

An Organized Assessment of Species of Plants of ‘*Alpinia*’ Genera, Belonging to Family ‘*Zingiberaceae*’

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ABSTRACT

The purpose of this review is to gathered information regarding plants of ‘*Alpinia*’ genera belonging to family ‘*Zingiberaceae*’. ‘*Zingiberaceae*’ is a family of flowering plants consisting of aromatic perennial herbs with creeping horizontal or tuberous rhizomes, comprising about 52 genera and more than 1300 species. In this review information about selected species was to be collected. For collecting information about that plants various sources were to be used. This sources provided information of plants including their synonym, distribution, description, medicinal uses, chemical constituents etc. From these studies we are concluding that their exists species of plants of ‘*Alpinia*’ genera, belonging to family, ‘*Zingiberaceae*’ with lots of chemical constituents and possesses beneficial medicinal properties. Due to this various parts like seeds, flowers, fruits, stems and roots of these plants are used in treatment of various diseases.

Keywords- *Alpinia*, *Zingiberaceae*.

INTRODUCTION¹⁻³

Zingiberaceae is among the plant families that are widely distributed throughout the tropics, particularly in Southeast Asia. It is an important natural resource that provides man with many useful products for food, spices, medicines, dyes, perfume and aesthetics. Thailand is a country of high plant biodiversity as a result of its geographical position in the tropics and the climatic variation between north and south. There are 200 species of *Zingiberaceae*

belonging to 20 genera found in Thailand. In recent years, several reports have been published concerning the composition and/or the biological properties (antimicrobial, antioxidant, anticancer and a stimulated effect on the immune system) of *Zingiberaceae* extracts. Many species have economic value because of their volatile oils, showy flowers and are used as spices, medicines, dyes, foods, perfumes, tonics, and as tropical ornamentals. For medicinal properties, many species of *Curcum* have been used world-widesince ancient times to today. Herbs perennial, terrestrial, rarely

epiphytic, aromatic, with fleshy, tuberous or non-tuberous rhizomes, often with tuber-bearing roots. Stems usually short, replaced by pseudostems formed by leaf sheaths. Leaves distichous, simple, those toward base of plant usually bladeless and reduced to sheaths; leaf sheath open; ligule usually present; petiole present or not, located between leaf blade and sheath, cushion like in *Zingiber*; leaf blade suborbicular or lanceolate to narrowly strap-shaped, rolled longitudinally in bud, gla-brous or hairy, midvein prominent, lateral veins usually numerous, pinnate, parallel, margin entire. Inflorescence terminal on pseudo-stems or on separate, short, sheath-covered shoots arising from rhizomes, cylindrical or fusiform, sometimes globose, lax to dense, few to many flowered, sometimes with bracteolate cincinni in bract axils and then a thyse, sometimes a raceme or spike; bracts and bracteoles present, often conspicuous, colored. Flowers bisexual, epigynous, zygomorphic. Calyx usually tubular, thin, split on 1 side, sometimes spathe-like, apex 3-toothed or 1-lobed. Corolla proximally tubular, distally 3-lobed; lobes varying in size and shape. Stamens or staminodes 6, in 2 whorls. Lateral 2 staminodes of outer whorl petaloid, or forming small teeth at base of labellum, or adnate to labellum, or absent. Median staminode of outer whorl always reduced. Labellum formed from lateral 2 staminodes of inner whorl¹⁻³.

SELECTED SPECIES

- *Alpinia galangal*
- *Alpinia nigra*
- *Alpinia nutans*
- *Alpinia officinarum*
- *Alpinia zerumbet*.

Botanical Name

Alpinia galangal

Synonym

*Maranta galangal*⁴.

Origin and Geographic Distribution

Alpinia galanga, commonly called greater galangal, is a rhizomatous herb distributed in various parts of India and throughout Southeast Asia. It is widely cultivated in small garden plots in rather wet ground in Malaysia, India, Indo China, Indonesia and the Philippines⁴.

Description

Alpinia galanga belongs to family "Zingiberaceae". The herb grows to a height of about 5 feet, the leaves being long, rather narrow blades, and the flowers, of curious formation, growing in a simple, terminal spike, the petals white, with deep-red veining distinguishing the lipp *et al*. The branched pieces of rhizome are from 1 ½ to 3 inches in length, and seldom more than ¾ inch thick. They are cut while fresh, and the pieces are usually cylindrical, marked at short intervals by narrow, whitish, somewhat raised rings, which are the scars left by former leaves. They are dark reddish-brown externally, and the section shows a dark centre surrounded by a wider, paler layer, which becomes darker in drying. Their odour is aromatic, and their taste pungent and spicy⁴.

