

# Andrographis

## The King of Bitters

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**P**OPULARLY known as Kalmegh in Ayurveda, *Andrographis paniculata* Nees is used as a wonder drug in traditional Siddha and Ayurvedic systems of medicine. It belongs to the family Acanthaceae consisting of 250 genera and 2500 species. The genus *Andrographis* consists of 28 species of small annual shrubs essentially distributed in tropical Asia. It grows wild in thickets throughout south Asia, although it may also be cultivated.

It is an erect annual herb found to be cultivated throughout India from Assam and Himachal Pradesh to all over south India. It grows well in moist and shaded places, but prefers sunny weather. In summer and autumn, clusters

of small white flowers appear, it is harvested when the flowers begin to bloom.

It is extremely bitter in taste and is, therefore, also commonly known as 'Maha-tita', or 'king of bitters'. It is known by numerous vernacular names such as Kirayat (Hindi), Nilavembu (Tamil), Kariyatu (Gujrati), Oli-kiryata (Oriya) and Nelaberu (Kannada). It is also known as 'Bhui-neem', since the plant, though much smaller in size, shows similar appearance and has bitter taste as that of Neem. In Malaysia, it is known as 'Hempedu Bumi' meaning 'bile of earth'. Because of its immunomodulatory properties sometimes it is also called the "Indian Echinacea".

Its medicinal properties are known since civilization.

The dried or fresh leaves or the aerial portions of the plants are used as a crude drug. Sometimes, the whole plants including the roots are used. *Kalmegh* has been used as a wonder drug in traditional Siddha and Ayurvedic systems of medicine as well as in traditional systems of medicine across different Asian countries and cultures including India for its multiple therapeutic properties and clinical applications.

Kalmegh (left), Dried leaves of Kalmegh (center) and medicines made of Andrographis





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It is one of the important ingredients in various Ayurvedic preparations for fever, cold, asthma, liver, and heart diseases. Cold infusion of the drug is mentioned in *Sushruta Samhita* for fever and liver disorders. It is also recommended in *Charaka Samhita* dating to 175 BC for treatment of jaundice along with other plants in polyherbal formulations.

The herb is adulterated with chirata (*Swertia chirayita* Karst) devoid of andrographolide, a major bioactive constituent of *Andrographis paniculata*. However, it can be distinguished from the latter easily by the green colour of its stems, numerous erect, slender, opposite branches and its lanceolate, green leaves. In England, it has been reported to be used as a substitute for quinine.

It was quite popular in Bengal during the great influenza epidemic of 1919, where a tincture of the plant was found to be highly effective in arresting the progress of the disease. It is one of the most thoroughly studied medicinal plants. In ancient literature, the herb has been mentioned as being useful in the treatment of colic, otitis media, chickenpox, eczema and burns but experimental or clinical data supporting such claims are awaited. However, the clinical application of herb is evidenced by its prescriptions by traditional medicine practitioners for the treatment of bacillary dysentery, bronchitis, carbuncles, colitis, coughs, dyspepsia, fever, hepatitis, malaria, mouth ulcers, sores, tuberculosis and venomous snake bites.

Modern researches assessing the clinical usefulness of *Andrographis paniculata* have found that it is beneficial in the prophylaxis and symptomatic treatment of upper respiratory infections such as common cold and sinusitis, bronchitis, pharyngo-tonsillitis, lower urinary tract infections and acute

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diarrhea. It has been found to possess "cold property" and hence it lowers body temperature.

The herb is found to contain several chemical classes such as flavones and lactones. Andrographolide, a diterpene lactone, is the major constituent responsible for its pharmacological activity. Andrographolide is used as a marker compound for standardization of the herb. Another non-bitter constituent, neoandrographolide is also used as a marker.

The plant extract has been found to possess a variety of pharmacological activities. The plant extract has been shown to exhibit antifungal, antimicrobial, antimalarial, antiulcer, antithrombogenic, antiinflammatory, antivenom, cardioprotective and hepatoprotective properties. Recently, it has been found to exhibit antiretroviral activity and inhibit the progression of HIV.

In a study examining the benefits of Kalmegh in cancer therapy the herb exhibited anticancer activity by arresting cell cycle growth through induction of cell cycle inhibitory protein and decreased expression of cyclin dependent kinase enzymes. Andrographolide appears to be an interesting molecule with anticancer and immunomodulatory activities.



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