INCORPORATION OF GAMMA LINOLENIC ACID WITH KONJAC GLUCOMANNAN CONTAINING FILM

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TABLE OF CONTENTS

ABSTRACT

Gamma linolenic acid (GLA) is a metabolism product of linoleic acid which is an essential fatty acid of omega-6 series. Currently GLA is used worldwide as supplement as it has the capability of lessen premenstrual syndrome, recover lipid profiles and currently used as treatment for dermatitis. Studies have proven that increase intake of GLA can diminish transepidermal water loss by blocking hyper-proliferation effects in disrupted epidermal barrier. In this study, GLA is intended to be administered topically in combination with natural polysaccharide polymer, Konjac Glucomannan (KGM) with the aid of surfactant. In this experiment,the polymer was hydrated using magnetic stirrer for a minimum of one hour. In the meantime, hydrophobic system which consists of GLA and surfactant was prepared. After incorporation of both systems, 50 g of air bubble-free mixture was transferred into a 9cm petri dish and brought forward for solvent evaporation process using hot air oven. Seven formulations were produced with no succeed in combination of GLA into KGM thin film. Different surfactant systems were used in the formulation resulted in different surface morphology and physical characteristics.From observation, F1 has the most oily surface due to inability of PVP to form matrix with KGM in order to incorporate GLA into the film.F2 was formulated using Tween 80 as the surfactant as high HLB value of the surfactant allowed greater association of its hydrophilic portion with the matrix of hydrophilic film. However, upon drying process, the film shriveled and became oily. Lecithin was employed in F3-F6 with varied concentrations. In F4 and F5, lecithin was used in combination with Ceric Ammonium Nitrate (CAN) that helped to create more physically stable emulsion. Nonetheless, it only reacted with the polymer. Further study needs to be conducted to investigate compatibility of KGM and GLA with the aid of suitable surfactant. F6 showed potential for this formulation to be optimized with various means of drying process.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Skin is generally known as largest organ of the human body. It can covers a surface area which up to 2.0m^2. From pharmaceutical perspective, skin has extensive potential as a route for therapeutic delivery as due to its advantages such as avoidance of first-pass metabolism, sustained delivery that can be control over time and increase in patient compliance (M. Chen, Gupta, Anselmo, Muraski, & Mitragotri, 2014). As a most readily accessible organ, skin has become the main route for topical delivery in which drug is administered using localized drug delivery system (Bhowmik, Gopinath, Kumar, Duraivel, & Kumar, 2012)

Gamma Linolenic Acid (GLA) is an omega-6 series of essential polyunsaturated fatty acids with molecular formula of $C_{18}H_{30}O_2$ which exists as an intermediate product of linoleic acid metabolism. It is produced by a time-consuming reaction that is catalyzed by enzyme delta-6-desaturase in the body. This reaction can be restrained due to insufficient body nutrients, inflammations or immunocompromised conditions such as diabetic patients that lead to debilitate performance of the enzyme (Kapoor & Huang, 2006). This enzyme is believed to be in charge of metabolising linoleic acid (LA) into gamma linolenic acid and can be further converted into dihomo-gamma linolenic acid (DGLA). DGLA is a precursor compound of prostaglandin E1(PGE1) that exhibits anti-inflammatory property(Simon et al., 2014). Based on its outstanding property of anti-inflammatory,