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Microencapsulation of *Lactobacillus plantarum* with alginate/resistant-starch and development of a new method for evaluating the viability of entrapped bacteria

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This study aimed to evaluate the emulsion technique for microencapsulation of *L. plantarum* using alginate/resistant-starch mixed gel and to develop a new method for evaluating the viability of entrapped bacteria and their release process. A mixture of sodium alginate (2% w/v) and resistant starch (2% w/v), containing bacterial suspension (1% v/v) was used in microencapsulation. The morphology of microcapsules was studied using Scanning Electron Microscopy (SEM). The viability of the entrapped bacteria as well as their ability to release was studied using light microscopy. A wet-mount smear of microcapsules was prepared, slightly stained by Lugol's iodine, and studied before and after releasing at the presence of Na+ ions. The stability of microcapsules in Bile Salts Solution (BSS), Simulated Gastric Juice (SGJ), Pancreatin Enzymes Solution (PES), and Phosphate Buffer Solution (PBS) were studied with and without 400 rpm mechanical shaking. The prepared microcapsules were spherical, with the mean size of 14.84 µm, containing 1.7×10^{9} cfu g^{-1} viable cells. Direct microscopic observations indicated that each microcapsule contained one or more living bacterial cells. Bacterial cells were weekly stained and their brownian motion could be traced inside the microcapsules and after being released. The stability of microcapsules was respectively 60 and 90 min. in BSS and PES without mechanical shaking, and 30 min. at rest conditions. The present study indicated that the emulsion technique is an efficient method for microencapsulation of *L. plantarum* and the new suggested method could be successfully used for evaluating the viability of entrapped bacteria and their release process.

Biography

Yahya Shafiei Bavil Oliaei has finished his academic educations on Veterinary Medicine (DVM) from Islamic Azad University of Tabriz Branch in the year 2006. He did his PhD degree in Food Hygiene from Islamic Azad University, Science & Research Branch of Tehran in 2012. He is a Faculty Member of Department of Food Science & Technology of Islamic Azad University, Khoy Branch, Iran, since 2007. His teaching experiences are dairy science and technology, meat science, food microbiology, food quality control, statistics, and principle of food packaging for undergraduate and graduate students. He is a member of Board of Directors of World Wide Traditional Cheese Association, former member of Institute of Food Technologists (IFT), and member of Society for Anaerobic Microbiology (SAM). He is a Research Member of Tabriz Central Library. He has published more than 20 research papers, books, and scientific reports in recent years. He is reviewer of some national and international scientific journals. He has the experience of organizing scientific conferences and workshops for students and food scientists. Now, he is contributing in writing an Encyclopedia and Handbook in the field of Cheese and Food Bio-Engineering.

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