

## **Antitumor and antioxidant effects of *Clinacanthus nutans* Lindau in 4T1 tumor-bearing mice**

### **ABSTRACT**

**Background:** *Clinacanthus nutans* Lindau (*C. nutans*) is a species of in Acanthaceae family and primarily used in South East Asian countries. *C. nutans* is well known as Sabah snake grass in Malaysia, and its leaves have diverse medicinal potential in conventional applications, including cancer treatments. On the basis of literature search, there is less conclusive evidence of the involvement of phytochemical constituents in breast cancer, in particular, animal tumor models. The current study aimed to determine the antitumor and antioxidant activities of *C. nutans* extract in 4 T1 tumor-bearing mice.

**Methods:** *C. nutans* leaves were subjected to methanol extraction and divided into two different concentrations, 200 mg/kg (low-dose) and 1000 mg/kg (high-dose). The antitumor effects of *C. nutans* extracts were assessed using bone marrow smearing, clonogenic, and splenocyte immunotype analyses. In addition, hematoxylin and eosin, tumor weight and tumor volume profiles also used to indicate apoptosis appearance. Serum cytokine levels were examined using ELISA assay. In addition, nitric oxide assay reflecting antioxidant activity was performed.

**Results:** From the results obtained, the methanol extract of *C. nutans* leaves at 200 mg/kg ( $P < 0.05$ ) and 1000 mg/ kg ( $P < 0.05$ ) showed a significant decrease in nitric oxide (NO) and malondialdehyde (MDA) levels in the blood. On the other hand, *C. nutans* extract (1000 mg/kg) also showed a significant decrease in the number of mitotic cells, tumor weight, and tumor volume. No inflammatory and adverse reactions related to splenocytes activities were found in all treated groups of mice. Despite its promising results, the concentration of both *C. nutans* extracts have also reduced the number of colonies formed in the liver and lungs.

**Conclusion:** In conclusion, *C. nutans* extracts exert antitumor and antioxidant activities against 4 T1 mouse breast model with no adverse effect and inflammatory response at high dose of 1000 mg/kg, indicating an effective and complementary approach for cancer prevention and treatment.

**Keyword:** Antitumor; Antioxidant; *Clinacanthus nutans* Lindau; Breast tumor