CHAPTER I

INTRODUCTION

Micromelum is a genus of trees and shrubs growing in tropical regions, from Indo-China to the Pacific Islands. It belongs to the subfamily Aurantioideae of the family Rutaceae.

There are at least 18 valid species of *Micromelum* in the Index Kewensis and its supplements, as listed below:

1. *Micromelum caudatum* Merr.
2. M. *ceylanicum* Wight
3. M. *compressum* Merr.
4. M. *coriaceum* Seem.
5. M. *curranii* Elmer
6. M. *diversifolium* Miq.
7. M. *falcatum* Tanaka

   [M. *glabrescens* Benth. (=M. *pubescens* Blume)]

   [M. *glabrescens* Villar (=M. *tephrocarpum* Turcz.)]
8. M. *glabrum* Guillamin
9. M. *globosum* Elmer ex Tanaka
10. M. *hirsutum* Oliver
11. M. *integerrimum* Wight & Arn.

    [M. *minutum* Seem., M. *minutum* Wight & Arn.

    and M. *minutum* (G. Forst) Wight & Arn.

    (= M. *pubescens* Blume)]
12. M. *molle* Turcz.

13. M. *monophyllum* Wight

14. M. *octandrum* Turcz.

15. M. *pubescens* Blume

16. M. *scandens* Rechinger

17. M. *sorsogonense* Elmer ex Tanaka

18. M. *tephrocarpum* Turcz.

[M. *timoriense* Zipp. ex Span. (= M. *pubescens* Blume)]

(Jackson, 1885; Prain, 1913; Hill, 1926; Hill, 1929; Hill, 1933; Taylor, 1970).

In Thailand, *Micromelum* species are distributed throughout all of the floristic regions (Smitinand, 1980); 5 specific names are listed, namely :

1. *Micromelum falcatum* Tanaka

2. M. *glanduliferum* B. Hansen

3. M. *hirsutum* Oliver (M. *hirsutum* Craib)

4. M. *integerrimum* (Buch.-Han.) M. Roem. (M. *integerrimum* Roxb.)

5. M. *minutum* Seem. (M. *minutum* Wight & Arn., M. *pubescens* Blume)

(Thailand. Royal Forest Department, 1948; Hansen, 1966; Suvatti, 1978; Smitinand, 1980).

Micromelum minutum Seem. (synonym M. *pubescens* Blume) is known in Thai as "Hat-sa-khun" (หัศคุณ) and also known in various local names in Thailand as "Mo-noi(หมอน้อย), "Ka-chap-lak"(กาจับลัก), "Ma-ho" (มะห้อ), "Chi-puk-tua-phu"(จี้ปุกตัวผู้), "Sap-hin" (สาบฮิ้น), "Sa-baek" (สะแบก), "Kan-throk" (กันโทรัก), "Sam-sok"(สามโซก), "Chi" (ฉี้), "Lin-chi" (ลิ้นฉี้), "Mui-chang" (หมุยช้าง), and "Sa-mui-chang"(สมุยช้าง) (Thailand. Royal Forest Department, 1948).

This plant usually grows as a shrub 120-180 cm high and only occasionally as a small tree, without spine; shoots very finely pubescent; leaves spirally arranged, odd-pinnate, leaf-rachis (inclusive of petiole) 6-30 cm; leaflet 7-15, variable in shape, accrescent towards the top of the rachis, alternate or subopposite, ovate-oblong, very oblique at base, attenuate on one side and broadly rounded on the other, acuminate, entire or undulate to shallowly dentate-crenate, subglabrous to shortly pubescent above, thinly hairy beneath (especially on the nerves), pellucid dotted, 3-10 cm by 2-4 cm; flowers strong-smelling, arranged in terminal, corymbose cymes, pubescent, dichotomous, 3-15 cm long, pedicels 4-6 mm long, calyx 5-lobed, hairy, $\pm \frac{3}{4}$ mm high, petals 5, valvate, oblong-linear, pale green or yellowish white, on the outside densely appressed-pubescent, 5-8 cm long, stamens 10, distinct, alternate one shorter, anthers subbasifixed, broadly oval, filaments $3\frac{1}{2}$-5 mm long, style 2-3 mm, stigma capitate, slightly broader than the style, ovary 5-celled; fruits 1-seeded berry, ellipsoid or ovoid, 6-8 mm long (Backer and Bakhuizen van den Brink, 1965; Hooker, 1973; Trimen, 1974).

Different parts of the plant are widely used medicinally. The leaves are pounded with tamarinds and salt, applied to the skin to draw out the pain and irritation which stinging caterpillars set up. A bit of the plant is chewed and spat out to cure a feeling of giddiness. An infusion is taken morning after morning for pains in the feet. A decoction of the root is given after childbirth to prevent the attacks of evil spirits. A fever patient is rubbed with the leaves. A patient suffering from sickness in the bones is gently

beaten with a bunch of plants, it being one of them. Leaves are also used with lime and the juice of a limefruit in application for leprous spots and ringworm (Burkill, 1870).

It is used in north-eastern Sumatra for fever. The bitter roots are chewed with betel for cough in southern Sumatra (Burkill, 1870).

In Malaya, a poultice of boiled roots is applied for ague (Burkill, 1870).

In India, it is recommended for phthisis and chest troubles. It also has the same uses as in southern Sumatra and Malaya (Sastri, 1962).

The Philippines use the leaves and roots as a febrifuge. The young shoots are heated with oil and used as medicine for infantile convulsions. The roots in decoction or infusion are given for diarrhoea in children, and as a carminative. The root is also good for toothache. According to Guerrero (quoted by Quisumbing), this plant is said to be used for curing stomachache and headache (Quisumbing, 1951).

In Thailand, the shoots are used as a carminative, antitussive and anthelmintic. Cathartic action is attributed by the fruits. The flowers are employed for expectorant. The leaves are applied for antipyretic, antiasthmatic and also carminative. A poultice of the roots is a remedy for rhinopolypus and yaw sores (Pongboonrod, 1958).

Early works on the chemistry of this genus, coumarin compounds were isolated (Price, 1963; Lamberton *et al.*, 1967; Chatterjee *et al.*, 1968; Joshi *et al.*, 1975; Cassady *et al.*, 1979; Ruangrungsi, interview

1980). Moreover, their activities, either in an extraction or in a pure form were investigated. Initial collections from India of *Micromelum integerrimum* (Buch.-Ham.) M. Roem. yielded extracts with cytotoxic activity against the *in vitro* 9KB human nasopharynx cell line. The 9KB activity was not reproducible on recollection. However, *in vivo* activity in mice against P-388 lymphocytic leukemia was detected in the fractionated extraction. The coumarins, micromelin and scopoletin were crystallised from the active fractions and demonstrated to have antitumour activities (Cassady *et al.*, 1979). Experiments on microminutin, a new coumarin from *Micromelum minutum* Seem., showed the *in vitro* antilymphocytic leukemia activity. In addition, the *in vivo* activity is currently being studied (Ruangrungsri, interview 1980).

In the screening test for alkaloids, the leaves of *Micromelum minutum* Seem. showed positive result, however, there has been no previous report about any known alkaloids isolated from this genus. Accordingly, the present work was carried on extraction, isolation and identification of alkaloid(s) occurring in the leaves of this plant.