DEVELOPMENT OF LIPID-BASED NANOSYSTEMS USING BIOSURFACTANTS FOR ENCAPSULATION OF VITAMINS

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Vitamins have a special role in human diet, being essential for normal maintenance, growth and development of human organism and their absence can lead to specific deficiency syndromes. Liposoluble vitamins are very difficult to disperse and at same time very sensitive and unstable when exposed to inadequate conditions (i.e. temperature and pH). This way, it is important to preserve the properties of these molecules and to improve their biological efficiency. Nanoencapsulation appears as a good solution and the lipid-based nanosystems presents as a good alternative for vitamins encapsulation due to their unique features (e.g. easy scalability, presence of digestible lipids, possible absence of solvents and use of food-grade materials during production). The main objective of this project is the development, characterization and comparison of lipid-based nanosystems (nanoemulsions (NEs), solid-lipid nanoparticles (SLNs) and nanostructured-lipid carriers (NLCs)) for encapsulation of liposoluble vitamins using biosurfactants. A factorial design for optimization of the process will be used. Initially will be developed NLCs and for their production will be used Neobee 1053 (liquid lipid) and glycerol monosterate (solid lipid) as lipid phase. The surfactant will be dissolved in ultra-pure water (aqueous phase) and will be tested Tween 80, saponin and rhamnolipids. For NLCs development will be used high intensity ultrasonic homogenizer being evaluated the production temperature, cycles, amplitude and time. Relatively to liposoluble vitamins that will be encapsulated, the vitamin A and D arise as good choices due to their health benefits. In the end size distribution, polydispersity, X-ray diffraction, and release behavior will be performed in order to understand the effect of the different surfactants in the lipid-based nanosystems properties.

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