Andrographis SPP.: A Source of Bitter Compounds
For Medicinal Use
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ABSTRACT: Andrographis is an important genus used in Indian medicine. A comprehensive review on this genus is presented in this article.

INTRODUCTION

Andrographis Wallich ex Nees belongs to the family Acanthaceae. The genus Andrographis wallich ex Nees is comprised of annual herbs or small shrubs, including about 40 species, distributed in the tropical Asia (Anonymous, 1948). Andrographis is a large genus of herbs distributed in the Indo-Malaya, Africa, Brazil and central America Northward into Mexico (Lawrence, 1969). On hilly habitats nearly all the plants of a species flower as a rule in the same season (Fyson, 1915).

About 21 species of Andrographis are reported to occur in India (Gamble, 1924; Anonymous 1985; Henry et all., 1987) of which Andrographis paniculata (Burm.f.) Wallich ex Nees is known to be medicinal (Anonymous, 1948). A. Paniculata known as Kalmegh in Ayurvedha, is one of the important ingredients in various Ayurvedic preparations for fever and liver diseases, which are commonly used by Ayurvedic physicians. Now-a-days, various pharmaceuticals are using the extracts of A paniculata in their preparations for treating liver disorders (Maiti, 1964 and Tomer et al., 1982). Several other species of Andrographis are used as substitutes and adulterants of A. paniculata the most important among these being A. alata and A lineate (Alagesaboopathi, 1993).

DISTRIBUTION OF SOME IMPORTANT SPECIES OF ANDROGRAPHIS

Andrographis paniculata (Brum.f.) Wallich ex Nees commonly known as kalmegh is distributed in the plains throughout India from Himachal pradesh to Assam and Mizoram and all over south India, Sri Lanka, Bangladesh at altitudes ranging from 10m-1400m. Flowering and fruting occur from December to April.

A. alata (Vahl) Nees commonly known as “Periyanagai” is distributed in south west India, Sri Lanka, Tamilnadu, Kerala, Andhra Pradesh at altitudes ranging from 100m-3000m. Flowering and fruting takes place during December-April.

A. lineate wallich ex Nees commonly known as “Periyanagai” is distributed in south west India, Sri Lanka, Tamilnadu, Kerala, Andhra Pradesh at altitudes ranging from 1025m-2500m. Flowering and fruting takes place during July–November.

A. echioides Nees commonly known as “Periyanagai” is distributed in south west India, Sri Lanka, Tamilnadu, Kerala, Andhra Pradesh at altitudes ranging from 10m-
Flowering and fruiting takes place from August – January.

*A Serpyrllifolia* (Vahl) Wight. Is widely distributed in Tamilnadu and Andhra Pradesh (Deccan and Carnatic) on dry soil with altitudes ranging from 350m-1000m. Flowering with two peaks during June-October and January-March. Fruiting throughout the year.

*A. wighitana* Arn. Ex Nees. It is widely distributed in the hills of kerala, Tamilnadu and Karnataka at altitudes ranging from 150m-750m. Flowering and fruiting occur from July-December.

**ACTIVE PRINCIPLES**

*Andrographis* is known as “King of bitters” It is well reputed under the name kalmegh as a common bitter principle prescribed for liver troubles in children (Kirtikar and Basu, 1935). The tinctures and extracts of it have earned recognition in the Indian Pharmacopoeia(1955). An attempt to isolate the active principle was made as early as 1911 and a colourless neutral substance was obtained which was called andrographide (Boorsma, 19911). The bitter principle was isolated in a pure crystalline from C\(_{20}\)H\(_{30}\) O\(_{5}\) m.p. 227.50 by Gorter (1911) who found it to be a lactone. He changed its name from andrographide to andrographide which is still is usage (Gorter, 1911 & 1914). Among the species of *andrographis*, *A. paniculata* is the most voluble and is used in medicines on a large scale particularly in India, Sri Lanka, Bangladesh and Nepal for its bitter principles. The active constituents of andrographis spp. are tabulated as follows.

