



Chapter I

Introduction

Andrographis paniculata Nees is a medicinal herb which grows widely in tropical area of Asia, known in Thai as Fah Talai Joan, Nam Laai Phangphon and Yaa Kannguu (คณิต สุวรรณปริรักษ์ และ ชัยชัย ชัยชาญทิพยุทธ, 2534)

The genus Andrographis belongs to the subtribe Andrographideae in the tribe Justicieae of the Family Acanthaceae. This genus comprises of 19 species (Hooker, 1973) all of them are endemic in India as followed

1. Andrographis subspatulata, Clarke
2. Andrographis elongata, T. anders
3. Andrographis ovata, Benth
4. Andrographis tenuiflora, T. anders
5. Andrographis alata, Nees
6. Andrographis stenophylla, Clarke
7. Andrographis wightiana, Arn. ex Nees
8. Andrographis macrobotrys, Nees
9. Andrographis viscosula, Nees
10. Andrographis neesiana, Wight
11. Andrographis stellunata, Clarke
12. Andrographis lileata, Nees
13. Andrographis lobelioides, Wight

14. Andrographis echiodes, Nees
15. Andrographis glandulosa, Nees
16. Andrographis rothii, Clarke
17. Andrographis serpyllifolia, Wight
18. Andrographis beddomei, Clarke
19. Andrographis paniculata, Nees

Andrographis paniculata Nees was characterized by an erect annual one 30-90 cm high; stem quadrangular; leaves opposite, smooth pointed, on short petioles, lanceolate, entire dorsal surface dark green and shining, ventral surface paler and finely granular. The leaves vary much in size, the largest was usually 7.5 cm in length and 2.5 cm in width. Inflorescences terminal racemes 3-10 cm long, flower alternate, pedicels 0-0.5 cm distance, usually pubescent, bract 0.15 cm linear, bracteoles smaller or not. Calyx 0.3 cm long deeply five-cleft, corolla 1.5 cm long, bilabiate; tips linear, reflected, upper one three toothed, lower one two toothed, white colored streaked with rose purple. Filaments 2 hairing upwards. Ovary and base of style subglabrous or very thinly hairy. Capsule 1.8 cm x 0.3 cm, young slightly glandular-hairy, mature glabrous. Seeds 8-10 deep brownish subquadrate, osseous, rugose, without hair or scales. Roots fusiform, simple woody with numerous fine radicles (Hooker, 1973). All parts of this herb have bitter taste. This herb was extensively used as medicinal

herb.

In India, this herb is well known under the name of Kalmegh (Chakravarti D. and Chakravarti R.N., 1952) and formed the principle ingredient of an extensively used household medicine call Alui . The herb was dried in the sun and made into little globules. The globules are prescribed for infant to relieve griping irregular stools and loss of appetite.

In China, this herb is named Chaun Xin Lian and has been used for treatment respiratory tract infection such as sorethroat, tonsilitis. (กรมวิทยาศาสตร์การแพทย์, 2529)

In Thailand, this herb has been promoted to be the primary health care medicinal herb. Fine powder of this herb was mixed with honey to formulate pills which had been prescribed for treatment of sorethroat , common cold and fever in seven community hospitals.
(บัณฑิตยาจารย์ มหาวิทยาลัย, 2533)

250 mg of fine powder of the leaves of this herb has been packed in capsule and named Fah Talai Joan capsule. The recommended dose for sorethroat and fever is 3-5 capsules in 3-4 times a day.

Pharmacological studies of this herb revealed that aqueous extract, 50% ethanol extract and 85% ethanol extract of the aerial part in concentration 200 mg/ml of physiological solution could decreased the spasm of

guinea-pig ileum activated with acetyl choline, barium chloride, histamine and serotonin. The ethanol extract was more effective than aqueous extract.

(กมล สวัสดิ์มงคล และคณะ, 2533)

Pharmacological studied of leave powder of this herb about inhibition of gastric ulcer induced by stress, aspirin and 30% acetic acid in albino rat revealed that gastric ulcer induced by aspirin and stress was effectively cured. (ศิริมา พรสุวัฒนา, ประสาน ธรรมอุบลกรณ และ อุมา กิติยานี, 2532)

In vitro studied by Agar Dilution method revealed that of 85% ethanol extract and 70% ethanol extract could inhibit microbials causing diarrhea such as Shigella dysenteriae, Vibrio cholerae O, Escherichia coli and Salmonella typhi. The 10 mg/ml extract could inhibit microbial causing respiratory tract infection such as β -streptococcus gr. A and staphylococcus aureus.

(ธิดารัตน์ ปลั่งมาจ และ นาคณัติ ลิทธิสมวงศ์, 2533)

85% ethanol extract in the dose of 2 g/kg could decrease the swelling of the carageenan-induced hind paw edema in albino rat. The inflammatory effect did not find in aqueous extract and 50% ethanol extract.

(ทองวิชัยและพัฒนาศมุนไพโร, 2533)

The crude extract of the leaves of this herb could afford significant protection against alcohol and carbontetrachloride induced hepatic injury at the level of

serum and liver glutamate oxaloacetate transaminase(SGOT), glutamate pyruvate transaminase(SGPT) and NADPH-mediated hepatic lipid peroxidation. It was also found to produce a remarkable resistance against carbontetrachloride-induced changes in the hepatic cellular and subcellular lipid profiles. (Choudhury and Poddar, 1984)

Comparative study between this herb and paracetamol in 152 pharyngotonsillitis patients revealed that paracetamol or this herb in regimen 6 g per day could decrease fever and sorethroat to 80-90% in 3 days.

(คณิศ สุวรรณบริรักษ์ และ ชัยราช ชัยชาณุทิพย์ทอ, 2534)

Comparative study between 250 mg capsules of fine powder of this herb and tetracyclin given in 2 regimens, 500 mg every 6 hours for 3 days or 1 g every 12 hours for 2 days, to 200 diarrhea or dysentery patients revealed that the herb capsules could decrease symptom more effectively than tetracycline.

(ปัญจางค์ อนันต์กุล และ ชัยราช ชัยชาณุทิพย์ทอ, 2528)

Although there were many studies about pharmacological activities of this herb, there was no clear explanation about the components in this herb which exhibited the pharmacological activities, modes of actions of the compounds and structure activity relationship.

Further of investigation about these requires the information of chemical constituents in this herb and their physicochemical properties.

Some major constituents which are diterpenoids in this herb have been determined over many years using chemical and spectroscopic techniques ; however, little is known about the conformation of these constituents. With the development of high-field spectrometers and two-dimensional NMR techniques it become possible to completely assign the chemical shift of protons and carbons of such molecules.

This study involved the isolation of chemical constituents in Andrographis paniculata Nees and the physicochemical properties determination of the constituents. The spectroscopic data especially data from NMR spectra were established for the correct assignment of the structure of the constituents.

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