

UNIVERSITY OF MALAYA  
FACULTY OF AGRICULTURE  
DEPARTMENT OF FOOD SCIENCE (Terengganu) (Terengganu) (Terengganu)  
2017

UNIVERSITY OF MALAYA

SCHOOL OF AGRICULTURE AND FOOD SCIENCE  
UNIVERSITY OF MALAYA, TERENGGANU  
KEMPAS, TERENGGANU

2017



**EXTRACTION AND EVALUATION OF ANTIOXIDANT ACTIVITY OF  
'JARUM TUJUH BILAH' (*Pereskia bleo*) LEAF**

**By**

**NUUR NADHIRAH BINTI MOHD AMIRRUZAN**

**RESEARCH PROJECT submitted in partial fulfillment of the requirement for  
the Degree of Bachelor of Food Science  
(Food Service and Nutrition)**

**FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
MENGABANG TELIPOT  
2007**

This project should be cited as:

Amirruzan, N.N.2007. Extraction and evaluation of antioxidant activity of 'Jarum Tujuh Bilah' (*Pereskia bleo*) leaf. Undergraduate thesis, Bachelor of Food Science (Food Service and Nutrition). Faculty of Agrotechnology and Food Science, University Malaysia Terengganu, Mengabang Telipot, Terengganu.

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## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any degree at Universiti Malaysia Terengganu (UMT) or other institutions.

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**NUUR NADHIRAH BT MOHD AMIRRUZAN**

**Date:**

**Approved by**

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**(PN. ZAMZAHAILA MOHD ZIN)**

**Date:**

## ACKNOWLEDGEMENT

Firstly, I would like to express my appreciation and gratitude to my supervisor, Pn. Zamzahaila binti Mohd Zin for her guidance, constructive criticism, encouragement and valuable suggestion in accomplishing this study.

I would like to thank the Head of Food Science Department, Prof. Madya Dr Amiza binti Mat Amin, all the lecturers and the staff of Food Science Department and Marin and Maritim Department especially the laboratory staff for their kindness and cooperation throughout this study.

I would like also to thank my family and friends for their support and concern.

## ABSTRACT

*Pereskia* is the only cactuses with leaves. *Pereskia bleo* is believed by the locals, to have anti-cancer, anti-tumour, anti-rheumatic, anti-ulcer and anti-inflammatory activities. Methanol of *Pereskia bleo* leaf may contain bioactive compound that kill breast carcinoma cell. At concentrations 3.125 µg/ml and above, the extract killed more than 90% of the cells. The objectives of this study were to study the antioxidant activity and total phenolic content from *Pereskia bleo* leaves and determine the proximate composition both fruit and leaves. The material of this species bought from Klang, Selangor were used for this study. The fruit made into powder by hot air drying while leaves by hot air drying and freeze drying. The chemical composition, antioxidant activities and the total phenolic content of this species were determined. The antioxidant activity was measured by using Ferris Thiocyanate (FTC) method while the total phenolic content was measured by using Follin-Ciocalteu method. Methanol and ethyl acetate were used as extraction solvent. For the chemical analysis, both fruit and leaf showed significant different ( $p < 0.05$ ) on the moisture, ash, fat, carbohydrate and fiber content. However, fruit of *Pereskia bleo* showed no significant effect ( $p < 0.05$ ) on the protein content. As for yield of extraction using two solvent, methanol (polar) showed higher level in yield compared with ethyl acetate solvent (nonpolar). The antioxidant analysis using FTC method, different drying method and solvent showed significant ( $p < 0.05$ ) in antioxidative activities. It was found that the freeze drying preserve more of antioxidant activities in methanol than ethyl acetate solvent. All extracts showed higher antioxidant activities which were as good as Butylated Hydroxytoluene (BHT) except ethyl acetate extract prepared by hot air drying. All extracts also showed significant different ( $p < 0.05$ ) higher antioxidative activity compared to  $\alpha$ -tocopherol. *Pereskia bleo* leaf extracts have a phenolic content 345 to 1243 mg/g that was indicated higher level of total phenolic compound and was exhibited strong potential antioxidant activities. The high antioxidant activity exhibited by the *Pereskia bleo* species extract in the current assay suggests that it has a potential for use in foods containing emulsified oils. The antioxidant effect of the extract may also be of biological relevance as it may prevent oxidation of lipid components within cell membranes. Therefore, the plant extract may prove to be of potential health benefit.

