

ELECTROSTATIC MICROENCAPSULATION OF LIVING CELLS

Dorota Lewińska, Józef Bukowski, Marek Kozuchowski, Andrzej Kinasiewicz,
Andrzej Weryński

*Institute of Biocybemetics and Biomedical Engineering, Polish Academy of Sciences,
Warsaw, Poland*

Abstract

Microencapsulation of different biologically active material for diverse applications have received increasing interest over the last 20 years. Microencapsulation of living cells seems to be a very promising and prospective technology, especially useful in biotechnology and medical applications. One of the most convenient and precise method for this purpose is an electrostatic technique. Electrostatic droplet generation could be performed using single- or multi-nozzle devices, significantly improving efficiency of the process. The usage of an impulse voltage generator allows to manufacture spherical and uniform microbeads with sizes from 0.2 to 3.0 mm of very narrow size distribution. Proposed two-liquid droplet electrostatic formation technique provides preparation of core/shell microbeads, where all cells are immobilized deeply inside a matrix and surrounded with cell-free polysaccharide layer. Such a solution prevents from cell protrusion out of the capsule. Applied electrostatic field is safe for encapsulated living cells and does not cause any cell dysfunction.

K e y w o r d s: microencapsulation of cells, alginate beads, electrostatic droplet generator