

**EXTRACTING BIOACTIVE COMPOUNDS FROM *MORINGA*  
*OLEIFERA* LEAVES FOR ANTICANCER PRODUCT**

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## ABSTRACT

Cancer is one of the most dangerous illness in the world. It occurs when cells in the body divide at an uncontrolled rate which then produces lumps or masses of tissue known as tumour. In addition, it affects the digestive, nervous and circulatory systems, these tumours also produce hormones which disrupts body functions. A benign tumour which remains in the same spot is harmless. On the contrary, a malignant tumour is dangerous as it may destroy healthy cells. These malignant tumours spread to healthy cells through the blood or lymphatic system. This condition is known as metastasis. Nowadays, various modern cancer treatments are available including surgery, drugs, chemotherapy, radiation therapy, steroid medications, and hormonal therapy. However, there are numerous side effects that arise from these modern treatments such as heart, lung, endocrine system, bone, joint, soft tissue, brain, spinal cord, nerve, memory, dental, vision and digestion problems. Moreover, the patient may suffer from emotional difficulties, fatigue as well as develop secondary type of cancer. In order to prevent side effects which arise from modern cancer treatments, a more natural approach with no detrimental effects to human health is required to combat cancer. The objectives of this research is to extract the bioactive compounds from the leaves of *Moringa oleifera* and to test the effect of the extracted material on cancer cells. In this study, the bioactive compounds from *Moringa oleifera* leaves is extracted using two methods which are the Soxhlet extraction method using ethanol, 2-propanol, acetone, petroleum ether and water solvent and the soaking method using ethanol and boiling water as solvent. Sample S2 which employed the Soxhlet extraction technique using water as the solvent exhibited significant cytotoxic activity against the human breast adenocarcinoma cancer cell line (MCF-7) in a concentration dependent manner with an  $IC_{50}$  value of  $81.77 \pm 6.05 \mu\text{g/mL}$ . The other samples showed no cytotoxic activity.

## ABSTRAK

Kanser merupakan penyakit yang paling berbahaya di dunia ini. Kanser berpunca daripada penghasilan tumor melalui pembahagian sel-sel badan pada kadar yang tidak terkawal. Selain menjejaskan sistem pencernaan, sistem saraf dan sistem peredaran darah, tumor kanser turut menghasilkan hormon yang mengganggu fungsi badan. Tumor *benign* dianggap tidak membahayakan, tumor *malignant* pula sebaliknya kerana tumor ini mampu menghapuskan sel-sel yang sihat. Penyebaran tumor *malignant* boleh berlaku melalui sistem peredaran darah dan limfa. Keadaan ini dikenali sebagai metastasis. Pada masa kini, terdapat pelbagai rawatan kanser yang moden seperti pembedahan, ubat-ubatan dadah, kemoterapi, terapi radiasi, ubat-ubatan steroid serta terapi hormon. Walau bagaimanapun, terdapat pelbagai kesan sampingan yang timbul melalui rawatan moden ini seperti masalah jantung, paru-paru, endokrin, tulang, sendi, tisu lembut, otak, saraf tunjang, saraf, ingatan, pergigian, penglihatan dan sistem pencernaan. Lebih-lebih lagi, pesakit mungkin menghadapi masalah emosi, keletihan dan masalah penghasilan kanser *secondary*. Bagi melawan penyakit kanser, kaedah semula jadi yang tidak memudaratkan kesihatan manusia patut digunakan bagi mengurangkan kesan negatif yang timbul akibat rawatan kanser moden. Objektif kajian ini adalah untuk mengekstrak kompon bioaktif yang terkandung dalam daun *Moringa oleifera* serta untuk menguji aktiviti sitotoksik ekstrak terhadap kanser sel adenokarsinoma payudara manusia (MCF-7). Menerusi kajian ini, kompon bioaktif yang terkandung dalam daun *Moringa oleifera* diekstrak melalui dua jenis kaedah iaitu kaedah pengekstrakan Soxhlet dengan menggunakan ethanol, 2-propanol, acetone, petroleum ether dan air sebagai pelarut serta kaedah rendaman menggunakan ethanol dan air sebagai pelarut. Sample S2 yang mengaplikasikan kaedah pengekstrakan Soxhlet dengan menggunakan air sebagai pelarut menunjukkan aktiviti sitotoksik (nilai  $IC_{50} = 81.77 \pm 6.05 \mu\text{g/mL}$ ) yang positif terhadap kanser cell yang diuji. Sample yang lain tidak memaparkan activity sitotoksik.