Medicinal and Other Uses

For different countries, galangal is used distinctly. In most South East Asian countries dried galanga is employed only in the absence of fresh galangal whereas in Indonesia slices or powder of the fresh or dried rhizome are used frequently. The rhizome is used against rheumatism, bronchial catarrh, bad breath, and ulcers whooping colds in children, throat infections, to control incontinence, fever and dyspepsia. The root has been used in Europe as a spice for over a thousand years, having probably been introduced by Arabian or

Greek physicians, but it has now largely gone out of use except in Russia and India. The rhizomes have been used as flavours in native dishes and ingredients in many traditional medicines to treat various ailments, such as stomach disorders and skin diseases. In India the rhizomes have many applications in traditional medicines such as for skin diseases, indigestion, colic, dysentery, enlarged spleen, respiratory diseases, mouth and stomach cancer. Rhizomes show antibacterial, anti-fungal, anti-protozoal, and expectorant activities. It is used as a body deodorizer and halitosis remedy⁴.

Chemical Constituents

The pungent principal of galangal is 1'-acetoxychavicol acetate (galangal acetate). limonene (3.7% and 3.5%,), 1,8-cineole (33.0% and 30.2%,), camphor (5.0% and 14.0%,), alpha-terpineol (9.3% and 2.3%,), alpha-fenchyl acetate (12.7% and 1.1%,) and (E)-methyl cinnamate (5.3% and 2.6%,). The major constituents of the leaf oils from the same locations were: alpha-pinene (6.6% and 6.3%), camphene (5.0% and 5.1%), (3-pinene (21.5% and 23.5%,), 1,8-cineole (34.4% and 30.7%,) and camphor (7.8% and 12.8%,). Mono and sesquiterpenes as well as (E)-methyl cinnamate. The essential oil of *A. galangal* leaves is rich in 1, 8-cineole (28.3%), camphor (15.6%), beta-pinene (5.0%), (E)-methyl cinnamate (4.6%), bornyl acetate (4.3%) and guaiol (3.5%). The stem essential oil contains 1, 8-cineole (31.1%), camphor (11.0%), (E)-methyl cinnamate, guaiol, bornyl acetate⁵.

Botanical Name

Alpinia nigra

Synonym

*Zingiber nigrum*⁶.

Distribution

Alpinia nigra B.L. Burtt (*A. nigra*, family Zingiberaceae) is a perennial aromatic medicinal plant found in China, Bhutan, India, Srilanka and Thailand. It is commonly called as "Noh Kala" in Thailand. is extensively grown in Bangladesh, India, and Srilanka⁶.

Description

A. nigra is a biennial herbaceous plant. It is morphologically characterized by the presence of a rhizome, simple, wide-brim leaves protected by showy bracts, and terminal inflorescences¹. It has a soft, leafy stem about 1.5–3 m high. Leaves are sessile or subsessile, elongated and pointed at the end. Its leaves are single cotyledons, shaped to look like a pike, about 7–9 cm wide, and about 20–40 cm long. The fruit is a berry having many seeds, and the pericarp is thin and green when it is young, becoming black and brittle when it gets old⁶.

Medicinal Uses

A. nigra is one of the most important herbal remedies and it is used in Thai traditional medicine for stomachic, gastric diseases, antibacterial and antifungal activities. The rhizome is used as an aphrodisiac, tonic, diuretic, expectorant, appetizer and analgesic. It is also used in the treatment of impotence and bronchitis. In most tribal communities the root pounded and mixed with rice whisky is applied to skin for fungal infections, such as ringworm and melasma. The boiled green root is a potent carminative to reduce flatulence or dyspepsia. A root extract is taken thrice daily for the treatment of gastric ulcers, and taken twice daily for the treatment of jaundice by the Chakmas. Its use as an antiinflammatory and analgesic agent has been supported by experiments in mice. The rhizome, cooked or raw, has been traditionally acclaimed as a remedy for intestinal infections among the Mizo tribes

of north-east India. Experimentally the crude extract was shown to be highly effective against the trematode *Fasciolopsis buski*⁶.

Chemical Constituents

Rhizome yield 0.05% essential oil; chief compound are :caryophyllene oxide 23%,geraniol19.9%,eudesmool19.4% and citronellyl OAc 16.5% caryophyllene (47.7–49.0%), pinene (13.7–14.4%), humulene (7.5–7.8%), (E)-nerolidol (3.6–3.7%)⁷

Botanical Name

Alpinia nutans

Synonym

*Alpinia molucana*⁸.

Distribution

Growing in valley brush or thickets along field or ditches, distributed in south-central and southwest China, Hebei, Shaanxi, Shandong, Zhejiang, Jiangxi, Fujian and etc⁸⁻¹⁰.

Description

His plant has attractive glossy foliage. Lanceolate glabrous leaves emerge from dense stands of pseudostems. The terminal inflorescence resembles that of *Alpinia zerumbet*, but with smaller bracts, and much larger, red and yellow labellums⁸⁻¹⁰.

Height

3'

Temperature/zone

Zone 7b, 20°F or higher

Light

Filtered shade.

Water

Keep them evenly moist during the warm months, but allow them to dry out a bit more during the winter.

Fertilizer

I use an all purpose fertilizer. Do not fertilize during the winter.

Medicinal Uses

Alpinia nutans is used in traditional medicine as diuretic, antihypertensive, antifungal, and antiulcer. The plant extract was experimentally shown to induce dose-dependent decrease in blood pressure in rats and dogs. However, it was found to have no effect on diuresis. Two new glucoside esters of ferulic acid isolated from the rhizome have higher antioxidant activity than Trolox. Its chemical compound dihydro-5, 6-dehydrokawain has an inhibitory effect on lipid peroxide, and has an activity similar to that of beta-carotene⁸⁻¹⁰.