## PENGESTRAKAN DAN PENILAIAN AKTIVITI ANTIOKSIDAN 'JARUM TUJUH BILAH' (*Pereskia bleo*) LEAF

### ABSTRAK

*Pereskia* merupakan spesies cactus yang mempunyai daun. *Pereskia bleo* dipercayai oleh masyarakat mempunyai antikanser, antitumor, antiulcer dan antiinflamasi. Daun *Pereskia bleo* hasil pengestrakan menggunakan metanol mengandungi komponen bioaktif yang boleh membunuh sel kanser payudara. Pada kepekatan 3.125 µg/ml dan ke atas, hasil ekstrak boleh membunuh lebih 90% sel kanser. Objektif kajian ini adalah untuk melihat aktiviti antioksidan dan jumlah phenolik daripada daun *Pereskia bleo* juga menentukan komposisi proksimat bagi buah dan juga daun. Bahan mentah yang digunakan di dalam kajian ini dibawa daripada Klang, Selangor. Di dalam kajian ini, sampel buah dijadikan ke dalam bentuk serbuk melalui kaedah pengeringan udara panas manakala sampel daun pula melalui proses pengeringan udara panas dan pengeringan sejuk beku. Untuk itu, komposisi kimia, aktiviti antioksidan, dan jumlah kandungan phenolik untuk spesies ini ditentukan. Aktiviti antioksidan ditentukan dengan menggunakan kaedah Ferris Thiocyanate (FTC) manakala jumlah kandungan phenolik ditentukan menggunakan kaedah Follin-Ciocalteu. Metanol dan etil acetate digunakan sebagai agen pengestrak. Untuk analisis kimia, kedua-dua buah dan daun menunjukkan perbezaan signifikan ( $p < 0.05$ ) di dalam kandungan kelembapan, abu, lemak, karbohidrat dan fiber. Bagaimanapun, bahagian buah menunjukkan tiada perbezaan signifikan ( $p < 0.05$ ) pada kandungan protein. Untuk jumlah hasil pengestrakan dengan menggunakan dua bahan pengestrak, metanol (polar) menunjukkan aras yang tertinggi jika dibandingkan dengan menggunakan etil acetate (tidakpolar). Perbezaan kaedah pengeringan dan agen pengestrak di dalam kaedah FTC menunjukkan perbezaan signifikan ( $p < 0.05$ ) dalam aktiviti antioksidan. Melalui kaedah tersebut, kajian ini menemukan pengeringan sejuk beku mengekalkan lebih aktiviti antioksidan di dalam agen pengestrak metanol berbanding etil acetate. Semua hasil ekstrak menunjukkan aktiviti antioksidan yang tinggi dimana ia adalah sebaik Butylated Hydroxytoluene (BHT) kecuali ekstrak etil acetate yang disediakan melalui pengeringan udara panas. Semua hasil ekstrak juga menunjukkan perbezaan signifikan ( $p < 0.05$ ) dan tinggi aktiviti antioksidan jika dibandingkan dengan  $\alpha$ -tocopherol. Hasil pengestrakan daun *Pereskia bleo* mengandungi kandungan phenolik diantara 345 ke 1243 mg/g dimana jumlah ini menunjukkan kandungan phenolik yang tinggi seterusnya memberikan aktiviti antioksidan yang kuat. Aktiviti antioksidan yang tinggi yang diberikan oleh hasil ekstrak spesies daun *Pereskia bleo* mencadangkan ia mempunyai keupayaan untuk digunakan di dalam makanan yang mengandungi minyak pengemulsi. Kesan antioksidan yang diberikan oleh hasil ekstrak berkemungkinan boleh menghalang pengoksidaan komponen lipid diantara sel membran. Oleh itu, hasil pengestrak daripada tumbuhan ini berupaya menyumbangkan faedah dalam aspek kesihatan.