



CHAPTER I

INTRODUCTION

Phytoestrogens are plant-derived compounds being ingested through our diet and elicit their estrogenic-like activities in humans and animals. Phytoestrogens have been documented to induce development and changes in endocrine, nerve, and immune systems in animals. Therefore, their biological effects on our health need to be fully reexamined in the light of risk assessment as man-made endocrine disrupters (Safe, 1997; Jefferson, 2000). From epidemiological and experimental studies, phytoestrogens are suggested to reveal not only estrogenic activities such as stimulation of uterus growth and inhibition of bone loss (Ishimi, 2000), but also antagonizing estrogenic activities such as inhibition of estrogen-dependent breast and prostate cancer cell growth by competing for ER binding with more active estrogens such as estradiol (Fioravanti, 1988). Among Southeast Asian populations, and in the areas where phytoestrogens are traditionally consumed in high amounts in the diet, incidence of breast cancer is low in comparison to those populations who consume in low amounts (Wu, 1996; Ingram, 1997).

The use of certain plants in traditional medicine and folklore may be ascribed to their hormonally activities caused by their ingredients. Phytoestrogen-rich plant sources used in clinical research may interact with phytoestrogens and either potentiate or interfere with their activity and bioavailability. In addition, some phytoestrogens may act as estrogen agonists or antagonists depending on their structure and concentration as mentioned above, so that studies on dietary should be performed with standardized and structurally characterized mixtures of compounds or with isolated phytoestrogens. Moreover, most phytoestrogens reported have been classified as flavonoids, isoflavonoids, coumestans, stilbenes, ligans and steroids (Wange, 2002).

During our preliminary evaluation for estrogenic-like activities, twenty-seven Thai plants extracts were screen-tested with human breast cancer MCF-7 cells to clarify their active principles. There are two interesting plants, *Belamcanda chinensis* and *Dalbergia parviflora* that showed stimulative activities on the cell proliferation at

the concentration 10-100 $\mu\text{g}/\text{mL}$ compare to 100 pM of positive control Estradiol. Both plant species were then selected for phytochemical investigation in this study.

In Thailand and Indo-China, the rhizomes of *Belamcanda chinensis* (L.) DC. are well known by their intensive use as Chinese traditional medicine to treat inflammation, asthma as well as throat disorders *e.g.* coughing, tonsillitis and pharyngitis (Singh and Agrawal, 1990). In Thai folk medicine, the rhizomes are also used for the regulation of menstrual disorders (Chayamarit, 1998). Moreover, isoflavones, tectorigenin and its glucoside, tectoridin isolated from rhizomes showed selective estrogen receptor modulating (SERM) properties (Seidlova-Wuttke, 2000). The chemical constituents of its rhizomes have been reported as flavonoids (Farnsworth, 1975; Dewick, 1993; Woo, 1993; Harborne, 1994) and iridal-type triterpenoids (Abe, 1991; Takahashi, 2000). In this present study, attention has been paid on more polar constituents in the methanol extract.

For *Dalbergia*, a number of chemical investigations of plants in this genus *Dalbergia* have shown that *Dalbergia* is rich source of flavonoids (Harborne, 1994). As for the species of *Dalbergia parviflora* Roxb, a very little is known about its phytochemical constituents and biological activities. Therefore, this work also covers the two aspects of this plant. Base on our interest in both plant species, the overall objectives of this reseach were set up as follows:

1. To isolate and purify of compounds from the rhizomes of *Belamcanda chinensis* and from the heartwood of *Dalbergia parviflora*.
2. To determine the chemical structures of various isolated compounds.
3. To evaluate the estrogenic activities of various isolated compounds.

It is expected that the information obtain from this studies will lead to a better understanding of the constituents and the traditional uses of both *Belamcanda chinensis* and *Dalbergia parviflora* in Thailand.