OPTIMIZATION AND THERMAL STABILITY OF PHYCOCYANIN POWDER FROM *Spirulina platensis*

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ABSTRACT

Spirulina platensis is a blue green microalgae as excellent source of phycocyanin (1500 mg/ 10 g *Spirulina*). Phycocyanin includes in biliprotein group that has unique blue green colour. Colouring powder is one of application from phycocyanin pigment has high value. To produce colouring powder was entrapment by dextrin. Phycocyanin was extracted by aqua destilata. Analysis of phycocyanin was measured with spectrophotometer at 615 and 652 nm. Intensity of phycocyanin colour was measured by chromameter. The result of this study that phycocyanin is more stable in base condition (7 & 8) and temperature at 45° C.

Keywords : *Spirulina platensis*, Phycocyanin, Pigment, pH, Colouring powder

BACKGROUND

Spirulina source of high phycocyanin as natural blue colorants are very rare and highly demanded

Food processing causes phycocyanin unstable. Stability of phycocyanin influenced by temperature and light.

Picture 1. *Spirulina platensis*

USES OF PHYCOCYANIN

1. Used for natural colourant, nutraceutical and immuno diagnostic applications
2. Uses of phycocyanin in foods include the coloring of fermented milk products, ice creams, chewing gum, soft drinks, alcoholic drinks, desserts, sweet cake decoration, milk shakes etc.

OBJECTIVE

The aimed in this research was to know the range of phycocyanin colour intensity. Determined optimation of phycocyanin by citrate phosphate buffer in the range of 2,0 – 7,0 pH; phosphate buffer in 7,0 and 8,0 pH; determine phycocyanin in variation temperature.

EXTRACTION AND PRODUCE PHYCOCYANIN POWDER

Extraction (aqua destilata methode)

➡

Measurement of phycocyanin

➡

Colouring powder (dextrin)

➡

Stability assay of phycocyanin by phosphate and phosphate citrate buffer ➡ Measurement of phycocyanin

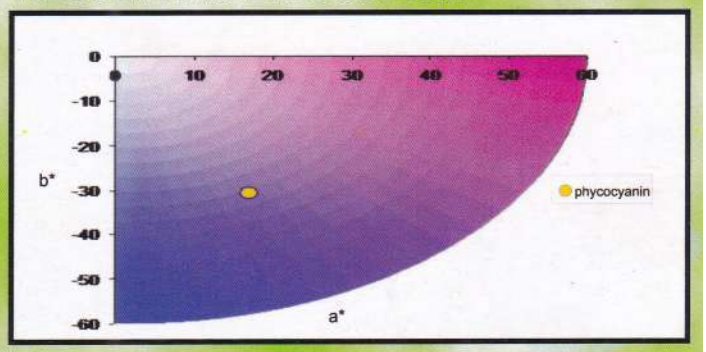
➡

Thermal stability assay (25°C, 45°C, 70°C, 100°C, 125°C) ➡ Measurement of phycocyanin

