The influence of lysozyme in the structural features of cubosomes: a potential drug delivery system

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Nanoparticles are becoming more and more important as drug delivery systems. This stem from its capability to increase drug delivery in the some specific targeted area, protect the drug from degradation and it can decrease its side effects. Nowadays, there are several different kinds of nanoparticles, like liposomes, cubosomes, ethosomes and others. Cubosomes are malleable nanoparticles with a three dimensional structure that can encapsulate hydrophilic, hydrophobic and amphiphilic drugs [1]. It can accommodate the drug in the bilayer membrane or in the water channel. Cubosomes usually are composed by lipids and a surfactant to preserve the colloidal stability [2]. In this study, cubosomes are made by phytantriol and Pluronic as nonionic surfactant loaded with lysozyme. This compound is a model protein that can be used as a bactericide. Knowing that proteins aggregate and be degraded in the body, it is interesting to encapsulate it. The lysozyme-cubosome system can be characterized by techniques as dynamic light scattering, zeta-potential, small-angle x-ray scattering and transmission electron microscopy. These techniques can determine size, polidispersity index, potential and shape. Our data showed that cubosomes loaded with lysozyme have the hydrodynamic diameter of 300 nm and are monodisperse (PDI around 0.1). Zeta-potencial experiments showed a zero-
like-value for the samples (Figure 1). The calculation of encapsulation efficiency demonstrated that this configuration is a promising for drug delivery system.
