UNIVERSITI PUTRA MALAYSIA

NUTRITIONAL COMPOSITION AND BIOLOGICAL CHARACTERISTIC OF TALBINA DRINK

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By

Sahar Sami M. Oraif

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia in Fulfillment of the Requirements for the Degree of Master of Science

May 2011

By The Name of Allah, The Most Gracious, Most Merciful.

Peace be upon Prophet Muhammad, His Family and Companions.

During my scientific career, I realized that without my family support as well as my mother prays (God's mercy be upon her) and her insistence to keeping on, I would not be what I am and I would not be here today

Therefore I dedicate this research to my dearly loved family and my great parents,

Awatif Ibrahim A. Oraif (God's mercy be upon her)

Sami Muhamad noor A. Oraif

in remembrance of their love and support. God bless them all.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Master of Science

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Chairperson: Prof. Asmah Rahmat, PhD

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Talbina is a beverage made by cooking 2 table spoons of barley wholegrain flour and a cup of water for 30 minutes then adding a cup of milk and 1 tablespoon of bee's honey as a sweetener. Even the Talbina had been recommended by the Prophet Mohamed (peace be upon him) to be drunk for the sick and grieving people, it has not have been studied nor defined by the scientific community. Therefore, this study was aimed to initially define the Talbina by measuring its nutritional composition values with its components (whole grain barley flour, honey and milk) in terms of their proximate composition analyses followed by investigating the biological characteristic of Talbina and its components by determining their antioxidant vitamins content, antioxidant and toxicity effects of Talbina against human colon cancer cell line.

Using the AOAC methods, the proximate nutritional composition values of Talbina and its components were analyzed such as total carbohydrate, crude fat, total dietary fiber, crude protein, total ash and antioxidant vitamins. Talbina contained the basic nutritional components. Moisture content exceed 85%, total carbohydrate content was 8.17 ±0.31g/ 100g of sample, crude fat was 3.91 ±0.06g , total dietary fiber was 1.83 ±0.1 g, crude protein reached 1.82 ±0.01g and total ash was 0.5 ±0.01g. However, Talbina was not rich in antioxidant vitamins (vitamin A, C and E) which might be correlated with the possible antioxidant activity. Results showed significant differences in the content of certain macronutrients compared with its components. HPLC analysis showed Talbina has no vitamin A, low content of vitamins C (ascorbic acid equivalent = 7.60 ±0.26 mg/100g) and E (α tocopherol equivalent = 66 ±2.58 µg/ 100g). According to the β-carotene bleaching method and DPPH free radical scavenging method, antioxidant activity of Talbina was negligible, only the total phenolic content of the Talbina has gave a significant difference comparing with barley in a value of 38.58 ±3.86 mg gallic acid equivalent /100g of sample using Folin- Ciocalteu method. In MTT assay, Talbina methanolic extract showed toxicity activity against HT-29 colon cancer cell line, since IC_{50} exceeded 76 µg/ ml after 96 hours of exposing incubation.

Generally, Talbina produce a whole nutritionally serving beverage with all basic macronutrients but boiling Talbina could reduce significantly the antioxidant vitamins and activity.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KOMPOSISI NUTRIEN DAN CIRI-CIRI BIOLOGI MINUMAN TALBINA

Oleh

SAHAR SAMI M. ORAIF

Mei 2011

Pengerusi: Prof. Asmah Rahmat, PhD

Fakulti: Perubatan dan Sains Kesihatan

Talbina merupakan minuman yang dihasilkan dengan memasak 2 sudu besar tepung barli berbijirin penuh dengan secawan air selama 30 minit dan seterusnya dicampurkan dengan secawan susu dan 1 sudu besar madu lebah sebagai pemanis. Walaupun Talbina telah dicadangkan oleh nabi Muhammad (S.A.W.) sebagai minuman bagi orang sakit, bahan ini masih belum dikaji secara terperinci secara saintifik. Oleh itu, kajian ini dijalankan bertujuan untuk mengenalpasti Talbina dengan menentukan nilai komposisi nutrien berbanding dengan bahan-bahan kandungannya (tepung barli berbijirin penuh, madu dan susu) dari segi analisa komposisi proksimat, seterusnya mengenalpasti kesan antioksidan dan anti-proliferatif Talbina ke atas sel kolon kanser manusia. Dengan menggunakan kaedah dari AOAC, kandungan nutrien proksimat telah dianalisa seperti jumlah karbohidrat, lemak kasar, jumlah gentian serat keseluruhan, jumlah protein kasar, jumlah abu dan vitamin antioksidan.Talbina

mengandungi komposisi asas nutrien. Kandungan air Talbina melebihi 85%, jumlah keseluruhan karbohidrat 8.17 ± 0.31g/ 100g sampel, jumlah lemak kasar 3.91 ± 0.06g, jumlah gentian serat keseluruhan 1.83 ± 0.1g, jumlah protein kasar 1.82 ± 0.01g dan jumlah abu keseluruhan 0.5 ± 0.01g. Walaubagaimanapun, kandungan vitamin-vitamin antioksidan dalam Talbina (vitamin A, C dan E) adalah kurang dan mempengaruhi kadar aktiviti antioksidan. Keputusan kajian secara keseluruhan menunjukkan perbezaan yang signifikan dalam kandungan makronutrien tertentu berbanding dengan komponen yang lain. Analisis HPLC menunjukkan Talbina tidak mengandungi vitamin A, rendah kandungan vitamin C (askorbik asid ekuivalen = 7.60 ± 0.26mg/ 100g) dan vitamin E (α-tokoferol ekuivalen = 66.0 ± 2.58 µg/ 100g). Berdasarkan keputusan dari kaedah penurunan β-karotin dan kaedah aktiviti pemerangkapan radikal DPPH, aktiviti antioksidan Talbina adalah hampir tidak dapat ditentukan. Hanya kandungan jumlah keseluruhan fenolik menunjukkan perbezaan yang signifikan apabila dibandingkan dengan barli (38.58 ± 3.86mg/ g ferulik asid ekuivalen) menerusi kaedah Folin-Ciocalteu. Keputusan dari kajian antiproliferatif pula menunjukkan ekstrak methanol Talbina memberikan aktiviti toksisiti ke atas sel kolon kanser (HT-29), yang mana melebihi nilai IC_{50} iaitu 76µg/ ml selepas 96 jam.

Oleh itu, secara keseluruhannya, Talbina menghasilkan minuman yang berkhasiat menerusi nilai komposisi nutriennya tetapi pemanasan talbina menurunkan secara signifikan aktiviti dan vitamin antioksidan.

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May Allah bless all of you!

Sahar Sami M. Oraif

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master. The members of the Supervisory Committee were as follows:

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or other institutions.

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