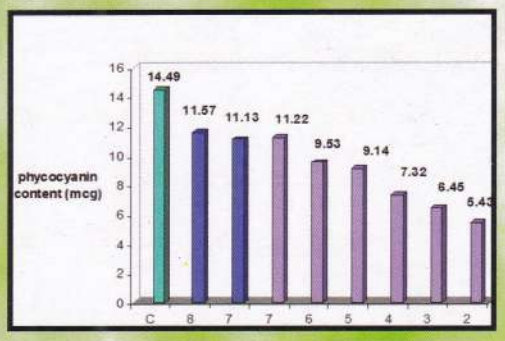
Picture 2. Extract of phycocyanin

Picture 3. Phycocyanin powder

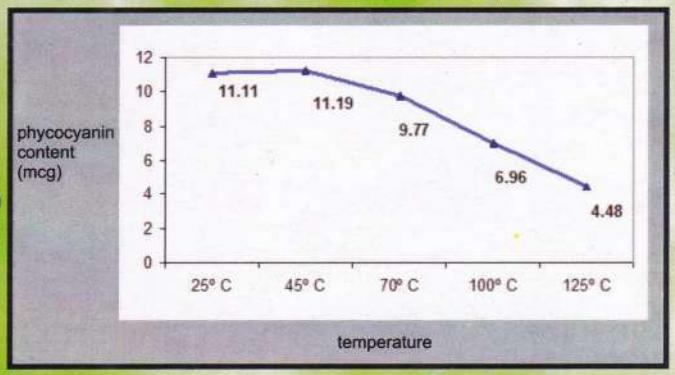
RESULT AND DISCUSSION



Phycocyanin content after extraction is 376.84 mcg. a* value : 17.036 and b* value : -30.77, it means that intensity of phycocyanin was located in blue range.



Information :
C : control
P8 : Phosphate
P7 : Phosphate
PC 7 : Phosphate Citrate 7
PC 6 : Phosphate Citrate 6
PC 5 : Phosphate Citrate 5
PC 4 : Phosphate Citrate 4
PC 3 : Phosphate Citrate 3
PC 2 : Phosphate Citrate 2



CONCLUSION

Phycocyanin more stable in 45° C (11.19 mcg) and base condition pH 7 & 8

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Sarada, R; Manoj G. Pillai and G.A. Ravishankar. (1999). Phycocyanin From Spirulina sp: Influence of Processing of Biomass on Phycocyanin Yield, Analysis of Efficacy of Extraction Methods and Stability Studies on Phycocyanin. Process Biochemistry 34:795-801,

International Food Conference 2011

"Life Improvement through Food Technology"

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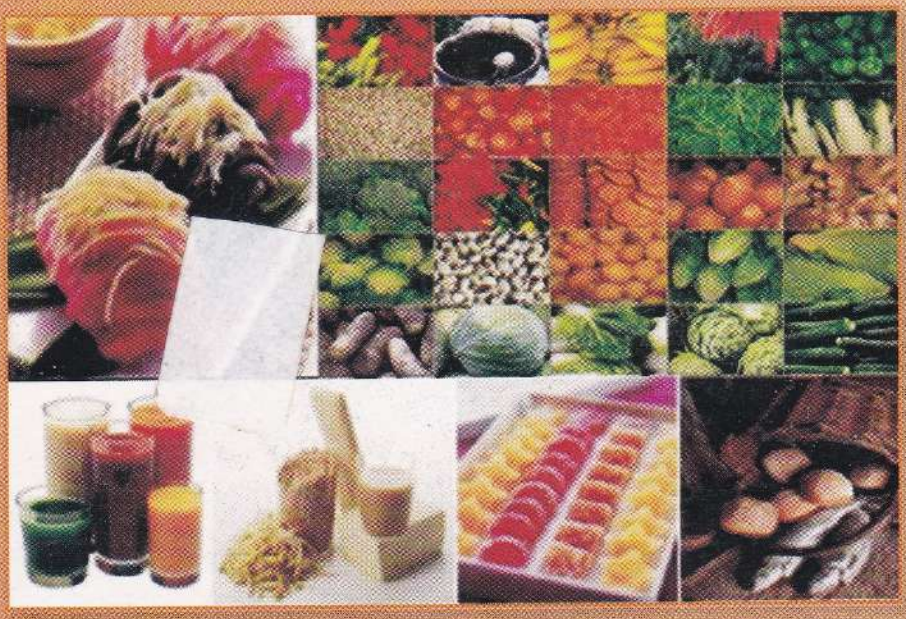

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INTRODUCTION

Healthy and high quality, acceptable foods will improve the quality of life in general, but they need the appropriate technology to produce. The development of food technology allows the growth of not only large-scale food industries but also home industries. It will give positive impacts to the welfare of society. That is why this conference will focus on the theme of Life Improvement through Food Technology.

