

UNIVERSITI TEKNOLOGI MARA

**MUTAGENIC EFFECT AND
ANTIMUTAGENIC POTENTIAL OF
AQUEOUS AND METHANOL
EXTRACTS FROM
Hydrocotyle bonariensis AND
*Centella asiatica***

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Thesis submitted in the fulfillment
of the requirements for the degree of
Master of Science

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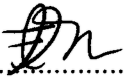
January 2015

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Mutations are the cause of innate metabolic defects in cellular system, triggering morbidity and mortality in living organisms. Since the mutagens are involved in the initiation and promotion of several human diseases, including cancer, the significance of novel bioactive phytochemicals in counteracting these pro-mutagenic and carcinogenic effects is now gaining attention. The aims of this study are to evaluate the phytochemical constituent, to determine the antioxidant capacity and to determine the mutagenic effect and antimutagenic potential in the absence and presence of metabolic activation (S9) in the plants extracts. In these study two samples namely *H.bonariensis* and *C.asiatica* aerial parts and roots in aqueous and methanol extracts were used to determine its bioactive compound via phytochemical screening and antioxidant capacity using the FRAP assay. Determination of the mutagenic effect and antimutagenic potential for both plants species were done using the Ames test after the bacterial strains fulfill the genotype characteristics needed. The finding revealed that both plants extract possessed alkaloid, phenol and tannins on its phytochemical content except for flavonoid which was only found in methanol extracts of *H.bonariensis* aerial parts. In the FRAP assay, both plants extracts showed antioxidant power. The results indicated that both methanol extracts of *H.bonariensis* aerial parts and methanol extracts of *C.asiatica* aerial parts and roots contain strong antioxidant power with high value of ascorbic acid equivalent. In the mutagenicity study, the methanol extracts of the aerial parts of *H.bonariensis* showed significant different ($p<0.05$) when compared to the negative control which shows positive response mutagenic effect at the concentration of 50 mg/ml with the mean number of revertant colony of 36.7 ± 6.4 for strain *S.typhimurium* TA 98 with the presence of metabolic activation (+S9). However, no mutagenic effect was observed by the roots of *H.bonariensis* in both extracts. On the other hand, the methanol extracts of the aerial parts of *C.asiatica* showed mutagenicity effect when tested in the presence of metabolic activation (+S9) by *S.typhimurium* TA 98 strain. The methanol extracts of the aerial parts of *C.asiatica* showed a significant difference ($p<0.05$) when compared to the negative control in all concentrations studied and also a dose-response relationship. The mean number of revertant colony at concentration of 50 mg/ml was 94.0 ± 2.6 , 66.3 ± 7.8 for the concentration of 12.5 mg/ml and 38.0 ± 2.6 for the concentration of 3.125 mg/ml. No mutagenic effects were seen when treated with *C.asiatica* roots in both aqueous and methanol extracts. In contrast, both aerial parts and roots of *H.bonariensis* and *C.asiatica* in aqueous and methanol extracts exhibited an antimutagenic effect against direct mutagen. The strong antimutagenic effect was found in methanol extracts of *C.asiatica* aerial parts and roots against the direct mutagen in *S.typhimurium* TA 98 with the percentage of inhibition valued 64.39% and 67.80% respectively. In conclusion, both extracts of *H.bonariensis* and *C.asiatica* aerial parts and roots have alkaloid, phenol and tannins and also antioxidant capacity which possibly contribute to the antimutagenic potential against direct mutagen by both plants species. The mutagenic effect was only showed by the methanol extracts of aerial parts of *H.bonariensis* and *C.asiatica* in the presence of metabolic activation (+S9).

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