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RESEARCH ARTICLE .....!!!

## KULANJAN (*ALPINIA GALANGA*) FROM THE PERSPECTIVE OF UNANI MEDICINE

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### ABSTRACT

Kulanjan (*Alpinia galanga*) is a rhizomatous perennial herb used in traditional systems of medicine especially in Unani medicine. It is used as a single drug or as a compound medicine and it has actions such as expectorant, nerve stimulant, digestive, appetizer, stomachic, cardiac tonic, carminative, etc. The aim of this study is to gather relevant data regarding Kulanjan in order to give base for the researchers for further studies. The rhizome is generally used as a spice or as a source of essential oil. The flowers and young shoots are used as vegetables or as spices. It contains flavonoids and volatile oils. Actions and uses of Kulanjan have been mentioned in many places of authentic Unani classical text books such as Al Qanun-fil-tibb, Magzanul mufradat, Bisthanul mufradat, etc. In addition to that Siddha materia medica, Ayurveda pharmacopoeia and many other traditional books have also mentioned its actions and uses clearly. Further, there are hundreds of authentic scientific articles which have scientifically proved its beneficial actions in various diseases through many research studies. When critically reviewed these articles, it is revealed that this herb possessed many pharmacological activities such as antitumorigenic, antioxidant, anti-inflammatory, hepatoprotective, diuretic, antibacterial, antifungal, antiviral, antiprotozoal, immunomodulatory, antidiabetic, antiplatelet, hypolipidemic, anti-oxidant antipyretic and, many other pharmacological properties. Further this herb can be used to treat several diseases like arthritis, cancer, asthma, sinusitis, infections etc. Therefore, randomized controlled clinical studies should be undertaken to reveal all its medicinal potential in order to utilize the maximum benefit of this herb.

**INTRODUCTION:**

There are hundreds of traditional medicines used in the treatment of ailments, most of them are herbs. In the last few decades there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin and lesser side effects<sup>(1)</sup>. They are replacing the modern medicine in society as natural alternatives to synthetic chemicals<sup>(2)</sup>. There are multiple reasons for patients to revert back to herbal remedies. Often cited is a “sense of control, a mental comfort from taking action, “which helps explain why many people taking herbs have diseases that are chronic or incurable viz. diabetes, cancer, arthritis or AIDS. In such situations, they often believe that conventional medicine has failed them<sup>(3)</sup>. At the present juncture, the modern conventional healthcare is burdened with great problems of unsafe medicines, chronic diseases, resistant infections, auto immune disorders and degenerative disorders of ageing, despite great scientific advances. Therefore, exploring new effective drug with fewer side effects is the current challenge for the scientists.

**KULANJAN (*Alpinia galanga*)**

Kulanjan is popularly used in Unani medicine as a single drug (*mufrad dawa*) or used in the form of compound drug (*murakkab dawa*). It is scientifically known as *Alpinia galanga*. In Unani Medicine it is used as expectorant<sup>(4,6)</sup>, nervous stimulant<sup>(5,6)</sup>, digestive, appetizer<sup>(4,7)</sup>, stomachic<sup>(4,8)</sup>, cardio tonic<sup>(5,6)</sup>, carminative<sup>(6,8)</sup>, etc.

*Alpinia galanga* (Linn.) is commonly found around the world. Different parts of this plant are traditionally claimed to be used for the treatment of anti-fungal, anti-tumor, anti-diuretic, disease of heart, rheumatic pains, dyspepsia, fever, diabetes etc<sup>(9)</sup>. Greater galangal is botanical cousin to ginger was recognized to be superior in many ways and has been employed in medicine for over a thousand of years<sup>(10)</sup>. The rhizomes are large, with a spicy taste and pungent odour. The skin of the rhizome is deep-orange brown in colour which is prominently contrasting with pale-buff colour of the internal portion. Fracture is very tough, fibrous and uneven. Rhizomes are marked with wavy annulations of the leaf bases which possess a lighter colour than the remainder of the surface<sup>(4,5)</sup>.

