobacillus casei* into calcium pectinate gel

Aigerim Bepeyeva,¹ Joao Barros,² Aitbek Kakimov¹, Zhaynagul Kakimova¹,
Dimitris Charalampopoulos,³ Vitaliy Khutoryanskiy²

¹ Shakarim State University of Semey, Kazakhstan

² Reading School of Pharmacy, University of Reading, Whiteknights, Reading, UK

³ Department of Food and Nutrition Sciences, University of Reading, Whiteknights, Reading, UK

Live probiotic bacteria are known to provide health benefits when delivered to the human intestine. However these bacteria often cannot survive the transit through the stomach because of low pH values in the gastric juice. The present work is focused on the studies of the viability of *Lactobacillus casei* in solutions mimicking the gastric juice at different pHs (1-5) and on encapsulation of these bacteria into calcium pectinate gel aiming to protect them during gastric transit.

Lactobacillus casei dispersed in simulated gastric fluid (pH 2.0) maintain high levels of viability at $(4.11 \pm 2.45) \times 10^9$ CFU/mL, but their subsequent incubation under these conditions results in significant reduction of their viability. This justifies the need for their protection through encapsulation.

Various types of pectin were studied as materials to form calcium pectinate gel capsules. Pectin with low methyl ester content and amidated pectin were found to form spherical capsules of good quality (with diameters of 2.50 ± 0.03 mm and 2.10 ± 0.02 mm, respectively) when their 2 w/v % solutions were carefully extruded into 0.15 w/v % calcium chloride solution (Figure 1). When lower concentration of these polysaccharides were used (1 w/v %) the capsules were of irregular non-spherical shape. High methyl ester pectin did not form capsules under these conditions.

The effect of encapsulation of *Lactobacillus casei* into pectinate capsules on their viability related to gastric transit is currently being investigated.

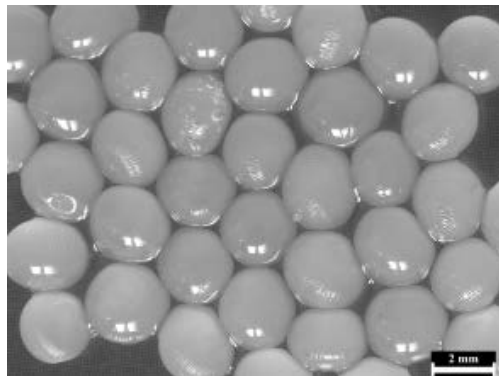


Figure 1. Capsules formed by extrusion of 2 w/v % aqueous solution of amidated pectin into 0.15 w/v % solution of CaCl₂