CHAPTER I

INTRODUCTION

Anthocephalus is a small genus (two species only) (Burkill, 1870) of trees of the Tribe Naucleeae, Subfamily Cinchonoideae, Family Rubiaceae (Rendle, 1952), the one species, Anthocephalus chinensis A. Rich., being Indo-Malayan; the other, Anthocephalus macrophyllus Havil., being restricted to the Moluccas, where it is both wild and cultivated (Burkill, 1870).

Anthocephalus chinensis A. Rich., (Synonyms: A. cadamba Miq.; A. indicus A. Rich.; A. morindaefolius Korth.; Nauclea cadamba Roxb.; Sarcocephalus cadamba Kurz.) (Petelot, 1953; Hooker, 1973).

This plant is known in Thai as "Kra-thum" (กระทุ่ม) or "Ka-thum" (กะทุ่ม) and also known in various local names in Thailand as Ka-thum-bok "กะทุ่มบก" (Bangkok), Tum-kan-suang "ตุ้มก้านช้วง" (North), Ka-thum-phrai "กะทุ่มพราย" (Khonkaen), Ka-thum-khi-mu "กะทุ่มขี้หมู" (South) (Thailand. Royal Forest Department, 1948).

It is a large deciduous tree of rapid growth, erect stem, about 9 meters high and girds up to 1.5 - 2.1 meters, branches horizontal, rounded crown rather drooping at the ends (The Wealth of India, 1948). The trees are

common in moist deciduous forests and thrive best in well-drained alluvial soil, grow rapidly in the first 6-8 years and attain their maximum size in about 20 years (The Wealth of India, 1948). Bark dark-gray with numerous regular longitudinal fissures, the outer bark peeling off in small rectangular scales. Wood white, with a yellowish tinge, soft, even-grained. Leaves opposite, coriaceous, shining, glabrous above, pubescent beneath, elliptic-oblong, ovate, or ovate-cordate, acute, 7.5 - 17.5 cm by 4.5 - 11.0 cm, lateral-nerves about 10 pairs, prominent on both sides, looping within the margin; petioles 1.25 - 2.5 cm long; interpetiolar stipules lanceolate, early caducous. Flower-heads scented at night, 3.75 cm in diameter, yellow, solitary, terminal, peduncles stout, 2.5 - 3.75 cm long; bracts stipuliform. Calyx 5 lobes oblong, persistent, 0.5 cm long. Corolla-lobes lanceolate, acute, erect, imbricate in bud; tube 1.0 cm long, slender, dilated upwards, slightly pubescent outside. Stamens 5, on throat of corolla, filaments short. Styles and stigmas white. Ovaries non-confluent, 4-celled in the upper, 2-celled in the lower portion. Bracteoles none. Fruits a fleshy receptacle, globose, orange mass of closely packed, compressed angular capsules, crowned with the persistent calyx-lobes, seeds not winged, muriculate, minute (Backer and Bakhuizen van den Brink, 1963; Talbot, 1976; Kirtikar and Basu, 1938).

The tree begins to set flowers and fruits at the

age of at least five years. In India, the flowers are offered in the temple of Siva. The flowers are small, white or yellowish, in large globose pendent heads. The receptacle becomes fleshy, and an edible compound fruit is formed about the time of the periodic leaf fall, and is eaten by men and animals. The seeds are dispersed by birds and bats (Burkill, 1870). The young leaves have a slightly aromatic odour, and an unpleasant taste, whereas the older are without odour, and have a sour taste (Burkill, 1870).

This plant is known as "wild cinchona" in English and "Kadamb" in Hindi (Prasad and Bhattacharya, 1960). The bark of the tree is widely used in India as a febrifuge and tonic, and in uterine complaints, blood diseases, leprosy and dysentery. A decoction of the leaves serves as a gargle in case of aphthae and stomatitis. The fresh juice of the bark is applied to the heads of infants when the fontanells sinks, and a small quantity mixed with cumin and sugar is given internally. In inflammation of the eyes, the bark juice with equal quantities of lime juice, opium and alum, is applied round the orbit. The compound fruit is used as astringent in case of diarrhoea. The claim for its use in the treatment of snake bite has been disproved (Burkill, 1870; The Wealth of India, 1948; Kirtikar and Basu, 1938; Chopra, 1932; Mhaskar and Caius, 1931).

