

## ABSTRACT

### **Effect of Using Protectants on the Characteristics of Freeze Dried Micelles Literature Review**

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Micelles are one of drug carrier that can increase the solubility of hydrophobic drugs. By nature, micelles are not stable both physically and chemically so the freeze drying process is carried out to obtain solid form micelle with better characteristics. During freeze drying, protectants are needed to prevent micelles aggregation and irreversible fusion. The aim of this literature review is to study the effect of adding protectants for freeze drying formulation on the micelle's characteristics. Literature review was made by compiling and comparing the characteristics of freeze dried micelles from 10 different research articles obtained from ScienceDirect and PubMed using predetermined keywords. The result showed that the freeze dried micelles have following characteristics: low CMC, spherical morphology, size <200 nm, small PDI (uniform size), drug loading before and after freeze drying were 2,27-19,52% and 2,03-19,84%, encapsulation efficiency before and after freeze drying were 90,3-99,91% and 79,1-99.91%, and negative zeta potential. In conclusion, adding protectants for the freeze drying process did not affect the CMC. Protectants also can prevent destabilization, aggregation, and irreversible fusion of micelles so that the drug loading, encapsulation efficiency, size, PDI, and size distribution can be maintained. Freeze dried micelles have morphology with the lowest formation energy and negative zeta potential means that micelles are stable and uneasily aggregate. Trehalose and polyethylene glycol are superior beyond other protectants.

**Keywords:** Micelle, Freeze Drying, Protectant