

CHAPTER 1

INTRODUCTION

Cancer is abnormal cells, which can not control the normal mechanism of cell growth and proliferation. These abnormal cells can rapidly increase and invade to local and distant organs, and then be called tumors⁽¹⁾. Cancer is one of the leading causes of death in Thailand. In 2000, cancer accounted for 63.9% of all deaths in Thailand^(2,3). Approximately 39,480 cancer related deaths, which were 75.2 % and 52.8 % in men and women, respectively were reported. The high mortality rates of specific cancers in women are breast, cervix, and ovarian cancers, while commonly found cancers in men are liver, lung cancers, and leukemia⁽⁴⁾. Possible causes of cancer are ultraviolet radiation, free radicals, genetic mutation, chemical substances, etc. Presently, cancer treatment can be done by surgery, radiotherapy, immunotherapy, and chemotherapy. Chemotherapy helps in palliation, often with improved survival and in a variety of other tumors⁽⁵⁾. Chemotherapy can be used on systemic tumors, which are not sensitive to other cancer treatments. The sources of chemotherapeutic agents are from synthesis, partial synthesis, and natural products^(6,7). Chemotherapeutic agents can be classified following to their mechanisms of action; for example alkylating agents, DNA intercalating agents, antimetabolites, and others. Invaluable chemotherapeutic agents are usually derived from plants, such as paclitaxel from *Taxus brevifolia* for breast cancer treatment and vincristine from *Catharanthus roseus* for leukemia⁽⁸⁾. Searching for specific plants with pharmacological activities is often done by randomised selection^(9,10). The United State National Cancer Institute (NCI program) had a major screening program for chemotherapeutic agents from plants in 1955. Both *in vitro* and *in vivo* assays were used in this program⁽⁶⁾. *In vitro* assays were preferable

chosen because they are rapid, simple and uniform. *In vitro* assays can be classified as cell-based and mechanism-based assays⁽¹¹⁾. In this research, the cell-based assay for cytotoxic activity studies was chosen, because it requires small quantities of plant extracts and is simple, automatic, and specific to specific cancer cells. Since cervix and breast cancers are the major cancers occurred in Thailand. Breast carcinoma (MCF-7) and cervix carcinoma (KB-3-1) cell lines were selected for this cytotoxic study.

The Rubiaceae plants were chosen because of their diversity and known cytotoxic activity of many members. Local plants were tested for their cytotoxic activity against both human-origin cell lines. After screening, the plants with high potential was selected for further study in order to isolate active compounds.

Objectives

1. To determine cytotoxic activity against MCF-7 and KB-3-1 cell lines of some plants of the Rubiaceae in Northern part of Thailand.
2. To isolate the active compounds from the plant that displayed cytotoxic activity.