STUDY OF COLOUR AND OXIDATIVE STABILITY OF PITAYA FRUIT PEELS EXTRACT IN MUFFINS

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TABLE OF CONTENTS

ABSTRACT

STUDY ON COLOUR AND OXIDATIVE STABILITY OF PITAYA PEEL EXTRACT IN MUFFIN

Pitaya or locally known as dragon fruit has gained wide recognition as a potential crop in Malaysia. It has been planted in Malaysia since year 2000. In this study red-purple pitaya (*Hylocereus polyrhizus*) was used. The fruit components analysed was the peel of pitaya. This study was conducted to determine the optimum condition for the colour stability of pitaya peel extract and to determine the oxidative stability of pitaya peel extract (betalains) in muffins. Water was used as a solvent for the extraction. The optimum condition for the colour stability of pitaya peel extract is at pH 4 with absorbance range from 535 nm to 550 nm and it can withstand until 85°C with an addition of 1% ascorbic acid. The peak of absorbance in UV-Visible spectrophotometer analysis for colour and total betalains in pitaya peel extract was obtained. The highest peak was in the order: unheated control > unheated extract with 1% ascorbic acid > unheated extract with 5% ascorbic acid > heated extract with 1% ascorbic acid > heated control > heated extract with 5% ascorbic acid. Analysis on oxidative stability of muffins was conducted by doing peroxide value (PV) and Thiobarbituric acid (TBA) test to measure the product of lipid oxidation process. The highest PV (mEq/kg) and TBA (mg malonaldehyde/L) were in the order: control formulation > formulation with 20 ml pitaya peel extract > formulation with 200 ppm BHA/BHT > formulation with 40 ml pitaya peel extract. Colour analysis was determined and interpreted as L*, a* and b* values. Control formulation showed highest L* value followed by formulation with 20 ml pitaya peel extract, formulation with 200 ppm BHA/BHT and formulation with 40 ml pitaya peel extract. The highest a* and b* value are formulation incorporated with 40 ml pitaya peel extract > formulation with 200 ppm BHA/BHT > control formulation > formulation with 20ml pitaya peel extract started from day 3 onwards. The results indicated the pitaya peel extract had an oxidative stability effect on muffins but only a mild effect as a food colourant.

CHAPTER 1

INTRODUCTION

1.1 Background and problem statement

Nowadays, most of the consumer and food manufacturers interest in the natural colourants that originated from plant sources as replacement of synthetic dyes or artificial food colourants. Lack of data on colour and oxidative stability of peel extracts incorporated in food product also cause the limitation of natural food colourant. Basically, the most common plant pigments are carotenoids, chlorophylls, anthocyanins and betalains. Most red colouration in plants is due to carotenoids and flavonoids. The red colour of most fruits and vegetables, such as strawberries and grapes is due to anthocyanins, which are in the flavonoid class of pigments. Betalains also commercially used for food colouring which are available in red and yellow beet root *(Beta vulgaris* L. ssp. *vulgaris, Chenopodiaceae),* grain or leafy amaranth *(Amaranthus* sp., Amaranthaceae) and also in cactus fruits (Cactaceae) (Cai *et al.,* 1998; Kugler *et al.,* 2004; Stintzing e*t al.,* 2002). There is broader colour spectrum of betalain in cactus fruits from yellow-orange *(Opuntia* sp.*)* to red-violet *(Hylocereus* sp.*)*. According to Herbach *et al.* (2006), *H. polyrhizus* exhibit betacyanins (red-violet) which has interest as a potential alternative for red beet.