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Effect of Carrageenan as Gelling Agent on Tocopherol Acetate Emulgels

Meiti Rosmiati*, Marline Abdassah, and Anis Yohana Chaerunisaa

Dept. of Pharmaceutical Technology, Faculty of Pharmacy, Padjadjaran University,
Jl. Raya Jatinangor Km. 21,5 Sumedang 45363 Jawa Barat – Indonesia

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*Corresponding author: maytearose@yahoo.com

Abstract

Vitamin E (Tocopherol acetate) is used in both oral and topical dosage. The aim of the research was to study different concentration of Carrageenan a polymer that derived from seaweed particularly Eucheuma cottonii, as a gelling agent in Tocopherol acetate Emulgels.This experimental study was initiated by emulgel formulation using different concentration of carrageenan as gelling agent, as much as 0.5% (F1), 0.75% (F2), 0.85% (F3), 0.95 % (F4), 1% (F5), 1.125% (F6), 1.25% (F7), 1.5% (F8) and 2% (F9). For each formulation Tween 20 and Span 20 were used as emulsifiers (1 and 1.5 %), Liquid paraffin as oily phase (7.5%), Propylene glycol as humectant (10%), propyl and methyl paraben as antimicrobial preservative (0.01% and 0.03%). The physical investigation of emulgels observed were pH, spreading test, viscosity and freeze thaw test, that initiated with basis evaluation and then stability testing conducted for 90 days. The results showed that F5 formulation give the best physical parameters of emulgels in accordance with the requirement for topical dosage form.

Key words: Tocopherol acetate, Vitamin E, emulgels, carrageenan

1. Introduction

Vitamin E is a lipid soluble antioxidant that is essential for the maintenance of healthy skin. Naturally occurring vitamin E is not a single compound; instead, vitamin E is a group of molecules with related structures, some of which may have unique properties in skin. Vitamin E is normally provided to the skin through the sebum. Topical application can also supply the skin with vitamin E and may provide specific vitamin E forms that are not available form the diet[1].

When gel and emulsion are used in combined form the dosage forms are referred as emulgel[2]. As the name suggest they are the combination of emulsion and gel. In recent years, there has been great interest in the use of polymers with complex functions as emulsifiers and thickeners[3].

One of a carbohydrate polymers is Carrageenan that derived from seaweed particularly Eucheuma cottonii[4], caraageenan has the ability to form gels in a thermo-reversible waymaking it widely used as a gelling agent, thickener, and stabilizer in various industries such as food, pharmaceuticals, cosmetics, printing, and textile[5]. Application and use of carrageenan in the manufacture of gels and other gel products is still very limited especially for cosmeceutical products. Therefore, it is necessary to conduct a study on the effect of the concentration of gelling agent as to provide more comprehensive data related to the physical properties of the gel produced. For this purpose carrageenan was chosen, a polysaccharide and has very interesting properties like good adhesiveness on skin which can be a benefit for topical application[6].

In this research, the aim study is to formulate Tocopherol acetate (Vitamin E) in emulgels, using Carrageenan as gelling agent as well as to evaluate its characteristics.

2. Materials and Methods

2.1. Materials

Carrageenan was obtained as a gift sample from Padjadjaran University (Bandung, Indonesia). Tocopherol Acetate (Vitamin E)