CAROTENOID CONTENT AND ANTIMICROBIAL ACTIVITIES OF MEDICINAL PLANT SPECIES USED FOR MALAY TRADITIONAL POST NATAL BATH (*MANDI SEROM*)

BY

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ABSTRACT

The modern Malay community today prefers to spend their daily routines in accordance with the current available advancements; be it in terms of education, fashion, food, lifestyle, or health. Currently, traditional knowledge of Malay midwifery practices has been sadly neglected because of the poor transmission of knowledge, and the poor understanding of the importance or benefits it can provide to women. The lack of published research has also caused these practices to disappear. The current research attempted to provide supporting data collection of medicinal plants used in Malay traditional postpartum bath and supportive scientific data based on the identification of the carotenoid content and its antimicrobial activities. Through high performance liquid chromatography (HPLC) analysis, all 20 species were found to have at least four individual carotenoid pigments with a relatively high concentration of lutein and β-carotene and lower concentrations of zeaxanthin. The highest amount of lutein was found in *Nilam* (1488.4±49.6 μg/g DW) and the highest amount of β-Carotene was found in *Pisang kelat* (405.17±81.20 μg/g DW). The carotenoid extracts were further investigated for its antimicrobial activities against 12 human pathogens using disk diffusion test (Kirby – Bauer Method). Based on the observation made, among 12 strains, *S. pyogenes* was detected as to be the most inhibited strain with the highest inhibition zone was 18.0 ± 1.0 mm against 1 mg/disc of carotenoid extraction of *C. longa*. The significant outcome of the research was a new findings of new natural bioactive compound sources as health promoting agents which covers not only the Shariah requirement, but also safety aspects. Moreover, it will preserve the traditional knowledge of Malay traditional bath practices.

خلاصة البحث

يفضل المجتمع الملايوي المتحضر قضاء روتينه اليومي حسب التطورات الحديثة المتوفرة سواء في التعليم، أو الأزياء، أو الطعام، أو نمط الحياة، أو الصحة. حاليا وللأسف فإن ممارسات القبالة في حالات الحمل قد أُهملت نتيجة للنقل الغير جيد للتعاليم، وسوء فهم أهميتها وفوائدها للمرأة، بالإضافة إلى أن قلة الأبحاث قد سببت اختفاء هذه الممارسات. حاولت هذه الدراسة توفير بيانات علمية بناء على التعرف على محتوى مركب الكاروتينويد ونشاطه المضاد للبكتيريا. تم استعمال الكروماتوجرافيا السائلة العالية الأداء (HPLC) للتحليل وأظهرت النتائج وجود 4 صبغات مستقلة على الأقل من تركيزات عالية من الليوتين و البيتا كاروتين وبتركيز منخفض من الزيزانتين وذلك في جميع النباتات المدروسة (20 نبتة). كانت أعلى كمية من الليوتين في نبتة النيلام (1488.4±49.6 µg/g DW) وأعلى كمية من البيتا كاورتين كانت في موز كيلات (405.17±81.20 µg/g DW). تمت أيضا دراسة المستخلصات الكاروتينويدية للتحقق من أنشطتها المضادة للميكروبات ضد 12 مسببا للأمراض البشرية باستخدام اختبار نشر القرص (كيربي - بور ميثود). واستنادا إلى الملاحظات التي تم إجراؤها، تم الكشف عن سيبوجينيس لتكون السلالة الأكثر تثبيطا من بين الإثني عشرة سلالة مع أعلى منطقة تثبيط كان لمستخلصات الكاروتينويد للكركم (*C. longa*) وذلك بمعدل تثبيط 18.0 ± 1.0 ملم ضد 1 ملغ/قرص. اعتبرت النتائج الهامة التي توصل إليها البحث نتائج جديدة لمصادر مركبات طبيعية نشطة بيولوجيا كعوامل لتعزيز الصحة البشرية والتي لا تلبي متطلبات الشريعة فحسب، بل تشمل أيضا جوانب السلامة، وسيحفظ ذلك التعاليم التقليدية لممارسات الاستحمام التقليدية الملايوية.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (Halal Industry Science).

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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To Mama and Abah,

Thank you for your trust & blessing.

This is for you.

