Title : Evaluation of anticancer and antioxidant activities of *Curcuma globulifera* extracts

Author(s) : **1.** Supitcha Techapun **Student ID :** 650510108

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Advisor(s) : **1.** Associate Professor Dr. Panchika Prangkio

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ABSTRACT

Cancer remains a leading cause of death worldwide, driving the search for natural anticancer agents. *Curcuma globulifera,* a newly identified species from the northern of Thailand, has not been extensively studied for its biological properties. This study aims to evaluate the anticancer and antioxidant activities of *C. globulifera* extracts, obtained from rhizomes and sequentially extracted with hexanes, ethyl acetate (EtOAc), and methanol (MeOH). Cytotoxicity of plant extract in three different fractions was assessed using the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay against human lung carcinoma (A549), ACE2-overexpressing lung cancer (A549-ACE2), osteosarcoma (143B), cervical cancer (HeLa), and human embryonic kidney (HEK293T) cell lines, while antioxidant activity was determined by the DPPH (2,2 diphenyl-1-picrylhydrazyl) radical scavenging assay. In lung cancer cells, the hexane extract exhibited the strongest cytotoxicity toward A549 and A549-ACE2 cells, with IC_{50} values of 22.56 ± 0.43 µg/mL and 25.64 ± 0.41 µg/mL, respectively, whereas the MeOH and EtOAc extracts showed moderate cytotoxicity. Cytotoxicity between A549 and A549-ACE2 cells was not significantly different ($p > 0.05$). In cervical cancer (HeLa) cells, the hexane extract also demonstrated high cytotoxicity (IC_{50} = 21.08 ± 0.82 µg/mL), followed by lower activity in the MeOH and EtOAc fractions. In osteosarcoma (143B) cells, all extracts exhibited lower cytotoxicity compared to lung and cervical cancer cells, with the hexane extract remaining the most active (IC_{50} = 52.57 ± 7.53 µg/mL). In HEK293T cells, all extracts showed slightly lower cytotoxicity than lung and cervical cancer cells, with IC_{50} values of 29.08 ± 5.04 µg/mL (hexane), 42.83 ± 6.29 µg/mL (MeOH), and 65.19 ± 1.59 µg/mL (EtOAc). Overall, *C. globulifera* extracts exhibited pronounced cytotoxic effects, particularly in lung and cervical cancer cells, with the hexane fraction showing the strongest activity. Moreover, *C. globulifera* extracts displayed moderate antioxidant activity, with IC_{50} values of 159.57 ± 6.00 µg/mL and 136.53 ± 4.67 µg/mL, for the MeOH and EtOAc extracts, respectively, whereas the hexane extract showed the lowest antioxidant activity (IC_{50} value of 15.96 ± 0.51 mg/mL). These findings indicate that *C. globulifera* contains bioactive compounds with cytotoxic and antioxidant properties, supporting further investigation for anticancer applications.

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