Conference abstract PDD06

Nanostructured Dispersions as Delivery Systems

A. CHEMELLI, O. GLATTER

Department of Chemistry, Karl-Franzens University, Graz, Austria

E-mail: angela.chemelli@uni-graz.at (A. Chemelli)

Sci Pharm. 2010; 78: 595 doi:10.3797/scipharm.cespt.8.PDD06

Unsaturated Monoglycerides (or Phytantriol) dispersed in water form particles having a cubic nanostructure over a broad temperature range. The cubic structured phase has a high viscosity which requires high energy input in order to be dispersed in water.

By the addition of lipophilic substances the structure can be changed to hexagonal, micellar cubic and micellar, respectively [1, 2]. The low viscosity of the micellar phase allows the use of more gentle dispersion methods.

Those nanostructured dispersions have a high interfacial area, which allows them to be good carrier systems for amphiphilic substances. Due to their oil and water compartments they can also host hydrophilic as well as lipophilic molecules. Furthermore, if substances are incorporated in the phases their stability against degradation is enhanced. These properties make them interesting as possible drug delivery systems.

With the structural change not only the viscosity of the self assembled phase alters but also properties which can affect the release rate. The diffusion inside the phase is heavily dependent on the nanostructure.

The internal structure can further be expanded by the addition of lamellar phase forming amphiphiles such as Diglycerol Monooleate and Phosphatidylcholine [3]. The symmetry of the structure is maintained even thought the hydrophilic compartments are enlarged. This enables the incorporation of larger molecules such as proteins.

In order to be able to use nanostructured dispersions as delivery vehicles it is important to gain information about the release mechanism and possible ways to control it. For this purpose the release from the self-assembled bulk as well as from the dispersed phases is studied.

[1] Yaghmur A, de Campo L, Salentinig S, Sagalowicz L, Leser M, Glatter O. Emulsified microemulsions and oil-containing liquid crystalline phases. Langmuir. 2005; 21: 569–577. doi:10.1021/la0482711

[2] Yaghmur A, de Campo L, Salentinig S, Sagalowicz L, Leser M, Glatter O. Oil-loaded monolinolein-based particles with confined inverse discontinuous cubic structure (Fd3m). Langmuir. 2006; 22: 517–521. doi:10.1021/la052109w

[3] Yaghmur A, de Campo L, Sagalowicz L, Leser M, Glatter O. Control of the internal structure of MLO-based Isasomes by the addition of diglycerol monooleate and soybean phosphatidylcholine. Langmuir. 2006; 22: 9919–9927. doi:10.1021/la061303v