-Aliya-

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بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

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ABBREVIATIONS

ADR	Adverse Drug Reactions
ATCC	American Type Culture Collection
MRSA	Methicillin-resistant *Staphylococcus aureus*
BHT	Butylated hydroxytoluene
CAR	Carotenoid extraction
CAMRSA	Community-Associated Methicillin Resistant *Staphylococcus aureus*
CRD	Crude extraction
DW	dry weight
EO	Essential oil
HPLC	High performance liquid chromatography
i.z.	Inhibition zone
LHCIIb	Light Harvesting Complex
MHA	Müeller-Hington Agar
MHB	Müeller-Hington Broth
NaCl	Sodium chloride
ND	Non-detectable
OD	optical density
PDA	Potato Dextrose Agar
PDB	Potato Dextrose Broth
ROS	reactive oxygen species
SO	singlet oxygen
UK	United Kingdom
UV	ultraviolet
g	gram
mg	milligram
µg	microgram
L	Liter
mL	milliliter

µL	microliter
mm	millimeter
µm	micrometer
nm	nanometer
w/w	weight over weight
w/v	weight over volume
v/v	volume over volume
min	minute
g	gravity

SYMBOLS

–	Minus
°C	Degree Celcius
λ	Wavelength
%	Percentage
α-	Alpha
β-	Beta
σ	Standard variation
ϵ-	Epsilon

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Malay midwifery practice has been studied in a wide range of perspectives, concepts and ideas that provide an in-depth knowledge and understanding of its status and practices within the folk community (Karim, 1984). *Bidan kampung* is a well-known traditional midwife in Malay communities who has the expertise in traditional rituals pertaining to women healthcare starting from early pregnancy until confinement period (Barakbah, 2007; Chen, 1981). Since 1960, research in regard to *bidan kampung* were conducted and many journals at that time focused on elements such as spiritual care, the importance of *bidan kampung* among pregnant women during pregnancy and confinement and sociocultural aspect (Ali & Howden-chapman, 2007). In Malay traditional midwifery practices, the treatments given focused on revitalising the body conditions and the mind of the mothers and also the procedures of the afterbirth disposal (placenta or *uri*). Usually, *bidan kampung* will use various kind of plants during confinement period since it is believed that they possess therapeutic effects on the women (Adnan & Othman, 2012; Barakbah, 2007; de Boer & Cotingting, 2014; Hasan, Mazlan, & Yaacob, 2005).Scientists believe that the therapeutic effects given by these plants are due to the presence of bioactive compound such as carotenoids, flavonoids, terpenoids, alkaloids, tannins and glycosides (Ajayi, Ajibade, & Oderinde, 2011; Sati, Sati, Rawat, & Sati, 2010). These compounds served as the sources of drugs in modern world (Para et al., 2010). Generally, medicinal plants are widely known and used as antioxidants that help to

prevent diseases such as cancers and other chronic ones. (Othman, Kammona, Jaswir, & Jamal, 2015).To this date, the process of documentation and research of traditional knowledge of medicinal plants is still on-going in Malaysia. In fact, the exploration of the usages of these plants mainly in Malay traditional postpartum bath is still lacking and the reports on these folklore medicinal plants are limited. Henceforth, it is necessary to establish a scientific basis in supporting the claims of the therapeutic traits and effects of the medicinal plants for a better understanding and by preserving, conserving and utilising the traditional knowledge of Malay midwifery practices, it would efficiently sustain the Malay cultures and its identity for future references.

1.2 PROBLEM STATEMENT

1. Urbanisation and modernisation of the world lead to the extinction of the traditional knowledge concerning Malay midwifery practices.

2. There are few scientific evidence being provided pertaining to medicinal plants that are used by Malay traditional midwives in traditional postpartum bath.

3. Poor transmission of traditional knowledge and lack of scientific studies causes the lack of understanding and interest among the younger generations hindering it to put the trust upon them to continue the traditions of Malay midwifery practices.

1.3 RESEARCH OBJECTIVES

Aim: To provide scientific evidence in supporting the usage of medicinal plants which were claimed to function as therapeutic agents in Malay traditional postpartum bath.

Objectives:

1. To provide supporting data collection of medicinal plants used in Malay traditional postpartum bath.
2. To identify carotenoid content and composition in the plants used for Malay traditional postpartum bath.
3. To screen the antimicrobial activities of the carotenoid obtained from the selected plants.