UNIVERSITI TEKNOLOGI MARA

PRELIMINARY STUDY ON HPLC QUANTITATIVE ANALYSIS OF MIRACULIN FROM *SYNSEPALUM DULCIFICUM* PLANT

NUR SYUHADA BINTI ZAINUDIN

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ABSTRACT

Synsepalum dulcificum known as miracle berry plant is a tropical plant. It contains glycoprotein called miraculin. Miraculin itself does not taste sweet but it has the ability to change the perception of taste into sweet taste. Miraculin has a potency to replace sugar in future. This study was carried out to determine the concentration of miraculin in every parts of the plant and to determine the best solvent which can extract the highest amount of miraculin. Detected miraculin from every sample was quantitatively analysed by using High Performance Liquid Chromatography (HPLC) method. It was analysed by using reverse phase HPLC with the linear gradient of acetonitrile (20-70%) containing 0.05% trifluoroacetic acid (TFA) for 40 min at a flow rate of 1 ml/min. From the study, linearity of the detector response to the miraculin standard was determined as means of linear regression, expressed in linear model, $y = 38544x + 14800$ with coefficient correlation curve, (r^2) of 0.9984. The retention time of miraculin observed was at 3.6 minutes. The data was analysed with ANOVA (factorial) and expressed as means ± stand deviation (S.D.). The results showed that the plant parts and the types of extraction solvent have significant effect on miraculin concentration. Meanwhile the interaction between types of solvent and plant parts also has significant effect on miraculin concentration. Based on the results, the highest concentration of miraculin after being extracted with water was in leaf with the value of 3.7740 ± 5.4389 mg/ml. Meanwhile the concentration of miraculin in root's ethanol extract was -3.6660 ± 0.0010 mg/ml which was the highest amount and root showed the highest concentration of miraculin in methanol extract with the value of -3.5600 ± 0.0030 mg/ml. Therefore, it might be concluded that the highest concentration of miraculin was in root and he best solvent used to extract more miraculin was methanol.

CHAPTER 1

INTRODUCTION

1.1 *Synsepalum dulcificum* Overview

Synsepalum dulcificum also known as Miracle berry is a tropical plant of berry. It contains a glycoprotein called miraculin that able to change the taste perception (Chen et al., 2012). The miracle berry is an oval shape berry and red in colour that can change the sour taste into sweet taste. According to the history, the miracle berry has been found and used in West Africa since 18th century, when European explorer Chevalier des Marchais discovered that people in West Africa ate the berry before taking their meals (Sabel, 2012).

1.2 Miraculin Overview

Miraculin is a bioactive compound found in the *Synsepalum dulcificum* which can change the taste bud function from perception of sour taste into sweet. The taste of miracle berry compound, miraculin itself not sweet, but it has capability to change the taste modifying activity on taste bud. Miraculin able to elicit sweetness from various acids, such as hydrochloric acid, oxalic acid, lactic acid, formic acid, acetic acid and citric acid. The sweetening effect is dependent on the sourness and the pH of the acid (Hiwasa-Tanaseet al., 2012).

The usage of the miraculin is normally to replace the sugar used. This is because miraculin has low calorie as compared to sugar. Therefore, it has been used as a