UNIVERSITI TEKNOLOGI MARA

A Study on the Extraction and Stability of Blue and Green Pigment from Clitoria ternatea and Pandanus amaryllifolius for Food Colouring.

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ABSTRACT

The purpose of this project is to evaluate the extraction and stability of colour pigment from butterfly pea pandan leaves, Blue and green artificial colourant for food colouring. The natural colourant was extracted using Hydrodistillation, Supercritical Fluid Extraction and also Ultrasonic Homogenizer. The sample preparation was done by washing, cut into pieces, mixed with water and blend to achieve high surface area for the pigment to be extracted. The stability studies were done by the observation of the product (making of muffin), difference range of temperature, light condition, stored at the presence of light and absence of light and also storage. The analysis was done for 3-4 weeks for all tests. Besides, toxicology studies been done by inductive-coupled plasma spectroscopy (ICP-S). Findings are, the artificial colourant showed better stability than natural one but natural blue colourant showed good stability result compared to natural green colourant. Blue colourant showed the higher stability in temperature analysis. The colour for both artificial and natural colourant faded towards time but the most significant instability was the pandan extract. The limitations were, the extraction using Hydrodistillation and Supercritical Fluid Extraction was not suitable for colour extraction since the purpose of using those method is for oil extraction. The colour of untreated samples quickly faded during heating and storage at different temperature. Colour intensity was the best at lower temperature if it is been stored for a long time. Further improvements may fine the method to make the sample's colour intensity last long The results indicate the possibility of using Ultrasonic Homogenizer as an extraction method for natural colourant gives better stability results.

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INTRODUCTION

1.1 Summary

Extraction of blue and green colour pigment from Clitoria ternatea (Butterfly pea) and Pandanus amaryllifolius (Pandan leaves) by Supercritical Fluid Extraction, Hydro distillation process and Ultrasonic Homogenizer and to study the stability of the natural and synthetic colourant based on effect of various temperature, light, storage time and toxicity. We run experimental research by using natural and synthetic colourant powder with test on muffin to compare the stability test of each colour of natural and synthetic food colourant. The purpose of this experiment is to overcome the problem of synthetic food colorant contain toxicity and carcinogenicity effect to human body due to its chemical composition. The use of natural colours is most prevalent if foods that portray a healthy image there is also high demand but less production of natural food colorant been commercialize in the market. The market trend towards the use of natural colorants exist due to the current preoccupation for the use of synthetic products (Arocas et al., 2013). Lastly there is lack of scientific research based on toxicology and stability study of natural food colouring. Natural compounds, such as anthocyanins or carotenes, have demonstrated to have high antioxidants, antiradical and antiproliferatives activities. However it is well known that natural colourant is unstable to the effect of light, temperature, or changes in the pH compare to their artificial counterparts (Arocas et al., 2013).

1.2 Research Background

Public concerns on the safety of synthetic colorants have given rise to demand for natural colorants used in cosmetics and food. Natural colour is safe for body contact, unsophisticated, and harmonized with nature. Colours obtained from natural sources include blue from Clitoria ternatea (butterfly pea) and Pandanus amaryllifolius (Pandan leaves). Clitoria ternatea is a perennial climber belonging to the family Leguminosae.(Tantituvanont et al., 2008) It originates in Southeast Asia and been widely distributed to many tropical and subtropical countries where it has become naturalized (Michael & A, 2003). It is known to accumulate ternatins, a group of