BIOLOGICAL ACTIVITIES OF GREATER GALANGAL, *ALPINIA GALANGA* –A REVIEW

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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. *Alpinia galanga* has been used traditionally for the treatment of eczema, bronchitis, coryza, morbili, pityriasis versicolor, otitis interna, gastritis, ulcers and cholera. The seed of *A. galanga* is used for emaciation and to clean the mouth, stimulates the digestive power, appetite and as a purgative. 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. *Alpinia galanga* contained flavonoids and volatile oils. The previous studies showed that *Alpinia galanga* possessed many pharmacological activities. It is also being used in cosmetics for centuries. The World Health Organization (WHO) estimated that approximately 80% of world population relies mainly on traditional medicines, mostly plant drugs in their health care. Today, Ayurveda coexists with modern system of medicine, and is still widely used and practiced. About 30% of the currently used therapeutics is of natural origin.

PRODUCT DETAILS:

Botanical name	*Alpinia galangal*
Family	Zingiberaceae
Common name	Kulanjan
Origin	south and southwest Asia
Plant part used	Seeds
Extraction Method	cold pressing
Color	Pale yellow or amber colored liquid
Quality	100% pure and natural

GEOGRAPHICAL DISTRIBUTION:

Alpinia galanga commonly found in Indonesia, India, China, and Arabic gulf areas, Malaysia, Egypt and Sri Lanka. It grows in open, sunny places, forests and brushwood. It is commonly cultivated in the mid and low country in Sri Lanka. In India the plant is distributed in the Himalaya and Southern region of Western Ghats.

Alpinia galanga was observed against human liver cancer cell line HepG2 cell line

TOP BENEFITS OF ALPINIA GALANGA:

- ✓ Sharpens alertness and focus
- ