ANALYSIS OF *Acalypha indica* EXTRACTS FOR ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES

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Faculty of Biosciences and Medical Engineering
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Special dedicated to

ADABI CONSUMER INDUSTRIES SDN BHD

As the main sponsor of UTM-ADABI Halal Cat Food Project

MINISTRY HIGHER EDUCATION MALAYSIA and MARA

As provider for financial support

My beloved FAMILIES and FRIENDS

For unwavering love, support and encouragement
ACKNOWLEDGEMENT

بسم الله الحمدلله على كل حال

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NURUN NABILAH
29 SEPTEMBER 2015
ABSTRACT

Herbal medicines are made from herbs to treat or prevent disease which has been used since ancient. This present study was undertaken to investigate antioxidant and antibacterial activity of leaf-stem, root and whole plant of *Acalypha indica* by using aqueous-ethanol, aqueous-vinegar and water as solvents. Soxhlet apparatus was utilized in preparing the extracts by using fresh sample. All samples were evaluated for antioxidant activity by using DPPH assay and antibacterial activity, which assessed through disc diffusion method. *Staphylococcus aureus*, *Enterococcus faecalis*, *Escherichia coli* and *Pseudomonas aeruginosa* were used to analyze the antibacterial activity at different concentration of the extracts. Aqueous-ethanol extract of leaf-stem was found possessing highest activity of antioxidant with IC$_{50}$ at 21 µg/mL. Meanwhile, all parts of aqueous-ethanol and aqueous-vinegar extracts were susceptible against all those bacteria whilst water extracts were resistance. Presence of bioactive compounds such as flavonoids, phenolic compounds and alkaloids would be the vigor core of those activities. This study suggests the latent potential of *Acalypha indica* to be used as natural source for herbal medicine or any industrial related applications.
ABSTRAK

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<td>Absorbance</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
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<tr>
<td>ATCC</td>
<td>American Type Culture Collection</td>
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<tr>
<td>DMSO</td>
<td>Dimethylsulfoxide</td>
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<tr>
<td>DPPH</td>
<td>2,2-diphenyl-1-picrylhydrazyl</td>
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<tr>
<td>etc</td>
<td>Et cetera</td>
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<tr>
<td>FRIM</td>
<td>Forest Research Institute of Malaysia</td>
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<tr>
<td>g</td>
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<td>M</td>
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<td>NHCP</td>
<td>National Health Care Programmes</td>
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<td>nm</td>
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<tr>
<td>R</td>
<td>Resistant</td>
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<tr>
<td>UTI</td>
<td>Urinary tract infection</td>
</tr>
<tr>
<td>UV</td>
<td>Ultra violent</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>°C</td>
<td>degree Celsius</td>
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<tr>
<td>µg</td>
<td>Microgram</td>
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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Malaysia is bestowed with botanical wealth and diverse types of herbs. Those herbs possess medicinal properties which give enough purpose for people to utilize them since ancient. In these recent years, healthcare industry started diverting their heed towards the application of plant-based product as organic care products to meet the growing demands. People globally much perceive that organic product such plant-based product is safer to use than synthesized chemical-based product.

*Acalypha indica* known as ‘Kucing Galak’ in Malaysia, commonly treated as noxious weed which usually found in roadsides and low altitude of agricultural lands. This herb belongs to Euphorbiaceae family, also called as Ceka Emas, Cika Mas and Rumput Lis-lis by local (Forest Research Institute Malaysia [FRIM], 2013). This plant has been applied in alternative medicine in the Indian, and useful in treating many diseases like pneumonia, asthma, rheumatism and use as ailments (Jagatheeswari *et al.*, 2013). Poultice of this herb is applied to treat bedsore and wound and its leaves reported to possess contraceptive activity (Bourdy & Walter, 1992).
Relatively, herbal medicine has been a part of human evolution and still applied till nowadays. Herbal extracts are used for many purposes, including stress reliever, muscle relaxer, anti-venom, remedy for infection and many more, depending on type of plants used. Hence, possess important properties such as antioxidant and antibacterial would be a remarkable characteristic for a best extract. Antioxidant, compound capable of inhibit or delay the oxidation by neutralizing free radicals toxic effects (He et al., 2012). Acalpha indica is one of the plants that believed possessed such properties which may help fill up the needs of interest both in industry and scientific research towards application of medicinal herbs (Sanseera, 2012; Shanmugapriya, 2011).

1.2 Statement of Problem

Acalypha indica is well-known herbs use by traditional medicine practitioner as one of strong herbs that successively help in curing and used as preventive measures in many diseases. Using vinegar or aqueous-ethanol for extraction considered as a new thing since researchers commonly used solvents such as methanol, ethanol and acetone in extraction of this plant. On the side of sample preparation, researchers commonly chose dried over fresh samples. In addition, most of previous study focusing on leaf instead of whole plant or other part such roots and stem. Thus, some lingering question to be answer including, does A. indica extract is a worth useful product to use? Which solvent likely the best to use, in term of its part or sample chosen based on antioxidant activity and antimicrobial activity?
1.3 Specific Objective of Study

1. To extract *Acalypha indica* leaf-stems, roots and whole plants using aqueous ethanol, aqueous vinegar and water as solvents
2. To analyze the antioxidant activity of *Acalypha indica* extracts
3. To evaluate the antibacterial activity of *Acalypha indica* extracts using disc diffusion method

1.4 Significance of Study

*Acalypha indica* is believed possessing potent ability in matter of preventive as well as curative. This study is conducted to investigate the potential antioxidant properties and its antimicrobial activity against some common bacterial. This finding would be beneficial and help contributing for the better development in healthcare indirectly.

1.5 Scope of Research

The study focuses on the extraction of *Acalypha indica* using aqueous-ethanol, aqueous-vinegar and water as solvents by using Soxhlet apparatus. This study also involved on assessing the antioxidant and antimicrobial activities of the mentioned plant.
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