Kulanjan is known with different vernacular names by the various ethnicities. In Sinhala it is called as Aratta, Mahaaratta<sup>(7)</sup>; Tamil - Pera-rattai<sup>(7,9)</sup>; Hindi - Kulanjan; Kannada - Dhumarasma; Bengali - Kulingjan; Gujrati - Kulinjan; Malyalam - Per arattha<sup>(7,9)</sup>, Kol-inji<sup>(7,9)</sup>, Pararatta<sup>(7,9)</sup>; Telugu - Pedda-dhumpa<sup>(7,9)</sup>; Marathi - Kulinjan<sup>(9)</sup>, Koshtkulayan<sup>(7)</sup>; Sanskrit - Mahabaracach<sup>(9)</sup>, Sugandha vacha<sup>(9)</sup>, Rasna<sup>(9)</sup>, Barakulanjar<sup>(7)</sup>; English - Greater galangal<sup>(7,9)</sup>

## MORPHOLOGY

Its root stocks are tuberous and slightly aromatic. Leaves are oblong-lanceolate, acute, glabrous, green above, paler beneath with slightly callus white margins. Sheaths are long and glabrous and ligules are short and rounded. Flowers are greenish white, in densely flowered, 15-30 cm panicles, bisexual, irregular and bracts ovate lanceolate. Calyx is tubular, irregularly 3-toothed and 1 cm long. The corolla lobes are oblong, claw green, blade white, striated with red, rather more than 1 cm long, broadly elliptic and shortly 2-lobed at the apex with a pair of subulate glands at the base of the claw. stamen 1, 1.8 cm long, filament flattened, anther cells diverging at the top occasionally with an orbicular crest, lateral staminodes minute or obsolete; ovary inferior, 3-locular, ovules few on an axile placenta, style filiform, stigma subglobose; The fruit is size of a small cherry and orange red in colour (7,11).

## ETHNOPHARMACOLOGY

Kulanjan is widely distributed in the tropical countries like Sri Lanka, Indonesia, Malaysia, India, China, and Egypt<sup>(7,12)</sup>. It grows in open sunny places, forests and brushwood. It is commonly cultivated in the mid and low-country in Sri Lanka<sup>(7)</sup>. The plant is distributed in Himalaya and Southern region of Western Ghats in India<sup>(9)</sup>. *Alpinia galanga* belongs to the family Zingiberaceae has been used traditionally for the treatment of eczema, bronchitis, coryza, pityriasis versicolor, otitis interna, gastritis, ulcers and cholera. The seed of Kulanjan is used for emaciation and to clean the mouth, stimulates the digestive power, appetite and as a purgative<sup>(9)</sup>. The rhizome is generally used as a spice or source of essential oil. The flowers and young shoots are used as a vegetable or as a spice<sup>(1)</sup>. *Alpinia galanga* contained flavonoids and volatile oils<sup>(9)</sup>. The previous studies showed that *Alpinia galanga* possessed many pharmacological activities, including antibacterial, antifungal, antiviral, antiprotozoal, immunomodulatory, anti-oxidant effect, antidiabetic, antiplatelet, hypolipidemic and many other pharmacological effects<sup>(13)</sup>.

**Table 1: PHYSICO CHEMICAL ANALYSIS**

Physico-chemical parameter	Amount (%) on dry weight basis
Ethanol extractive of rhizome	9.8-10.5 <sup>(7,9)</sup>
Water extractive of rhizome	11.3-13.6 <sup>(7,9)</sup>
Acid insoluble ash	3.8-5.8 <sup>(7,9)</sup>
Water soluble ash	4.3-5.9 <sup>(7,9)</sup>
Total ash	8.3-11.9 <sup>(7,9)</sup>

**Table 2: PHYTOCHEMISTRY & ACTIVITY STUDIES**

PHYTOCHEMICAL	ACTIVITY
Ether and ethyl acetate	Antibacterial <sup>(14,15,16,17)</sup>
Ethanollic extracts of <i>Alpinia galangal</i>	Phytotoxic activity against <i>Lemma minor</i> <sup>(13)</sup> , anti-oxidative <sup>(7)</sup> , antibacterial <sup>(18)</sup>
Acetoxychavicol acetate	Antifungal <sup>(19)</sup>
1'S-1'-Acetoxychavicol acetate and <i>p</i> -coumaryl alcohol $\gamma$ - <i>O</i> -methyl ether	Anti-cancerous <sup>(20)</sup>
Alcoholic and aqueous extracts	Anti-inflammatory <sup>(21)</sup>
1'-acetoxychavicol acetate & acetoxyeugenol (seeds)	Antiulcer against ulcers induced by hyperthermia, ethanol, HCl, indomethacin, reserpine & pyloric ligation induced ulcers <sup>(7)</sup>
7-(4'-Hydroxy-3'-methoxyphenyl)-1-phenylhept-4-en-3-one	Anti-inflammatory <sup>(22)</sup>
1'S-1'-acetoxychavicol acetate and 1'S-1'-acetoxyeugenol acetate	Anti-allergic <sup>(23)</sup>
Acetoxylbenzhydrols	Anti-allergic <sup>(24)</sup>
Hot water extract of root	Stimulated RES & increased peritoneal exudates cells & spleen cells of mice <sup>(7)</sup>

