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Kalmegh, *Andrographis paniculata* and Its Medicinal Value

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Abstract
Andrographis paniculata (Burm. F.) also called Kalmegh or "King of Bitters" belongs to family Acanthaceae. Use of the medicinal plants is a core component at primary health care level due to availability, acceptability, compatibility, and affordability. The development of diterpene lactones is strongly influenced by both the growing location and seasonal fluctuations. Because the largest concentration of active ingredients is found right before the plant blooms, early autumn is the optimal time to harvest.

Keywords: Kalmegh, Flavonoids, Andrographis, Phytoextracts, Lactones

Introduction
Medicinal plants are an integral part of human life to combat the sufferings from the dawn of civilization. . . It is estimated that more than 80,000 total plant species have been identified and used as medicinal plants around the world. Among these plants, more than 1300 plant species have been used traditionally in Malaysia where the knowledge is being passed down from generation to generation. The indigenous medicinal plants and plant-derived drugs are the potential source of alternative medicine and are extensively used to treat various health ailments. Use of the medicinal plants is a core component at primary health care level due to availability, acceptability, compatibility, and affordability. Dependency on these medicinal plants varies from country to country. It is estimated that about 75–80% of people of developing countries and about 25% of people of developed countries depend either directly or indirectly on medicinal plants for the first line of treatment. Therefore, people are encouraging indigenous production and processing of these medicinal plants to use in different cultures and religion for the treatment of various diseases. Moreover, importance and uses of medicinal plants are also stated in different religious books (i.e., the Holy Qur'an, the Bible). About 19 medicinal plants and 176 medicinal plants are mentioned in the Holy Qur'an and the Holy Bible, respectively.

Kalmegh is an important medicinal plant and widely used across the world. It belongs to the family Acanthaceae and is commonly known as ' King of bitters', Maha-tita or Bhui-neem as that of neem. In Ayurvedic texts finds its origin in the word " KIRATATIKTA" meaning the bitter herbs of the kiratas. The genus *Andrographis* consists of 28 species of small annual herbs essentially distributed in tropical Asia. Only a few species are medicinal of which *A. paniculata* is the most popular.

Chemical properties
Andrographis paniculata contains diterpenes, loctones, and flavonoids, which are primarily found in the root but can also be found in the leaves**.** The presence of andrographoloide named Kalmegin, dioxyandrographolide, neoandrographolide, and dihydroandrographolie

extracted from the aerial portions is responsible for the bitter principles in the leaves. Flavonoids, gums, mucilages, and tannins are abundant in the leaves and stems. The popular hepatoprotective Indian herbal drug Kalmegh (*Andrographis paniculata*) can be standardized by high pressure chromatographic determination of its major active constituents. The leaves of the herb were found to contain the highest amount (2.39% w/w) of Andrographolide and the seed to contain the lowest.

Phytochemistry

The plant's unusual secondary metabolites have significantly increased its value in the realm of medicinal plants and pharmaceuticals. It has a very strong therapeutic action in healing liver diseases as well as common cough and cold in humans. Andrographis has yielded a number of diterpenoids and diterpenoid glycosides with comparable carbon skeletons, the most bitter of which are andrographolide, neoandrographolide, and deoxyandrographolide. 14-deoxyandro-grapholide, 14-deoxy-11,12-didehydroandrographolide, andrographiside, deoxyandrographiside, homoandrographolide, andrographan, andrographon, andro-graphosterin, and stigmasterol are further phytochemicals accumulated by the plant . The leaves of Andrographis contain the greatest andrographolide (2.39%), the plant's most medicinally active phytochemical, while the seeds contain the least. Andrographolide has a strong bitter taste, a colourless crystalline appearance, and a "lactone function." The development of diterpene lactones is strongly influenced by both the growing location and seasonal fluctuations. Because the largest concentration of active ingredients is found right before the plant blooms, early autumn is the optimal time to harvest. To ensure a standardised level of andrographolides in those parts of Asia where Andrographis is sold commercially as medicine, a variety of lab level methodologies are used: thin-layer chromatography, ultraviolet spectrophotometry, liquid chromatography, volumetric and colorimetric techniques, and HPLC is the most robust and reliable for quantitative and qualitative profiles of andrographolides..

Medicinal Value of Andrographis paniculata

- It is used for the treatment of cancer and HIV.
- Kalmegh is an antioxidant and anti-inflammatory in nature.
- The regular use of Kalmegh is helpful to cure cough, cold, sinusitis and body pain.
- Kalmegh is used as antibacterial, anti parasitic and antifungal.
- Traditionally, Kalmegh is used in the treatment of leprosy and cholera.
- The extract of Kalmegh is used in the treatment of slow digestion, bowel irritation and irregular menstrual syndrome.
- It has also been proved as anti-hepatotoxic and has anti-typhoid activity.

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