The use of Anthocephalus chinensis A. Rich. in

folk medicine and the interest in the indigenous plants of Thailand stimulated an investigation of active principles present in the leaves. By means of alumina column chromatography, an indole glycosidic alkaloid was isolated from the leaves of Anthocephalus chinensis A. Rich. growing in Thailand. The physical and chemical properties and spectroscopic evidences have shown that it is 3α-dihydrocadambine which has pentacyclic heteroyohimbinoid glycoside skeleton comprising of carboline unit joins with iridoid glucoside through C-3, N-4 bridge. Glucose unit of sugar residue links with oxygen bond as an O-glycoside and is cleaved by enzyme β-D-glucosidase (Fig. 1) (Ruangrungsi, 1978).

It is known that many indole alkaloids are physiologically active and some are of medicinal importance. For examples the oxytocic ergoline, the antihypertensive and transquilizer reserpine, vincaleucoblastine used in the treatment of leukemia, the stimulant strychnine, and the cholinergic physostigmine. Most of which are either indole alkaloid complexes or their simple derivatives.

In 1983 Endo et al., reported that a methanolic extract of the Oriental crude drug "chōtōkō" (the dried hooks of Uncaria sp. of the family Rubiaceae) elicited a strong and long lasting hypotensive on injection into rats. Fractionation of the extract resulted in isolation of three indole alkaloid glycosides, cadambine, 3α-dihydrocadambine and 3β-isodihydrocadambine. The former was

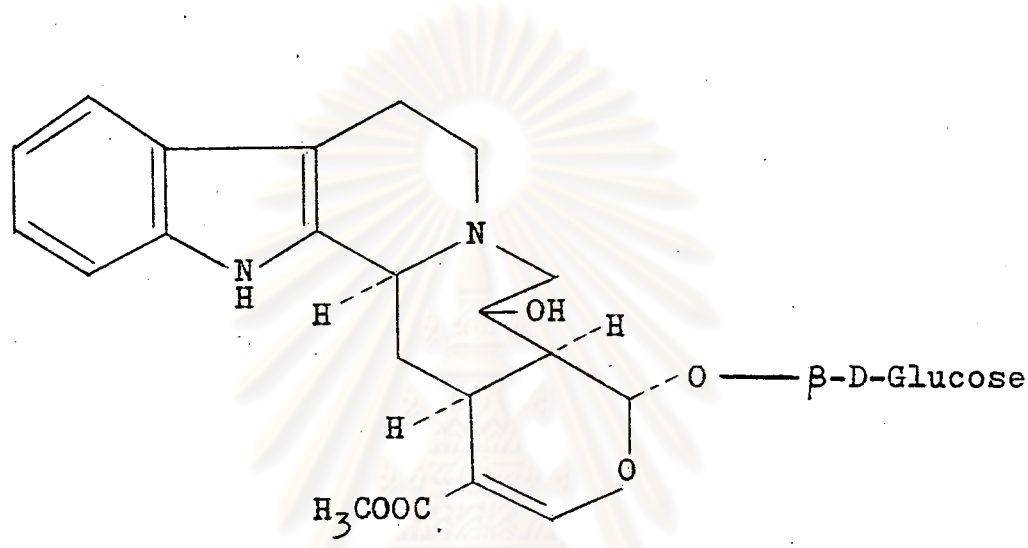

Figure 1. The structure of 3α-dihydrocadambine, indole glycosidic alkaloid isolated from the leaves of Anthocephalus chinensis A. Rich.

found inactive but the latter two exhibited strong and long lasting hypotensive action.

According to preliminary study of the action of the author, alkaloidal glycoside "3α-dihydrocadambine" which obtained from the leaves of Anthocephalus chinensis A. Rich. also exhibited hypotensive activity through it was in basic form.

This present thesis described effect of 3α-dihydrocadambine on blood pressure and cardiac contractility in experimental animals. The investigation deals with emphasis on its possible mechanism of hypotensive property which might be worthwhile in supporting the advanced studies of physiological pharmacology of this alkaloid and in turning natured resource into medicinal one.