UNIVERSITI TEKNOLOGI MARA

INCORPORATION OF GAMMA LINOLENIC ACID WITH SODIUM CARBOXYMETHYL CELLULOSE USING SURFACTANT SYSTEM IN THIN FILM PREPARATION

SITI NAZILA BINTI ISHAK

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ABSTRACT

This study was done to develop an optimized film formulation of GLA with SCMC using surfactant system. Thin films offer more dosage flexibility and ease of use, less irritation potential, better cosmetic appearance, higher simplicity of manufacture, and longer duration of drug release. GLA is an essential fatty acid and currently being used by dermatologists to treat skin problem such as atopic dermatitis, acne, psoriasis and rheumatoid arthritis. Sodium carboxymethyl cellulose (SCMC) is a cellulose type polymer derivative and commonly acts as a water soluble polymer in thin film preparation. Incorporation of 2.5% (w/w) GLA with 1.5% (w/w) to 2% (w/w) SCMC in a thin film preparation by solvent casting method. Several thin films were prepared by a single or combination of surfactant: PVP, Tween 80 and lecithin, in order to investigate the relationship between the surfactant system and physical properties of thin film. The mechanical properties and surface morphology also was determined by using texture analyser and SEM respectively. Film 8 that was formulated by incorporating of 2.5% GLA with 1.5% SCMC and 3% PVP has a good physical and mechanical properties, also appear smooth and even surface under SEM examination.

CHAPTER 1.0 INTRODUCTION

1.1 Background of studies

Topical thin film preparation is gaining interest due to its ability to overcome problems of certain formulation such as lotions and creams as that treatment needs to be applied multiple times a day during the treatment period meanwhile topical thin film does not. Multiple times application may cause inconvenient and can adversely affect patient compliance (Mathiowitz, Laulicht, Bakhru, & Steiner, 2014). Besides that, compared with transdermal patches, films does give better improvement in terms of dosage flexibility and ease of use, less irritation potential, better cosmetic appearance, higher simplicity of manufacture, and longer duration of drug release. (Mathiowitz et al., 2014)

Gamma linolenic acid (Choudhary, Patel, Chhalotiya, Patel, & Kundawala) is an essential omega-6 fatty acids mostly found in borage oil, and evening primrose oil (EPO). GLA is currently been used by dermatologists to treat skin problem such as atopic dermatitis, psoriasis and rheumatoid arthritis (H. R. Lee et al., 2014) . Supplementation with GLA will increased GLA and dihomo-gamma linolenic acid (DGLA) in blood therefore, DGLA will support the anti-inflammatory process and anti-proliferative process by conversion of DGLA into prostaglandin E 1 (PGE1) (Simon et al., 2014). GLA is classified as polyunsaturated fatty acid (PUFA) and this essential fatty acid plays many important roles along with non-essential omega-3 fatty acids in human body system. For example, they are important in the regulation of normal growth and development of the body, brain function, help skin and hair growth stimulation, maintain bone health, regulate metabolism, and maintain the reproductive system in human (D. Ehrlich, Steven, 2011).