CHAPTER I

Introduction

Flavonoids are a group of natural products isolated from a wide variety of plants, and are responsible for much of the coloring found in vascular plants. A single plant may contain dozens of different flavonoids, and the distribution of flavonoids within a plant family can yield useful classifying information about that family. These naturally occurring compounds have long been recognized to possess antiallergic, anti-inflammatory, antiviral, antiproliferative and anticarcinogenic activities as well as to affect some aspects of mammalian metabolism (Harborne, 1994). The plants selected for investigation of their flavonoid contents in this study are *Fissistigma polyanthoides* (DC.) Merr. (Annonaceae) and *Ochna integerrima* (Lour.) Merr. (Ochnaceae).

The genus *Fissistigma* belongs to the tribe Xylopieae in the family Annonaceae. They are usually climbers. According to the Index Kewensis, more than 80 species of the genus *Fissistigma* have been identified. In 1980 four species of *Fissistigma* have been recorded in Thailand (Smitinand, 1980). They are as follows:

F. bicolor Merr.	กล้วยมะสัง Kluai ma sang (Nakhon Si Thammarat).
F. latifolium Merr. var. *ovoidea* J. Sincl.	นมวัว Nom wua (Nakhon Si Thammarat).
F. minuticalyx Chatterijee	นมควาย Nom khwaai (Chiang Rai).
F. rubiginosum Merr.	โคกง Khlong (Malay-Pattani); นมวัว Nom wua (Songkhla); ย่านเกือด Yaan lueat (Surat Thani).

In subsequent botanical investigations by the Royal Forest Department, three additional species have been identified, including *Fissistigma glaucescens* (Hance) Merr., *F. polyanthoides* (DC.) Merr. and *F. thorelii* Merr..

Fissistigma polyanthoides is known in Thai as Khaa-hod (ข่าหด). Its stem bark is used by the local people in Petchaboon province in the form of paultice as a remedy for skin fungal infections. *F. polyanthoides* is a little scandant; undulating branch in pubescent then darkish smooth. Leaves ellipse, round at base and apex, 11-13 cm long, 6 cm wide, lateral nerve 15 pairs. Flowers; sepal 3, valvate, united at the very base, hairy outside, inside hairless; petals in 2 whorls of 3, the outer about 4 times longer than sepal, outside hairy, inside smooth except margin, involucre oval-triangular; stamen ∞ lodge parallel and adjoining; ovaries ≍ stigma (and style) cylindrical, hairy up to apex; ovules 4, carpels spherical, silky, pulp little abundance, big like plum. Flowering from March to October (Whitmore, 1972).

The genus *Ochna* belongs to the family Ochnaceae of the order Ochnales. It is distributed in tropical Asia, Africa and America (Rendle, 1952). They are usually shrubs or trees, sometimes undershrubs. Stipules small, intrapetiolary united, caducous. Leaves shortly petioled, chartaceous or subcoriaceous; nerves curved upward, especially near the margin, not joining; veinlets ± at right angles to the nerves near the midrib and joining in irregular tertiary nerves, ± transverse near the margin. Inflorescences lateral or terminal thyrses with a terminal flower; bracts small, caducous, often many at base of peduncle; pedicels articulate, accrescent. Flowers with ± hemispherical torus, which is distinctly swollen and red in fruit. Sepals 5, enlarged and red in fruit. Petals 5-10 in 1-2 whorls, yellow. Stamens ∞ in 2 or more whorls; filaments distinct; anthers opening by 2 spical pores. Carpels 5-10 (-15), 1-celled, obovoid; ovules 1 per cell, erect; style1, gynobasic,

persistent; stigmas as many as ovaries, on short branches or ± united. Drupes 1-3 (-5), greenish, turning black when ripe (Smitinand and Larsen, 1970).

According to the Index Kewensis, more than 85 species of the genus *Ochna* have been identified. In Thailand, only one species, *O. integerrima* (Lour.) Merr. has been recorded. The synonyms of this species are *O. harmandii* Lec. and *O. wallichii* Planch. (Smitinand, 1980). This plant is also known as ตานเหลือง Tan luang (Northern), แง่ง Ngaeng (North-eastern), ช้างน้าว Chang nao (North-eastern, Eastern), ตานนกกรด Tan nok krot (Eastern), กระโดงแดง Kra dong daeng (Central), กำลังช้างสาร Kamlang chang san (Central), ช้างโน้ม Chang nom (South-eastern), ช้างไหม Chang hom (South-western), ฝิ่น Fin (South-western), กระแจะ Krachae (Peninsular).

O. integerrima is widely distributed in Thailand, except in the Pattani, Yala and Narathiwat provinces. It is also found in NE. India, East Pakistan, Burma, the Andaman and Nicobar Islands, the Malay Peninsula (Perlis, Kedah), Laos, Cambodia, Vietnam and Hainan. It is an deciduous undershrub, shrub, or tree, up to 12 m, 45 cm diam. Leaves obovate-oblong or (obovate-) lanceolate, rarely obovate or linear-lanceolate, 6-20 (-25) by 2-7 cm, acuminate, sometimes acute or obtuse at apex, acute, sometimes obtuse at base, margin finely denticulate. Inflorescences many-flowered; rachis 0.5-1.5 (-4) cm; branches 1-3-flowered, monochasial; pedicels 2-4 cm, up to 5 cm in fruit, the basal 2-8 mm persistent. Torus 0.5-1 mm high, 1.5-2.5 mm diam., in fruit up to 6 mm high, 10 mm diam. Sepals 5, ovate to ovate-oblong. 10-16 by 4-9 mm. Petals 5-6 (-10), obovate, 15-25 by 8-15 mm, tapering at base or subunguiculate. Stamens (-25) 30-60 (-75); filaments 2.5-7 mm, unequal, the outermost longest; anthers 4-6 by 0.4-0.8 mm. Carpels 6-10 (-15), 0.7-1.1 by 0.5-0.7 mm; style 10-15 by c. 0.5 mm, up to 20 mm in fruit; stigmas sometimes on up to 1 mm long branches. Drupes up to 11 by 8 mm (Smitinand and Larsen, 1970).

The bark of *O. integerrima* has bitter properties, as pronounced as those of *Quassia*. Its use is suggested as a digestive tonic. A decoction from roots is used as an anthelmintic (Perry, 1980).

Up to the present there has been only one phytochemical investigation of *Fissistigma polyanthoides*. From the stem bark two flavonoids, 6-hydroxy-5,7,8-trimethoxyflavanone (isopedicin) and 2′,5′-dihydroxy-3′,4′,6′-trimethoxydihydrochalcone, and an alkaloid named ALK1 have been identified. In this study the author wishes to investigate the minor constituents of the stem bark of this plant. As for *Ochna integerrima*, no phytochemical work has been done.

The main objectives in this investigation are as follows.

1. To isolate and purify flavonoid compounds from the stem bark of *F. polyanthoides* and the leaves of *O. integerrima*.
2. To determine the chemical structure of each isolated compound.