Kulanjan contains more bioactive compounds when compared to other species of same family<sup>(19)</sup>. Essential oil from fresh and dried rhizomes of Kulanjan have potential antimicrobial activities against a range of bacteria, fungi, yeast and parasite<sup>(18)</sup>. However, the galangal extract, being hydrophobic in nature, could not inhibit the proliferation of gram-negative bacteria as the extract unable to penetrate the lipopolysaccharide monolayer of outer membrane of the cell wall<sup>(25)</sup>. However it has a potential as an antiamebic agent and it was found that the chloroform extracts from *A. galanga* to be highly effective with an added desired advantage of less side effects than conventional medicine, viz. metronidazole<sup>(26)</sup>.

Antileishmanial phenylpropanoids has been isolated using hexane, chloroform and ethyl acetate extracts of *A. galanga* rhizome<sup>(27)</sup>. 1'-Acetoxychavicol acetate was isolated as the major cytotoxic component of *A. galanga* against human cancer cell lines and non cancer cell lines by an assay<sup>(28)</sup>. 1,7-bis (4-hydroxyphenyl)-1,4,6-heptatrien-3-one (BHPHTO) and bisdemethoxycurcumin (BDMC) have been isolated from the rhizomes of *Alpinia galanga*,

and the study examined the bio-effectiveness of the two compounds on the human melanoma A2058 and showed that significantly inhibited the proliferation of melanoma cells in the cell viability assay <sup>(29)</sup>. *Alpinia galanga* treated animals as compared to the controls showed a significant rise in the RBC level and also this study showed gain in weight of sexual organs and increased sperm motility and sperm count <sup>(7)</sup>. It has anti-inflammatory properties and probably acts by blocking histaminic and serotonin pathways <sup>(30)</sup>.

Weerakkody et al. found that, the Kulanjan (*Alpinia galanga*), rosemary (*Rosmarinus officinalis*) and lemon iron bark (*Eucalyptus staigerana*) extracts have synergistic antimicrobial activity<sup>(31)</sup>. The different parts of the plant posses many pharmacological effects including antibacterial, antifungal, antiviral, antiprotozoal, immunomodulatory, anti-oxidant effects, antidiabetic, antiplatelet, hypolipidemic and many other pharmacological effects<sup>(32)</sup>.

### ACTIONS & USES OF KULANJAN

According to Unani medicine Kulanjan has Munafis-e-bulghum vo Mukhrij-e-bulgham (expectorant) <sup>(4,5,6,33)</sup>, Mufarreh (exhilarant)<sup>(4,5,6,36)</sup>, Muqawwi-e-Qalb (cardiac tonic)<sup>(4,5,6,33)</sup>, Latheef Muhallil riyah (resolvent)<sup>(8)</sup>, Muqawwi-e-meda<sup>(5,8)</sup> (stomachic), Mushahhi (appetizer) <sup>(4,5,7)</sup>, Mudir-e-luab (sialogogue)<sup>(4,6)</sup>, Kasurriyah (carminative)<sup>(33)</sup>, Muqawwi-e-jigar (liver tonic)<sup>(6)</sup>, Muthaib-e-dehan (mouth freshner) <sup>(4,5,6,7,8)</sup>, Musakkin-e-auja<sup>(6,33)</sup>, Muqawwi-e-bah (aphrodisiac)<sup>(4,5,6,7,8)</sup>, Musakhkhin (calorific)<sup>(6)</sup> and Daf-e-amraz-e balghamiya wa saudaviya (anti phlegmatic and black bilious disorders)<sup>(6)</sup> actions. It is used as external application to reduce coldness due to circulatory failure<sup>(7)</sup>, and good for colic pain<sup>(8)</sup>. According to Ayurveda, its theeksana (active or penetrative) property helps to increase digestive secretions, prevents anorexia and abdominal pain<sup>(7)</sup>. It removes bad odour<sup>(7,8)</sup>, reduces kapha<sup>(34)</sup>, dilates the bronchioles and prevents asthma<sup>(7,34)</sup>, sinusitis<sup>(34)</sup> and muscular dystrophy<sup>(35)</sup>. It is also used in cough, hoarseness of voice, Balghami dard (phlegmatic pain) especially in renal pain and urine incontinence<sup>(6)</sup>. Keeping a piece of rhizome in mouth will promote sexual desire<sup>(7)</sup>. It can be used for backache, sciatica, cancer, colic pain and sore throat<sup>(33,36)</sup>.

