Dermal Delivery of Anti-Wrinkle Agent Using Nanoemulsions and Nanoemulsion Loaded Gels

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Abstract

Skin wrinkles are a natural part of aging caused by chronological aging and photoaging. Ascorbic acid (AA) is antioxidant that can prevent skin wrinkles. However, AA has a hydrophilic nature, limiting it penetrate through the skin. In addition, it is extremely unstable compound when to exposure to light, oxygen and temperature. The objective of this study was to develop dermal formulations of ascorbic acid, nanoemulsions and nanoemulsion-loaded gels (nanogels), to improve its stability and enhance its delivery through the skin. A series of nanoemulsions and nanogels were prepared with and without the addition of the stabilizing agents ethylenediamine tetra-acetic acid (EDTA) and sodium metabisulfite (META), and citric acid. The dermal formulations were characterized physically and chemically. Nanogels with 0.3%EDTA and 0.9%META were the most physically stable, exhibiting viscoelastic properties, and were able to control the release of AA. Therefore, nanogels could serve as a potential platform for the dermal delivery of AA.

Keywords: Ascorbic acid, nanoemulsion, rheology, stabilizing agents, nanogels.