CHAPTER 1

INTRODUCTION

1.1 Information regarding Ostodes genus

The Euphobiaceae is a large family of flowering plants with 300 genera and around 7,500 species which are enumerated.[1, 2, 3] Most are herbs but some especially, in the tropics, are shrubs or trees. *Ostodes* belongs to Euphorbiaceae family which vastly distributed throughout tropical and parts of subtropical Asia from the east of Himalayas to Northern Borneo along with, India, Myanmar, South of China, Indonesia, especially in Thailand.[1, 4, 7] There are three species of *Ostodes* found in Asia, *Ostodes paniculate* Blume, *Ostodes katharinae* Pax. as well as *Ostodes muricatus* Hook.f.[1, 4, 5, 7] Surprisingly, other species excluding *O. paniculata* Blume have been no reports on their phytochemical considerations.[8, 9]

O. paniculata Blume is the richest source of bioactive compounds. From the screening bioactivity test of dichloromethane and methanol crude extract of leaves of *O. paniculata* shows a broad variety of activities such as against small lung (A549), non-small lung (NCI-H1299), breast cancer (MDA-MB-231) cell lines and against Vero cells with the 50% inhibitory concentration (IC₅₀) of 48.65 μ g/ml. Although methanol extract of leaves was also provided only anti small lung cancer (A549) cell lines as seen in Table1 and 2.

In addition, in North and North-East of Thai folklore, it is used extensively for the various ailments such as seeds and fruits of *O. paniculata* have been used in traditional medicine for Laxatives Cathartics and also in Bhutan, gum was extracted from wood used for paper-making.[10]

1.2 Biological screening test of crude extract of Ostodes paniculata leaves

The result of biological activity tests of dichloromethane and methanol extract of *O. paniculata* from Department of Biology, Chiang Mai University, and BIOTEC Central Research Unit, Bioassay Laboratory, NSTDA were shown in Table 1 and 2.

Table 1 Biological activity tests of dichloromethane and methanol crude extract of*O. paniculata* leaves (Department of Biology, Chiang Mai University)

| | Testing Types | IC ₅₀ (με | g/ml) |
|--|---------------|---------------------------------|-------|
| | | CH ₂ Cl ₂ | MeOH |
| | A549 | 13.62 | 30.04 |
| | NCI-H1299 | 11.52 | 96.81 |
| | MDA-MB-231 | 40.07 | 85.73 |
| | | | |

A549 = Small lung cancer cell

NCI-H1299 = Non small lung cancer cell

MDA-MB-23 = Breast cancer

Table 2 Biological activity tests of dichloromethane crude extract of *O. paniculata*leaves (BIOTEC Central Research Unit, Bioassay Laboratory, NSTDA)

| | | | Y | | |
|--|--|-------------------------|---|--|--|
| Т | esting type | IC_{50} (μ g/ml) | | | |
| K1 Strain [*] H37Ra strain ^{**} | | N/A | | | |
| | | N/A | | | |
| Су | totoxicity ^{***} | 48.65 | | | |
| N/A=Inactive | TIND T | | | | |
| * K1 Strain = Anti-ma | alaria (Plasmodium falciparum) | | | | |
| % inhibition | Anti-malarial activity | | | | |
| < 50% | Inactive | | | | |
| ** H37Ra strain = Ar | ti-Mycobacterium tuberculosis (Anti-TB) | | | | |
| % inhibition | Anti-TB activity | | | | |
| < 90% | Inactive | | | | |
| ≥90% | Active (MIC included) | | | | |
| *** Cytotoxicity = Cy | totoxicity against Vero cells (African green | monkey kidney) | | | |
| % inhibition | Activity | | | | |
| > 50% | Non-cytotoxic | | | | |
| $\leq 50\%$ | Cytotoxic (IC ₅₀ included) | | | | |
| | | | | | |

1.3 Information of Ostodes paniculata Blume

In Thailand, *Ostodes paniculata* Blume (Figure 1) is generally known as "Ma kung dong". It is ranging around North and North-East of Thailand. It is a large tree about 15 m tall, dioecious; bark gray-brown; branches and leaves glabrous. Leaves usually apically clustered; stipules caducous; petiole 4-12 cm; leaf blade ovatelanceolate to oblong-lanceolate, $10-24 \times 5-10$ cm, thinly leathery, abaxially glaucous-gray or gray-brown when dry, base rounded or broadly cuneate, apex acuminate or caudate acuminate. Seeds ellipsoidal are brown, with stripes of yellowish spots, smooth, glossy. This specy is widespread in wet tropical mountain forest from Asia. The elevation ranges from 400-1400 m and most of the bedrock are limestone and granite. Vegetation below 100 m, is mostly deciduous while above this it is evergreen (mixed evergreen and deciduous forest).[1, 4, 11-13]





(b)

Figure 1 Morphological illustration of *Q*. nguiaulata Plume: a) Eruits[6] b) leaves[6]

Figure 1 Morphological illustration of *O. paniculata* Blume: a) Fruits[6], b) leaves[6, 13] and (c) Sketched image[1]

1.4 Objectives of the research

As a part of this research, we will focus on the investigation of chemical constituents of the twigs of *O. paniculata*. On account of the fact that, the quality of leaves is very less than twigs; therefore, we chose to study on the twigs instead of leaves. Considering, the above medicinal uses and biological activities which corresponding to Tables 1 and 2 were chemically examined for their constituents. Until now, there has been no report on the constituents of the twigs and their activities. Furthermore, this is the first report on isolation and structural elucidation of the chemical constituents from the twigs of *O. paniculata* found in Thailand. Consequently, this was chosen to study in this research and was extracted with dichloromethane and methanol, respectively. It was purified by chromatographic techniques and accomplished on the basis of spectral analysis.

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