CHAPTER 1

INTRODUCTION

Natural products, in particularly medicinal plants, are important sources of new chemical substances with potential therapeutic efficacy. The most important analgesic prototypes e.g. salicylic acid and morphine were originally derived from the plant sources (Shanmugasundaram and Venkataraman, 2005). The available analgesic drugs exert a wide range of side effects and are either too potent or too weak, however, the search for new analgesic compounds has been a priority of pharmacologists and pharmaceutical industries (Mattison *et al*, 1998; Golshani *et al*., 2004). In Thailand, there are many plant species that possess medical value. Several medicines used today are derived straight from many plants. The plant kingdom represents a virtually reservoir of new and exciting chemical compounds, and many of them show extraordinarily biodynamics (Deraniyagala, 2003). However, the potential used of plants as a source of new drugs are still poorly explored.

Drugs of natural origin continue to be important for the treatment of many diseases worldwide and are believed to be an important source of new chemical substances with potential therapeutic effects. *Kaempferia galanga* L. (Family Zingiberaceae) possesses several bioactivities that provide many useful products for food, spices, perfume, anesthetics and widely used in Thai traditional medicine for treatment of various disorders.

In Thailand, rhizomes of *K. galanga* are used as a remedy for toothache or a wash for dandruff or scabs on the head. It is used as stimulant, stomachic and carminative and externally used to treat abdominal pain, swelling and rheumatism (Sirirugsa, 1997). *K. galanga* have been used to treat many conditions by people of the various regions where it is found. The most common indications included hypertension, rheumatism, athma, headache, cough, toothaches, and used as a poultice for the application on bruises and wounds (Perry and Metzger, 1980). In Malaysia and Indonesia, this plant is used to make a gargle, the leaves and rhizomes are chewed to treat cough, and used in poultices or lotions applied to relieve many ailments; the juice of the rhizome is used as expectorant and carminative, and is a part of children's medicine and

tonics. The rhizome is also used to treat abdominal pain, and treat swelling and rheumatism. In China, this plant is used as a remedy for toothache, stimulant, carminative and to treat cholera, contusions, chest pain, and headache (Ibrahim and Rahman, 1988; Mustafa *et al*., 1995).

The major chemical constitutents of the *K. galanga* are volatile oil which in the dried rhizome were identified as ethyl-*p*-methoxycinnamate (31.77%), methylcinnamate (23.23%), carvone (11.13%), eucalyptol (9.59%) and pentadecane (6.41%), respectively (Tewtrakul *et* al., 2005). It has also been reported that the constitutents of this rhizome included cineol, borneol, 3-carene, camphene, kaempferal, cinnamaldehyde, *p*-methoxycinnaamic acid, ethyl cinnamate, ethyl *p*-methoxycinnamate (Nakao and Shibu, 1924) and *n*-pentadecane (Anonymous, 1959). The methanolic extract of the rhizome contains ethyl *p*-methoxy *trans*-cinnamate which is highly cytotoxic to HeLa cells (Kosuge *et al*., 1985).

In the present study, a crude methanol extracts of *K. galanga* were tested because it is commonly used in folklore medicine to treat abdominal pain, toothache, swelling and rheumatism in patients both in Thai traditional medicines and other countries. Therefore, in this investigation it might be of great values to evaluate its effects on analgesic, anti-inflammatory and antipyretic activities in experimental animals to confirm its therapeutic efficacy.