| Name of the species | Active Constituents | Source |
|---------------------|---------------------|--------|
| *A paniculata*      | Andrographide       | Boorsma (1911) |
|                     | Andrographolide     | Gorter (1911,1914) |
|                     | Kalmeghin           | Bhaduri (1914) |
|                     | Paniculid A         | Butcher and Connolly (1971) |
|                     | Andrographapholide  | Moktader and sircar (1939) |
| *A alata*           | Andrographolide     | Maiti et al. (1959) |
| *A.lineata*         | Andrographolide     | Subba Rao (1962) |
|                     |                     | Gaind et al (1963) |
|                     |                     | Govindachari et al. (1969) |
|                     |                     | Xianglin et al. (1981) |
|                     |                     | Bharadwaj et al (1981) |
|                     |                     | Weiming and Xiaotian (1982) |
|                     |                     | Mu and zhou (1982) |
|                     |                     | Guptsa et al. (1983) |
|                     |                     | Ojha (1983) |
|                     |                     | Fujita et al. (1987) |
|                     |                     | Kuroyana et al. (1987) |
|                     |                     | Roy and paul (1991) |
|                     |                     | Alagesaboopathi and balu(1995) |
| *A. alata*          | Andrographolide     | Alagesaboopathi and Balu (1995) |
| *A.lineata*         | Andrographolide     | Alagesaboopathi and Balu (1995) |
A. echioides  
Eechioidinin 
Eechioidin 
Tectochrysin 
Apigenin 
Serpyn 
Flavone 
Wightin 
Eechioidinin 
Wightionolide 

A. serpyllifolia  
Chopra et al. (1956) and 
Govindachari et al (1965) 
Govindachari et al (1968) 

A. wightiana  
Govindachari et al (1965) 
Desai et al (1967) 

USES OF AND ROGRAPHIS IN MEDICINE

The genus exhibit antipyretic properties (Kirtikar and Basu, 1975). Whole plant collected in pre-flowering stages ad dried, constitutes the drug. Andrographis paniculata in the most commercial species used in medicine. It is also one of the drugs that is found in the bazaars of India.

A. paniculata s known as Mahatikta in Sanskrit, meaning “ King of Bitters” In the Indian Ayurvedic herbal market it is popularly known by its Bengali vernacular nomenclature kalmegh. In English it is known as creat, chiretta and king of Bitters.

The herb is the well-known as kalmegh or ‘green chiretta’ and forms the principal ingredient in reputed household medicines. It is used as a bitter tonic and febrifuge, it is official in Indian pharmacopoeia and also employed in Ayurvedha and Homoeopathy. The drug is sometimes mixed with the genuine chirata (Swertia Chirayita Karst).

The herb is reported to possess astringent, anodyne, tonic and alexipharmic properties and is helpful in dysentery, cholera, diabetes, consumption, influenza, bronchitis, swellings and itches, piles and gonorrhoea. A decoction of the plant is a blood purifier. It is used as a cure for torpid liver and jaundice. It form the major constituent of the Ayurvedic drug SG-I Switradilepa which is effective in treating vitiligo-a dermatological disease. The macerated leaves and juice together with certain spices, such cardamom, clove and cinnamon, are made into pills and prescribed for relief from gripe and other stomach ailments in infants. A decoction or infusion of the leaves is useful in general debility and dyspepsia. The leaves is useful in general debility and dyspepsia. The leaves and roots are also used as stomachic, intermittent fevers, malaria, alternative, snakebite, anti-snake venom, appetizer, activating taste, indigestion, skin diseases, worms, poisonous bites, giving strength fever, diarrhoe, child hood diseases, ascitis and impurities to blood. A tincture of the root is tonic, stimulant and aperient, It is used by them to treat cobra bites and other poisonous bits. In cobra bites the leaf paste along with hot water is administered internally (Chopra et al., 1956; Kirtikar and Basu, 1980; Anonymous, 1985; Alagesaboopathi, 1993).

A. alata and A. Lineata are medicinal herbs. They arte used in snake-bites, constipation, skin diseases and lung diseases. These plants are also claimed to possess snake- bittes. Leaf paste is locally applied for skin diseases in cattle (Alagesaboopathi, 1993).

Several other species of the genus Andrographis occurring in hill regions of India are used in similar manner as A. paniculata. They are A. echioides, A
serpyllifolia, A. macrobotrys, A. neesiana, A. elongate and A. wightiana. These as substitutes for A. paniculata the indigenous systems of medicine in South India.

CONCLUSIONS

It is evident that A. paniculata, A. alata and A. Lineata have got many uses. Due to its over exploitation the species have become rare. Hence, cultivation of this plant is recommended. As suitable habitats for the cultivation of A. paniculata which is the species of supreme commercial importance (Atal and Kapur, 1982).

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