

## Antioxidant potential and anticancer activity of young ginger (*Zingiber officinale* Roscoe) grown under different CO<sub>2</sub> concentration.

### Abstract

In the present study, leaves and rhizomes extract from two Malaysian young ginger (*Zingiber officinale* Roscoe) varieties namely: Halia Bentong and Halia Bara grown under ambient (400  $\mu$  mol/mol) and elevated (800  $\mu$  mol/mol) CO<sub>2</sub> concentrations were studied for their antioxidant and in vitro anticancer activities against two human cancer cell lines (MCF-7 and MDA-MB-231). Antioxidant activities in both varieties determined using thiobarbituric acid (TBA) assays increased significantly with increasing CO<sub>2</sub> concentration from 400 to 800  $\mu$  mol/mol. High antioxidant activity was observed in the rhizomes of Halia Bara grown under elevated CO<sub>2</sub> concentration. The results showed that CO<sub>2</sub> enriched Halia Bara exhibited the highest anticancer activity on MCF-7 cancer cells with IC<sub>50</sub> values of 25.3 and 27.31  $\mu$ g/ml respectively for rhizomes and leaves extract. IC<sub>50</sub> values for MDA-MB-231 exhibition were 30 and 32.81  $\mu$ g/ml, respectively for rhizomes extract of Halia Bara and Halia Bentong. Results showed that Halia Bentong and Halia Bara possessed anticancer and antiradical properties especially when grown under elevated CO<sub>2</sub> concentration. Antioxidant activities of ginger leaves and rhizomes could be increased or improved by using CO<sub>2</sub> enrichment in a controlled environment condition. Results also implied that these ginger varieties could be employed in ethno-medicine for the management of cancerous diseases.

**Keyword:** Thiobarbituric acid assays; CO<sub>2</sub> enrichment; Halia Bentong; Halia Bara; Breast cancer cell; MCF-7; MDA-MB-231.