

Abstract

Creams are semi-solid topical formulations widely used due to their ease of application, patient acceptability, and ability to deliver active ingredients effectively to the skin. The quality and performance of cream formulations are highly influenced by several variables, one of which is the type of emulsifier used, such as the stearic acid-triethanolamine (TEA) emulsifying system, which can affect important physicochemical properties such as pH, viscosity, and stability. Systematic optimization approaches, such as factorial design within the Quality by Design (QbD) approach, allow for simultaneous evaluation of formulation variations in a more efficient and structured manner. The study aims to develop and optimize a topical cream formulation containing varying stearic acid and TEA concentrations in an anti-acne cream. Two anti-acne products that are currently available in the market would be used as a reference for product acceptability. The effects of the different ingredient ratios are investigated through a 3^2 factorial design method. The resulting cream formulations are evaluated based on the resulting physicochemical properties, such as organoleptic analysis, type of emulsion, homogeneity, spreadability, viscosity, pH, and stability, as well as user feedback with simplified hedonic testing, in order to determine the optimal formulation.

Keywords: cream formulation, factorial design, quality by design, stearic acid, triethanolamine