



## Determining and Characterizing the Anti-cancer property of secondary metabolites from selected vegetables and mushrooms in the Philippines

Ma. Luisa D. Enriquez<sup>1</sup>, Marissa Noel<sup>2</sup>, Anamy Paano<sup>2</sup> and Consolacion Ragasa<sup>2</sup>

<sup>1</sup>Physics Department, CENSER, De La Salle University

<sup>2</sup>Chemistry Department, CENSER, De La Salle University

The study focuses on the anti-cancer activity of three cruciferous vegetables: cauliflower (*Brassica oleracea*), mustard (*Brassica juncea*), cabbage (*Brassica oleracea var capitata*) and two common green leafy vegetables: alugbate (*Basella rubra*) and malunggay (*Moringa oleifera*) and guyabano fruit *Annona muricata* Linnaeus. Selected wild mushrooms are also included in this study. Aqueous and alcohol extracts were prepared from these plants. In some, pure compounds were obtained using the dichloromethane extracting method. These plant-based compounds were tested for their anti-cancer activity using three cancer cell lines: colon (HT29), breast (MCF7) and leukemia (THP 1) and a normal cell line (human dermal fibroblast cell line). Each extract is evaluated on two properties: cytotoxicity and genotoxicity. We report some results in the cytotoxic assay (using Presto blue dye) done on three vegetable extracts: mustard, radish and malunggay on the cell lines earlier mentioned. The IC50 values were also determined for each extract in various cell lines. Malunggay extract showed cytotoxic indexes of 76.43%, 48.58% and 25.77% for HT-29, MCF-7 and HDF-n respectively. Mustard and radish extracts were found to show highest toxicity to MCF 7 (breast cancer) cell line followed by HT29. The cytotoxic activity of these extracts is attributed to isothiocyanates (ITC), a hydrolysis product of glucosinolates found in these vegetables. On the other hand, all extracts were found to be least toxic to THP1 (leukemia cell line). Moreover, using dichloromethane extracts from the following: leaves of *Brassica oleraceae var capitata* f. Rubra (red cabbage) and *Brassica oleraceae* L. (green/white cabbage) and stem of *Brassica oleraceae* L. var (broccoli) yielded beta sitosterol and unsaturated glycerides. Stigmasterol was obtained from red cabbage; while fatty acid and linoleic acid were obtained from white and green cabbage and broccoli stem. Leaves of mustasa (*Brassica juncea*) and roots of *Raphanus sativus* yielded  $\beta$ sitosterol, essential fatty acids,  $\alpha$  linolenic acid. From mustasa leaves trilinoleum, lutein and beta carotene were obtained. These compounds were earlier reported to have anti-cancer properties.