The development of food technology and its application can't be separated from the role of various parties such as researchers, academicians, industrialists, and the government as policy makers. At the 25th anniversary of Food Technology Department of Agricultural Technology Faculty-Widya Mandala Surabaya Catholic University organize The International Food Conference to bring all parties together in order to contribute to the life improvement internationally through the dissemination and discussion of research results and their application for human health and well-being. In general, the problems can be classified in to four groups: development of food processing and engineering; availability of health and safe food, and functional food that support human health; and effectiveness of food marketing and management; so the technical session will be clustered based on those subject.

Various speakers from inside and outside of the country those have expertise in food technology field which related to life improvement will be present as keynote speakers. It is expected the conference will be able to strengthen the networking among the international and national partners and all industry partners to improve the quality of life. Hopefully this conference will be meaningful for all parties involved.

Topic: **PROCESS AND ENGGINERING**			**SATURDAY, OCTOBER 29th, 2011**
Paralel Session Room: **A. 302 - Agustinus Building (3rd floor)**			
TIME	**CODE**	**NAME**	**TITLE**
08.00 - 08.50	PE-36	Farah Diyana Bt Mohamad Hanib, Zaibunnisa Abdul Haiyee, Misnawi Jati	Optimization of Cocoa Beans Roasting Process using Response Surface Methodology Based on Concentration of Pyrazine and Acrylamide
	PE-37	Misnawi, Ariza Budi Tunjung Sari and Shinta Setiadevi	Process of Producing Polyphenol From Unfermented Cocoa Bean Using Various Extracting Solvents
	PE-38	Junaedi Muhidong and Kartika	Volumetric-Shrinkage Model of Cocoa Beans
08.50 - 09.40	PE-39	Sukanta K Sen, Sandipan Chatterjee and Anindita Sinha	Production of food colorant by Monascus sp : Cultural aspects and strain development
	PE-40	Ignatius Srianta, Netty Kusumawati and Bobby Hendrawan	Red Mold Durian Seed: Study of the effects of Initial Moisture Content on Monascus Pigments Production
	PE-41	Yustina Widya Pristanti, Rika Pratiwi, Laksmi Hartayanie	Optimization and Stability Thermal of Pycocyanin Powder from Spirulina platensis
09.40 - 10.20	PE-42	Ariestya Arlene, Anastasia Prima K, Tisadona Mulyanto, Cynthia Suriya	Red Food Coloring Extraction From Rosella (*Hibiscus sabdariffa*)
	PE-43	Anastasia Prima K, Ariestya Arlene A, Catherine, and Jevfry Steven	Natural Dyes Extraction From Mangosteen Skin
	PE-44	Andri Cahyo Kumoro	Preliminary Investigation on the Preparation of Wanang From Jackfruit *(Artocarpus heterophyllus* Lam) Juice Using *Saccharomyces cereviseae*

PE-41

Optimization and Stability Thermal of Phycocyanin Powder from *Spirulina platensis*

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Abstrak

Phycocyanin includes in biliprotein group that has unique blue green colour. In food industry it use as a colouring powder which is rarely used. Colouring powder is one of application from phycocyanin pigment has high value. Making process of colouring powder by adding dextrin as binder and then dried using an oven at 45º C. *Spirulina platensis* is a blue green microalgae as excellent source of phycocyanin (111 mg/ gram). The protein fraction may contain up to 20% of phycocyanin. The study aimed to determined optimazion of phycocyanin by citrate phosphate buffer in the range of 2,0 – 7,0 pH at 45º C. The extracted by aqua destilata and analysis of phycocyanin in colouring powder was measured with spectrophotometer at 615 and 652 nm. In the citrate buffer was stable in pH 4 (0,03077 mg), pH 5 (0,03194 mg), pH 6 (0,03719 mg) and pH 7 (0,0356 mg). The result of this study show that increasing pH of buffer made concentration of phycocyanin was more stable.

Keywords : *Spirulina platensis*, phycocyanin, pigment, pH, colouring powder