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## Technology of Nutmeg Essential Oil Microcapsules by Extrusion method

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Essential oil is an unstable material which loses active substances when exposed to the environment. Microencapsulation by extrusion is one of a few methods to save volatile compounds. The purpose of this study was to protect nutmeg essential oil's volatile compounds. Sodium alginate, nutmeg essential oil, sucrose esters, calcium chloride were used as materials and medical syringe as a device in microparticles technology. Nutmeg essential oil emulsion was prepared as follows: 4% of sodium alginate aqueous solution (5 g) diluted with 10 mL of water, an emulsifier (0.2 of 0.5 g) and lastly, nutmeg essential oil (1.5 g) were added. A syringe was filled with manufactured emulsion and the microcapsules were formed into a crosslinker solution (5% and 2% calcium chloride). Physical parameters of nutmeg essential oil loaded microcapsules were measured: diameter of wet and dry microcapsules, force for crushing (firmness), and encapsulation efficiency. Microcapsules of unstable emulsion (0.2 g of sucrose esters) had better essential oil encapsulation efficiency, approximately  $103.37 \pm 4.92\%$  vs.  $86.23 \pm 2.86\%$  of stable emulsion (encapsulation efficiency was carried out after 48 h of manufacturing). Diameter and firmness of nutmeg essential oil loaded microcapsules with 0.5 g sucrose esters was higher than 0.2 g (17% and 15.5%, respectively). Microcapsules prepared in 2% of crosslinker solution were smallest, softer and the encapsulation efficiency was higher. After this study, the physical parameters of nutmeg essential oil loaded microcapsules were found to depend on emulsion stability, emulsifier amount, and crosslinker concentration.

**Keywords:** nutmeg essential oil, extrusion, microcapsules, encapsulation efficiency

### Biography:

Inga Matulyte studied Pharmacy at the Lithuanian University of Health Sciences (LUHS), Kaunas, Lithuania and obtained her Master's Degree in 2017. She started PhD studies in 2018 and joined the research group at the Department of Drug Technology and Social Pharmacy, LUHS, head of department Prof. Jurga Bernatoniene. In 2019, she joined the research group in the Institute of Pharmaceutical Technologies as a junior researcher, LUHS. Inga specializes in the technology of pharmaceutical forms (solid, semi-solid, liquid forms).