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Antioxidative activity of mengkudu (*Morinda citrifolia* L.) leaf and fruit from different maturity stage and locations / Roziyah Ramli.

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**HAK MILIK**  
PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH

**ANTIOXIDATIVE ACTIVITY OF MENGGUDU (*Morinda citrifolia* L.) LEAF AND FRUIT  
FROM DIFFERENT MATURITY STAGE AND LOCATIONS**

**ROZIAH BINTI RAMLI**

**RESEARCH PROJECT submitted in partial fulfillment of the requirements 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 for quotations and summaries which have been duly acknowledged.

15<sup>th</sup> June 2006



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(ROZIAH BINTI RAMLI)

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Approved by,

15<sup>th</sup> June 2006



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(PUAN ZAMZAHAILA BINTI MOHD ZIN)

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## ABSTRACT

This study was conducted to evaluate the antioxidative activity of extracts from twelve samples of *mengkudu*'s leaf and fruit from different locations and maturity stages. The samples were: young leaf (Pak Tuyu); old leaf (Pak Tuyu); young leaf (Batu Rakit); old leaf (Batu Rakit); young leaf (Sekayu); old leaf (Sekayu); young fruit (Pak Tuyu); ripen fruit (Pak Tuyu); young fruit (Batu Rakit); ripen fruit (Batu Rakit); young fruit (Sekayu); ripen fruit (Sekayu). Methanol and ethyl acetate were used as extracting solvent. The antioxidative activities of methanol and ethyl acetate extracts were measured by using ferric thiocyanate (FTC) method and  $\alpha$ - $\alpha$ -diphenyl- $\beta$ -picrylhydrazyl (DPPH) assay method, whereas total phenolic compounds (TPCs) was measured using Folin ciocalteu method. Then, the samples were compared with Butylated hydroxytoluene (BHT) which was considered as synthetic antioxidant and  $\alpha$ -tocopherol as natural antioxidant. Among the samples tested, methanol extracts of *mengkudu*'s old leaf sample from Batu Rakit shown highest antioxidative activity compared to old leaf sample from Pak Tuyu and Sekayu, but majority of crude extracts from Sekayu was slightly highest than samples from other locations. The crude extract of young *mengkudu*'s fruit samples from all locations had highest antioxidative activities compared to ripen fruits. It is interesting to note that there were no significant difference towards lipid peroxidation of all the ethyl acetate extracts compared to BHT. *mengkudu*'s young leaf from Pak Tuyu had a lower amount of antioxidative activities and *mengkudu*'s ripen fruit from Sekayu had a highest antioxidative activities in extracts of ethyl acetate which were measured by DPPH method. There were no significantly difference among the samples in crude extracts of ethyl acetate. While, phenolic compounds in different extract of samples were not significantly different from each other except in samples of old leaf from Pak Tuyu, young leaf from sekayu and young fruit that was also from Sekayu. The results of this study strongly showed that extract of *mengkudu*'s leaf and fruit from different locations and maturity stages were high in antioxidant constituents regarding lipid peroxidation but *mengkudu* from Sekayu (wetland) and both *mengkudu*'s young leaf and fruits have more antioxidative activities than matured one.

## **AKTIVITI PENGOKSIDAAN DALAM DAUN DAN BUAH MENGGKUDU (*Morinda citrifolia* L. ) PADA TAHAP KEMATANGAN DAN LOKASI BERBEZA**

### **<sup>1</sup>ABSTRAK**

Kajian ini dijalankan adalah untuk menentukan aktiviti antioksidan bagi ekstrak daripada dua belas sampel yang terdiri daripada daun dan buah mengkudu dari lokasi dan tahap kematangan berbeza. Sampel-sampelnya adalah daun muda (Pak Tuyu); daun tua (Pak Tuyu); daun muda (Batu Rakit); daun tua (Batu Rakit); daun muda (Sekayu); daun tua (Sekayu); buah muda (Pak Tuyu); buah tua (Pak Tuyu); buah muda (Batu Rakit) dan buah tua (Sekayu). Metanol and etil asetat digunakan sebagai pelarut pengestrakan. Aktiviti antioksidan di dalam ekstrak metanol dan etil asetat diukur dengan menggunakan kaedah *ferric thiocyanate* (FTC) dan kaedah *α-α-diphenyl-β-picrylhydrazyl* (DPPH). Manakala kandungan komponen fenolik diukur menggunakan kaedah Folin ciocalteu. Kesemua sampel akan dibandingkan dengan menggunakan *Butylated hydroxytoulene* (BHT) yang dikenali sebagai antioksidan sintetik dan *α-tocopherol* sebagai antioksidan semulajadi. Daripada sampel yang dikaji, ekstrak metanol daun mengkudu tua dari Batu Rakit menunjukkan aktiviti antioksidan yang paling tinggi jika dibandingkan dengan sampel dari Pak Tuyu dan Sekayu. Namun demikian, majoriti ekstrak mengkudu dari Sekayu adalah tinggi dalam aktiviti antioksidan. Aktiviti antioksidan bagi buah mengkudu muda adalah lebih tinggi daripada buah mengkudu tua dari setiap lokasi. Daripada kajian ini juga didapati, tiada perbezaan bererti terhadap pengoksidaan lipid dalam ekstrak etil asetat jika dibandingkan dengan BHT. Daun mengkudu muda dari Pak Tuyu mempunyai aktiviti antioksidan paling rendah manakala buah mengkudu tua dari Sekayu mengandungi aktiviti antioksidan paling tinggi dalam ekstrak etil asetat apabila diukur dengan kaedah DPPH. Bagi ekstrak etil asetat untuk kaedah yang sama menunjukkan tiada perbezaan yang bererti. Bagi kaedah Folin ciocalteu juga tiada perbezaan yang signifikan kecuali bagi ekstrak sampel daun mengkudu tua Pak Tuyu, daun mengkudu muda dan buah mengkudu muda Sekayu. Hasil kajian juga menunjukkan semua sampel daun dan buah mengkudu dari lokasi dan tahap kematangan berbeza mengandungi aktiviti antioksidan yang tinggi bagi mencegah pengoksidaan lipid namun, mengkudu dari Sekayu (tanah lembap) dan daun serta buah mengkudu muda mengandungi aktiviti antioksidan yang lebih tinggi berbanding daun dan buah mengkudu tua.