### PROPERTIES OF KULANJAN ACCORDING TO UNANI MEDICINE

<b>Mizaj (Temperament):</b>	Hot <sup>2</sup> Dry <sup>2</sup> <sup>(4,5)</sup> , Hot & Dry <sup>(6,8)</sup>
<b>Dose:</b>	2-3 Masha <sup>(6)</sup>
<b>Muzir (Side effect):</b>	Habis –e-boul (Retention of urine) <sup>(6)</sup>
<b>Musleh (Correctives):</b>	Kateera ( <i>Cochlospermum religiosum</i> L.), Sandal ( <i>Santalum album</i> L.), Tabaseer (bamboo salt), Anisoon ( <i>Pimpinella anisum</i> L.) <sup>(6)</sup>

**Badal (Substitute):** Darcheeni (*Cinnamomum zeylanicum*)<sup>(4,5,6)</sup>, Kababcheeni (*Piper cubeba*)<sup>(4,5)</sup>, Qaranfal (*Syzygium aromaticum*)<sup>(8)</sup>

## COMPOUND MEDICINAL PREPARATIONS

In Unani medicine, Kulanjan is a constituent of many compound formulations such as Hab-e-Jadwar<sup>(6)</sup>, Halwa-e-Salab<sup>(37,38)</sup>, Hab-e-Mumsik-ul-Surkh<sup>(38)</sup>, Ithripal-e-Muqawwie Basar<sup>(37)</sup>, Halwa-e-Maghz-e-Sar-e-Kunjashk Nar<sup>(37)</sup>, Halwa-e-Gheekwar<sup>(38)</sup>, Jawarish-e-Jalinoos<sup>(4,5,6)</sup>, Jawarish Ood Shirin<sup>(38)</sup>, Jawarish-e-Zarooni Ambari<sup>(38)</sup>, Lauq-e-surfa<sup>(6)</sup>, Laboob-e-Barid<sup>(38)</sup>, Laboob-e-Kabeer<sup>(6)</sup>, Majoon-e-Chibchini Ba Nuskha Kalan<sup>(38)</sup>, Majoon-e-Muqawwi wa Mumsik<sup>(38)</sup>, Majoon-e-Piyas<sup>(38)</sup>, Majoon-e Alkula<sup>(37)</sup>, Majoon-e-Khadar<sup>(4,5)</sup>, Hab-e-Hilteet<sup>(4,5)</sup> and in Ayurveda, it is a constituent in Rasanadhi Gugul<sup>(7)</sup>, Maha Narayana oil<sup>(7)</sup>, Rasna sapthakaya<sup>(7)</sup>, Dasamuladi Kwathaya<sup>(7)</sup>, Dasamul Iguradi kwathaya<sup>(7)</sup>, Kumara Guliya<sup>(7)</sup>, etc.

## CONCLUSION

Practice of traditional medicines are becoming popular day by day and it draws the attention of modern world as it is believed to be devoid of side effects or have less side effects. Unani physicians have recorded many actions of Kulanjan on human through their clinical experience and observation. Scientists have under taken many research activities to validate those claims with the help of modern parameters. Kulanjan contains many chemical compounds which are responsible for its diverse activities. This review on Kulanjan (*Alpinia galanga*) from several scientific studies revealed that it has antimicrobial activity, anti-parasitic and insecticidal activity, antioxidant, neuroprotective activity, anti-inflammatory and analgesic activity and anti-cancerous activity. There are many actions and uses mentioned in Unani and other traditional medicine yet to be proved scientifically. Therefore, it is the prime time to discover their medicinal values at molecular level with help of various biotechnological tools and techniques through conducting various scientific based researches. Hence this review would serve as a base for further studies.

**CONFLICT OF INTEREST:** None

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