

Hibiscus tiliaceus AS POTENTIAL SOURCE FOR
ANTIOXIDANT AND ANTICANCER AGENT

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SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
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***Hibiscus tiliaceus* AS POTENTIAL SOURCE FOR ANTIOXIDANT
AND ANTICANCER AGENT**

By

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**Research Report submitted in partial fulfilment of
the requirements for the degree of
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**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU**

**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled *Hibiscus tiliaceus* As Potential Source for Antioxidant and Anticancer Agent by Noor Zulaikha Binti Shamsudin, Matric Number UK26638 have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment as partial fulfilment towards obtaining Degree of Bachelor of Science (Marine Biology), School of Marine Science and Environment, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

v/v	-	volume to volume ratio
cm	-	centimeter
mm	-	millimeter
nm	-	nanometer
mg	-	milligram
ml	-	milliliter
μl	-	microliter
M	-	Molarity
cm ²	-	centimeter square
°C	-	degree Celcius
DPPH	-	2,2-diphenyl-1-picrylhydrazyl
OD	-	Optical density
IC ₅₀	-	Concentration for 50% inhibition
TLC	-	Thin layer chromatography
UV	-	Ultraviolet
R _f	-	Retardation factor
DMSO	-	Dimethyl sulfoxide
FBS	-	Fetal bovine serum
PBS	-	Phosphate buffer saline
CO ₂	-	Carbon dioxide
MTT	-	3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazoliumbromide

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ABSTRACT

Hibiscus tiliaceus (Sea hibiscus) is a tree that grows in the coastal environment and widely distributed in tropical mangroves regions. The objectives of this study are to know the antioxidant activity of the extracts of *H. tiliaceus* by using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and to study the anticancer activity of *H. tiliaceus* extracts against MCF-7 human breast cancer cells by using the MTT assay. Quercetin was used as standard for antioxidant and anticancer activities. The extract used are methanol, hexane, ethyl acetate and water extracts from the flower (HMF, HHF, HEAF and HWF), seed (HMS, HHS, HEAS and HWS) and leaf (HML, HHL, HEAL and HWL) of *H. tiliaceus*. In quantitative assay of antioxidant, ten of sample extracts (HMF, HMS, HML, HHS, HEAF, HEAS, HEAL, HWF and HWL) contained antioxidant activity higher than quercetin which has IC_{50} of 0.127 mg/ml and two samples extracts have antioxidant activity lower than quercetin which are HHF and HHL. HEAF has the highest antioxidant activity with IC_{50} of 0.085 mg/ml. Meanwhile in qualitative assay, TLC plates showed that HHS has seven potential antioxidant fractions and HEAF has two fractions. For anticancer activity, IC_{50} of quercetin is in range of moderately toxic (25.0 μ g/ml) and HEAF in range of mildly toxic (39.0 μ g/ml). This showed that both quercetin and HEAF contained low anticancer activity against MCF-7. Based on this study on antioxidant and anticancer activities of *H. tiliaceus*, it is clearly indicates the *H. tiliaceus* has potential as antioxidant agent but not as anticancer agent against MCF-7 human breast cancer cell.

***Hibiscus tiliaceus* SEBAGAI SUMBER BERPOTENSI UNTUK EJEN**

ANTIOKSIDA DAN ANTIKANSER

ABSTRAK

Hibiscus tiliaceus (Baru laut) merupakan satu pokok yang tumbuh di persekitaran pantai dan meluas di kawasan bakau tropikal. Objektif kajian ini adalah untuk mengetahui aktiviti antioksidan bagi ekstrak *H. tiliaceus* menggunakan ujian DPPH dan untuk mengkaji aktiviti antikanser *H. tiliaceus* melawan sel kanser payudara manusia MCF-7 menggunakan ujian MTT. Kuersetin digunakan sebagai piawai untuk aktiviti antioksidan dan antikanser. Ekstrak yang digunakan ialah ekstrak-ekstrak metanol, heksana, etil asetat dan air daripada bahagian bunga (HMF, HHF, HEAF dan HWF), buah (HMS, HHS, HEAS dan HWS) dan daun (HML, HHL, HEAL dan HWL) pokok *H. tiliaceus*. Dalam pengujian antioksidan kuantitatif, sepuluh ekstrak sampel (HMF, HMS, HML, HHS, HEAF, HEAS, HEAL, HWF and HWL) mengandungi aktiviti antioksidan yang lebih tinggi dari kuersetin yang mempunyai 0.127 mg/ml nilai IC₅₀ dan dua ekstrak sampel yang rendah dari kuersetin iaitu HHF dan HHL. HEAF mempunyai aktiviti antioksidan yang paling tinggi dengan 0.08 mg/ml nilai IC₅₀. Manakala dalam pengujian kualitatif, plat TLC menunjukkan bahawa HHS mempunyai tujuh bahagian berpotensi antioksidan dan HEAF mempunyai dua bahagian. Bagi aktiviti antikanser, nilai IC₅₀ bagi kuersetin berada pada lingkungan ketoksikan sederhana (25.0 µg/ml) dan HEAF pada lingkungan ketoksikan ringan (39.0 µg/ml). Ini menunjukkan bahawa kedua-dua kuersetin dan HEAF mengandungi aktiviti antikanser melawan sel MCF-7 yang rendah. Berdasarkan kajian ini ke atas aktiviti antioksidan dan antikanser *H. tiliaceus*, ini jelas

menunjukkan bahawa *H. tiliaceus* mempunyai potensi sebagai ejen antioksidan tetapi bukan sebagai ejen antikanser melawan sel kanser payudara manusia MCF-7.