Chemical Constituents

α -pinene, β -pinene and α -cadinol, monoterpenes, sesquiterpenes, diterpenes and alkanes, of which the sesquiterpenes, calamenene (41.4%), farnesol (10.9%), spathulenol (5.6%) and β -selinene (5.2%) and the diterpene (8 β ,13 β)-kaur-16-ene (10.7%)⁸⁻¹⁰.

Botanical Name

Alpinia officinarum

Synonym

*Alpinia officinalis*¹¹.

Distribution

Lesser galangal is native to China, growing mainly on the southeastern coast, and it grows in Hainan, Japan, and Thailand¹. It is also cultivated in India. Hong Kong is the commercial center for the sale and distribution of the lesser galangal. It is a tropical weedy shrub native to India valued for its scented seed. Ambrette is a close relative to Okra, a popular horticultural crop. The genus *Abelmoschus* has six species distributed in the

South and South East Asia and in North Australia¹¹.

Description

This herbaceous plant can grow up to ten feet in height, though three to five feet is more common. The leaves are lanceolate (long and thin), and the flowers are white with streaks of red, growing from a spike at the top. The plant's rhizomes, the part known as galangal, are thin and tough, and they are the principal reason the plant is cultivated. They have orange flesh with a brown coating, and have an aromatic odor and a pungent flavor. These are smaller than greater galangal¹².

Medicinal Uses

The galangal rhizomes were widely used in ancient and medieval Europe, where they were reputed to smell of roses and taste of spice. Its use in Europe has dramatically declined, however, and is now mainly used in Eastern Europe. It is used in Russia for flavoring vinegar and the liqueur Nastoika. It is still used as a spice and medicine in Lithuania and Estonia. In Asia the rhizomes are ground to powder for use in curries, drinks, and jellies¹. In India an extract is used in perfumes, and Tatars prepare a tea with it. *Alpinia officinarum* contains high concentrations of the flavonol galangin, which has been shown to slow the increase and growth of breast tumor cells. Historically, the rhizomes were reputed to have stimulant and digestive effects¹³.

Chemical Constituents

1,8-cineole, methyl cinnamate, a-cadinene, galangin, 3-O-methyl galangin, kaempferide, alpinin, galangol, and some diarylheptanoids flavonoids, which was present in high concentrations in AO, diarylheptanoids, phenylpropanoids, neolignans¹⁴.

Botanical Name

Alpinia zerumbet

Synonym

*Alpinia speciosa*¹⁵.

Distribution

Native to eastern Asia¹⁵.

Description

Native to eastern Asia, this plant is a rhizomatous, evergreen tropical perennial that grows in upright clumps 8 to 10 ft (2.4 to 3.0 m) tall in tropical climates. It bears funnel-formed flowers. Flowers have white or pink perianths with yellow labella with red spots and stripes³. There are three stamens, but only one has pollen. There is one pistil. The fruit is globose with many striations. In more typical conditions, it reaches 4 to 8 ft (1.2 to 2.4 m) feet tall in the green house, and 3 to 4 ft (0.91 to 1.2 m) feet tall, as a house plant¹⁶.

Medicinal Uses

The plant's long leaf blades are still used for wrapping zongzi. In Okinawa, Japan, *A. zerumbet* is known in the local dialect as *sannin*, or in Japanese as *getto*. Its leaves are sold as herbal tea and are also used to flavour noodles and wrap mochi rice cakes. Its tea has hypotensive, diuretic and antiulcerogenic properties. Decoction of leaves has been used during bathing to alleviate fevers. The leaves and rhizomes have been proven effective against HIV-1 integrase and neuraminidase enzymes, and has also shown anti-diabetic effect through inhibitions of formation of advanced glycation end products. Besides, the antioxidant activities of different parts of *Alpinia zerumbet* has already been reported¹⁷.

Chemical Constituents

Terpinen-7-al (40.5%) and sabinene hydrate (15.4%); in August, the major

components identified were terpinen-4-ol (29.4%) and 1, 8-cineole (23.1%). Leaf oil of *A. purpurata* was rich in β -pinene (34.7%) and α -pinene (11.8%). Monoterpenes (52.5%), terpinen-4-ol, γ -terpinene¹⁸.

CONCLUSION

After the through literature we have found that Zingiberaceae Family have tremendous medicinal properties such rheumatism, bronchial catarrh, bad breath, and ulcers whooping colds in children, throat infections, to control incontinence, fever and dyspepsia antibacterial, anti-fungal, anti-protozoal, antiinflammatory and analgesic, diuretic, antihypertensive, anticancer, and antiulcer effective against HIV-1 integrase and neuraminidase enzymes Apart from biological profile Cucurbitaceae Family posses many therapeutically important chemical constituents such as limonene, 1, 8-cineole ,camphor alpha-terpineol, geraniol, eudesmool caryophyllene, pinene, kaempferide, alpinin, galangol γ -terpinene, to explore the medicinal value of this species.

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