

EFFECT OF DIFFERENT DIFFERENTIATION OF
PHYSIOLOGICAL AND ANATOMICAL
LOCITIES IN MALE GUINEA PIGS

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FACULTY OF AGRICULTURE, BIOLOGY AND FOOD SCIENCE
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
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2006

**EFFECT OF DIFFERENT DRYING METHODS ON PHYSICOCHEMICAL
AND ANTIOXIDANT ACTIVITIES OF YAM FLOURS**

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**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
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DECLARATION

I hereby declare that this research project is based on my original work except the quotation and summaries which have been duly acknowledge.

15th June 2006



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ABSTRACT

Yams are regarded as health foods and not staple foods in oriental countries. Yam flour is worth developing since flour can be easily stored for long period of time and conveniently used in manufacturing formulated foods or capsules for consumption. The objectives of this study was to evaluate the effect of different drying methods on physicochemical and antioxidant activities of yam flours. Two varieties of yams, *Dioscorea alata*, white yam and purple yam, which were bought from Pasar Payang, Kuala Terengganu, were used for this study. The yams were made into flours by freeze drying and hot air drying. The chemical compositions, physical properties and antioxidant activities of yam flours were determined. The antioxidant activity was measured by using Ferris Thiocyanate (FTC) method. Methanol and ethyl acetate were used as extracting solvent. For the chemical analysis, drying methods showed significant effects ($p < 0.05$) on the moisture, ash, protein, and fiber for both white and purple yam flours. However, drying methods showed no significant effect ($p < 0.05$) on the fat contents of both the white and purple yam flours. As for the physical analysis, colour attributes and Water Absorption Capacity (WAC) of yam flours were all affected by drying methods to different extents. However, for both white yam and purple yam, drying methods showed no significant effect ($p < 0.05$) on the Water Solubility Index (WSI) of the yam flours. As for the antioxidant analysis using FTC method, different drying methods showed significant difference ($p < 0.05$) in antioxidative activities of methanol and ethyl acetate extracts of both purple yam and white yam flours. It was found that freeze drying preserved more of the antioxidant activities in methanol and ethyl acetate yam flour extracts than hot air drying. All methanol yam flour extracts have the antioxidant activities which were as good as Butylated Hydroxytoluene (BHT). All methanol yam flour extracts showed significantly ($p < 0.05$) higher antioxidative activity compared to α -tocopherol (0.55 ± 0.02^b). Besides this, all ethyl acetate yam flour extracts showed significantly ($p < 0.05$) higher antioxidative activity compared to α -tocopherol (0.55 ± 0.02^b) except for purple yam flour extract which was prepared by hot air drying (0.53 ± 0.02^b). The study suggested that yam flour extracts could be used as accessible source of natural antioxidant.

KESAN KAEDAH PENGERINGAN YANG BERLAINAN KE ATAS KIMIA FIZIKAL DAN AKTIVITI ANTIOKSIDAN DARIPADA TEPUNG UBI BADAK

ABSTRAK

Di Negara-negara Timur, ubi badak adalah sebagai makanan kesihatan dan bukannya makanan utama. Oleh itu, adalah bermanfaat sekiranya penghasilan tepung ubi badak dapat dilakukan kerana ia boleh disimpan untuk jangka masa yang lama. Objektif kajian ini dilakukan adalah untuk mengkaji kesan kaedah pengeringan yang berbeza ke atas kimia fizikal dan aktiviti antioksidan tepung ubi badak. Ubi badak putih dan ungu telah dibeli dari Pasar Payang, Kuala Terengganu dan digunakan untuk kajian ini. Ubi-ubi badak ini telah diproses menjadi tepung ubi badak melalui kaedah pengeringan udara panas dan pengeringan sejuk beku. Analisis komposisi kimia, ciri-ciri fizikal dan aktiviti antioksidan telah dijalankan ke atas tepung ubi badak tersebut. Aktiviti antioksidan tepung ubi badak ditentukan dengan menggunakan kaedah Ferric Thiocyanate (FTC), di mana methanol dan etil asetat digunakan sebagai pelarut pengekstrak. Bagi analisis kimia, kaedah pengeringan menunjukkan perbezaan yang signifikan ($p < 0.05$) ke atas kandungan kelembapan, abu, protein dan gentian serat tepung ubi badak. Akan tetapi, kaedah pengeringan tidak menunjukkan perbezaan yang signifikan ($p < 0.05$) ke atas kandungan lemak tepung ubi badak. Bagi analisis fizikal, kaedah pengeringan yang berbeza memberi kesan terhadap atribut warna dan kapasiti penyerapan air tepung ubi badak secara takat yang berbeza. Akan tetapi, kaedah pengeringan tidak menunjukkan perbezaan yang signifikan ($p < 0.05$) terhadap Indeks Keterlarutan Air tepung ubi badak. Bagi analisis antioksidan yang menggunakan kaedah FTC, kaedah pengeringan menunjukkan perbezaan yang signifikan ($p < 0.05$) ke atas ekstrak-ekstrak metanol dan etil asetat bagi tepung ubi badak putih dan ungu. Didapati bahawa pengeringan sejuk beku memelihara lebih banyak aktiviti antioksidan dalam ekstrak ubi metanol dan etil asetat jika dibandingkan dengan pengeringan udara panas. Semua ekstrak ubi metanol menunjukkan aktiviti antioksidan sebaik dengan BHT. Semua ekstrak ubi metanol menunjukkan aktiviti antioksidan yang tinggi secara signifikan ($p < 0.05$) berbanding dengan α -tokoferol (0.55 ± 0.02^b). Selain itu, semua ekstrak ubi etil asetat menunjukkan aktiviti antioksidan yang tinggi secara signifikan ($p < 0.05$) berbanding dengan α -tokoferol (0.55 ± 0.02^b) kecuali ekstrak tepung ubi ungu yang disediakan secara pengeringan udara panas (0.53 ± 0.02^b). Adalah dicadangkan supaya ekstrak ubi digunakan sebagai sumber antioksidan yang semulajadi.