ANTICANCER AND ANTIOXIDANT ACTIVITY OF SWEET CORN (*Zea Mays*) EXTRACTS AGAINST HUMAN BREAST CANCER (MCF-7) CELL LINE

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By
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Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Food Science (Food Service and Nutrition)

DEPARTMENT OF FOOD SCIENCE
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ENDORSEMENT

The project report entitled **Anticancer and Antioxidant Activity of Sweet Corn (*Zea Mays*) Extracts Against Human Breast Cancer (MCF-7) Cell Line** by **Lee Mei Chee,** Matric No. **UK16610** has been reviewed and corrections have been made according to the recommendations by examiners. This report is submitted to the Department of Food Science in partial fulfillment of the requirement of the degree of Bachelor of Food Science (Food Service and Nutrition), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu.

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(Dr Hayati Mohd Yusof)

Main Supervisor

DATE: 29/1/2012

DECLARATION

I hereby declare that the work in this thesis in my own except for quotations and summaries which have been duly acknowledged.

Signature : .....

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ABSTRACT

Breast cancer is one of the mortality diseases which can affect anyone in the world. It is also a leading cause of cancer deaths among women in Malaysia. Chemotherapy drug for breast cancer treatment result in several physiological and psychological distress to patient. Thus, research concentrated an alternative and provide better anti breast cancer treatment with fewer side effects is crucial. Sweet corn (*Zea mays*) is believed to provide variety of medical value in cancer researches. In the present study, the sweet corn extracts of fresh corn kernel (FC), cooked corn kernel (CC), corn silk (CS) and corn husk (CH) were used to determine the cytotoxic and antioxidant activities. In cytotoxicity study, different concentrations of corn extracts were tested against MCF-7 cell line in 96 well plates for 72 hours at 37°C. The IC_{50} value obtained were 9.37 µg/mL (FC), 47 µg/mL (CC), 75 µg/mL (CS) and 96 µg/mL (CH). Moreover, for antioxidant assay, 50% inhibition of DPPH concentration was determined. The EC_{50} value given by FC, CC, CS and CH were 13.20 µg/mL, 6.25 µg/mL, 45 µg/mL, and 6.72 µg/mL, respectively. All the samples showed the higher EC_{50} value as compared to standard pure compound, quercetin where the EC_{50} obtained was 1.67 µg/mL. The result of this study showed that FC had high cytotoxicity activity compared to other extracts and it can be considered as an ideal anti cancer agent. Although CC had higher antioxidant activity compared with FC or other, the FC still had potency to be used as chemopreventive agent. The confirmation of presence of bioactive such as saponin, alkaloid and tannin via Thin Layer Chromatography Profiling (TLC) method in fresh corn contribute to its high cytotoxic activity. Therefore, the safe use of the corn product as health supplement for the benefits of health can be considered.

ABSTRAK

AKTIVITI ANTI-KANSER DAN ANTI-OKSIDA EKSTRAK JAGUNG MANIS (*Zea mays*) TERHADAP KANSER PAYU DARA MANUSIA (MCF-7) LINE SEL

Kanser payu dara merupakan salah satu penyakit kematian yang boleh menjangkiti sesiapa saja di dunia. Ia merupakan punca utama kematian akibat daripada kanser dalam kalangan wanita di Malaysia. Ubat kemoterapi untuk rawatan kanser payu dara membawa kesusahan dari segi fisiologi dan psikologi kepada pesakit. Oleh itu, penyelidikan menumpukan perhatian kepada agen anti kanser payu dara yang lebih baik dengan kesan sampingan yang kurang. Jagung manis dipercayai memiliki pelbagai nilai perubatan dalam penyelidikan kanser. Dalam kajian ini, ekstrak jagung manis segar (FC), jagung dimasak (CC), sutera jagung (CS) dan sekam jagung (CH) telah digunakan untuk menentukan sitotoksik dan aktiviti antioksida. Dalam kajian sitotoksik, kepekatan ekstrak jagung yang berbeza telah diuji terhadap sel-sel kanser dada manusia (MCF-7) dalam 96 pinggan dengan baik selama 72 jam pada 37^0C. Nilai IC_{50} diperolehi adalah 9.37 µg/mL, 47 µg/mL, 75 µg/mL dan 96 µg/mL. Selain itu, bagi uji antioksida, 50% kerencatan DPPH dalam ekstrak ditentukan. Nilai EC_{50} yang diberikan oleh FC, CC, CS dan CH adalah 13.20 µg/mL, 6.25 µg/mL, 45 µg/mL dan 6.72 µg/mL masing masing. Semua sampel menunjukkan EC_{50} yang lebih tinggi berbanding dengan sebatian tulen standard, quercetin di mana EC_{50} yang diberikan adalah 1.67 µg/mL. Hasil kajian ini menunjukkan bahawa FC mempunyai aktiviti cytotoxicity yang tinggi berbanding dengan ekstrak lain dan ia boleh dipertimbangkan sebagai agen anti kanser. Walaupun, CC mempunyai aktiviti antioksida yang lebih tinggi berbanding dengan FC atau lain-lain. FC masih mempunyai potensi untuk digunakan sebagai agen pencegahan kemoterapi. Pengesahan kehadiran bioaktif seperti alkaloid, saponin dan tannin melalui kromatografi lapis tipis (TLC) dalam jagung segar menyumbang kepada aktivit sitotoksik yang tinggi. Oleh itu, penggunaan yang selamat produk jagung sebagai makanan tambahan kesihatan untuk faedah kesihatan boleh dipertimbangkan.