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Involvement of CO_2 enrichment on *in vitro* anticancer and antioxidant activities of extracts from young ginger (*Zingiber officinale* Roscoe)

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Abstract

Ginger is one of the traditional folk medicines and it is widely used in cooking in Malaysia. It is extensively used overall especially in Asia and contains several interesting bioactive constituents which possess health promoting properties. The present work is aimed to find out antioxidant and anticancer activities of two Malaysian young ginger varieties namely: Halia Bentong and Halia Bara grown under ambient (400 µmol/mol) and elevated (800 µmol/mol) CO_2 concentrations 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_2 concentration from 400 to 800 µmol/mol. High antioxidant activity was observed in the rhizomes of Halia Bara grown under elevated CO_2 concentration. The results showed that CO_2 enriched Halia Bara exhibited the highest anticancer activity on MCF–7 cancer cells with IC_{50} values of 25.3 and 27.31 µg/ml respectively for rhizomes and leaves extract. IC_{50} values for MDA–MB–231 exhibition were 30 and 32.81 µg/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_2 concentration. Antioxidant activities of ginger leaves and rhizomes could be increased or improved by using CO_2 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.

Key words: CO_2 enrichment; Breast cancer; Thiobarbituric acid assays, Halia Bentong, Halia Bara, MCF–7, MDA–MB–231.

Biography

Ali Ghasemzadeh has completed his Ph.D at the age of 32 years from University Putra Malaysia in field of Environmental Plant Physiology (medicinal plants). He is currently Post Doctoral researcher in University Putra Malaysia. He has published 20 ISI papers in reputed journals since 2010 and serving as an editorial board member of OMICS group Journal Agrotechnology and other two Journals.