

Controlled Release of Niacinamide from Fibrous Silica Nanocarrier in face Serum Formulation

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Abstract

The current study offers a controlled release of niacinamide from fibrous silica (KCC-1) loaded in face serum formulation. Furthermore, three drug loading methods namely physical mixing, (Phy)/Nia-KCC-1, melting (Mel)/Nia-KCC-1 and solvent evaporation, (Sol)/Nia-KCC-1 were implemented and the percentage loading efficiency were compared. (Mel)/Nia-KCC-1 demonstrated highest percentage drug loading at 33%, followed by (Phy)/Nia-KCC-1 and (Sol)/Nia-KCC-1 at 25% and 17%, respectively. Likewise, the in vitro release study also revealed similar pattern with (Mel)/Nia-KCC-1 recorded highest percentage release at 29%, followed by (Phy)/Nia-KCC-1 and (Sol)/Nia-KCC-1 at 24% and 21%, respectively. As (Mel)/Nia-KCC-1 sample unveiled decent result in transporting the sample drug, the respective sample was then further loaded into the face serum formulation and the pH stability was observed for 7 days. The pH readings were at constant pH 4.3 throughout 7 days, in acceptance range according to the derma-cosmetic product that stated the effective pH is supposed to lies between pH 4 to pH 6. Therefore, it can be stated that the (Mel)/Nia-KCC-1 serum fulfilled the acceptance criteria of pH requirement for the derma-cosmetics products.

Keywords: Controlled release; Niacinamide; Fibrous silica; Drug loading; Serum formulation.