Introduction

The tropane alkaloids which have been isolated from various species of the plant families, Agaricaceae[1,2], Convolvulaceae, Dioscoreaceae, Erythroxylaceae, Euphorbiaceae and Solanaceae[3], all exhibit the common structural features. They are all esters of organic acids (such as tropic, benzoic, cinnamic, isovaleric, and veratric) combined with one of a series of bicyclic hydramines (methylecgonine, nortropine, pseudotropine, scopine and others[4]).

The work in this branch of alkaloid chemistry has been extensively studied and a number of these bicyclic hydramines have been isolated.

The sources of the tropane alkaloids used in modern medicine are obtained from the important plant families (Erythroxylaceae and Solanaceae[5,6,7]).

Many genera and species of the Solanaceae contain the physiological effective alkaloids. The solanaceae genera from which the tropanes have been isolated are as follows:-

Atropa[6,8]

Datura[9,10]

Duboisia[11]

Hyoscyamus[6,8]

Latua[12]

Mandragora[13]

Mathylsticodendron[14,15]

Physoclaina[16]

Scopolia[7]

Solandra[17,18]

and Withania[10]

Besides these genera of the Solanaceae, there is a very interesting monocotyledonous genus Dioscorea (Dioscoreaceae)[4], which also contains tropane alkaloids.

The name "Datura" originates from the Asiatic "metel nut" or Indian Datura, "Dhustura" or "Dutra" [19]

It was Linnaeus who latinized the word "Dhatura" or "Dutra" into Datura[20] in the Hortus Cliffortianus.[20]

There are not less than fifty species included in Datura[21] and wildly distributed in every continents.[22,20,9]

Universal species

Datura stramonium Linné

Datura ferox Linné

African species

Datura arborea Linné

Datura betolonii Parl.

Datura candida (Per.) Safford.

Datura ferox Linné

Datura inermis Jacq.

Datura laevis L.f.

Datura metel Linné

Datura stramonium Linné

Asian species

Datura alba Nees.

Datura fastuosa Linné

Datura ferox Linné

Datura inoxia Mill.

Datura laevis L.f.

Datura metel Linné

Datura nigra Hassk.

Datura stramonium Linné

Datura tatula Linné

European species

Datura inoxia Mill.

Datura ferox Linné

Datura stramonium Linné

Australian species

Datura leichardtii Muell.

Datura ferox Linné

Datura stramonium Linné

Central and North American species

Datura cornigera Hook.

Datura discolor Bernh.

Datura inoxia Mill.

Datura meteloides D.C.

Datura pruinosa Greemn.

Datura quercifolia H.B.K. or (Datura villosa Fernald)

Datura suaveolens Humb. & Bonpl. ex Willed.

Datura stramonium Linné

South American species

Datura candida Persoon Safford or D. arborea Linné.

Datura ceratocaula Ort.

Datura erinacea Vell.

Datura ferox Linné.

Datura inoxia Mill.

Datura metel Linné.

Datura meteloides D.C.

Datura quercifolia H.B.K. or D. villosa Fernald.

Datura scandens Vell.

Datura stramonium Linné.

Datura metel linne' known as "Lamphong" in the middle of Thailand, as "ma-khua-ba" (Mad egg-plant) in the northern part of Thailand. The plant can be found throughout the tropical Asia and probably to the tropical Africa. Its English name is "thorn apple".[24]

Datura metel Linné includes several distinct types, Flowers white, yellow, purple or purple outside & white inside. Corolla trumpet-shaped, single, double, triple or rarely quadruple by the irregelar petaloid outgrowth of the stamens and inner corolla surfaces about 14-15 cm. long. Calyx regular, 5-7 cm. long, evenly five lobed, less than half as long as the corolla, style 11-13 cm. long. Capsule globose, 4-6 cm. in diameter, covered with very short spines or tubercles. Leaves ovate, nearly entire or with a few teeth, leaf base oblique. Stem green in form of with white or

yellow flowers and purple in those with purple flowers.

Leaf-scars conspicuous on the stem. Stem erect, about 0.3 m. in some varieties, reaching to 1.5 meters in others. Stem and leaves glabrous. The very short spine or tubercles on the capsules and the glabrous condition of the stem and leaves are the main characters that distinguished this species from the other large species of Datura section.[20]

According to the Species Plantarum,[23] Linnaeus showed that the form with a simple white corolla called by Rhumphius "Datura alba" is a form of "Datura metel" Linné and also the species with corolla externally purple and often double as a variety of Datura metel Linné.

The folk-lore medicinal used of Datura metel have been reported[24] such as, the roots, flowers, and leaves are used by the Malays in treating boils, sore on the legs, haemorrhoids and ringworm. The hot leaves are applied over an enlarged spleen and to swallen testicles.

It is said that a poultice for swelling may be made by pounding the leaves with rice, turmeric and urine, the poultice is applied hot.

The Indian use the leaves for skin complaints.

In Thailand, the smoking of the flowers in the form of cigarette is reputed for the treatment of asthma symptoms. Throughout the survey of literature, Thailand is the only one country that the making use of the thorn apple flowers in

medicine has been found.

The presence of tropane alkaloids in this plant has lead to the suggestion that the medicinal properties may be attributed to the tropane alkaloid constituents.

Not only Datura metel Linne', but also Dioscorea hispida Dennst. contain very interesting toxic tropane alkaloid[25,26].

Dioscorea hispida Dennst. or wild yam in common English name and its local names in Thailand are Kloi, Man-Kloi (general), Koi, Koi-nok, Kloi-khao-nieo, Kloi-hua nieo (Nakhorn Rachasima) and Hua-kloi (Southern Thailand.)

Wild yam is a very strongly poisonous climbing plant with a spiny greyish-green stem.

The tubers of wild yam are edible if properly prepared, otherwise they are highly poisonous.[27]

The entire plant contain tropane alkaloids, which act on the central nervous system similar to the action of picrotoxin.

A piece of tuber about the size of an apple is efficient to kill a man and death comming in about six hours. The effect is discomfort in throat, which intensified to burning sensation; giddiness follows, then vomiting of blood, a sensation of suffocation, drowsiness, and exhaustion. The tubers must be mature if it is to be eaten. It must then be sun-dried, sliced into thin pieces, and washed in a running stream or steeped in a salt water for five days if it is steeped, the water must be changed frequently. The steamed slices may

then be made into food by mixing with glutinous rice and coconut cream. The Malays use the bitter juice for its narcotic effect and to induce vomiting. They also use the young shoot to poison fish, while the jungle folk of the Thai peninsula combine the shoot with a latex of upas tree (Antiaris toxicaria Lesch. Moraceae) to make a poison for darts.

Owing to the presence of tropane alkaloids in Datura metel leaves[28] and Dioscorea hispida tubers[29] and medicinal values of atropine, scopolamine, hyoscyamine etc.

The isolation and comparison of alkaloids in the plants mentioned and the allies plants (Belladonna, Hyoscyamus and Stramonium) official in several pharmacopoeiae, should be made with the hope that alkaloids which have never been separated nor isolated from the plant may be found.

The results of the comparison may show that Datura metel leaves may be good enough for making use as a substitute for those of the allied plants official in the pharmacopoeia. If possible after standardization, this indigenous drug may be inserted in the future Thai Pharmacopoeia.

Dioscorea hispida tubers contains a poisonous alkaloid[30] dioscorine which was isolated from Dioscorea hispida by Schulte HW.[25] but there has been no report for the presence of this alkaloid in plants growing in Thailand.

The investigation and isolation of the physiological active constituents of its tubers, which is used as a delicacy,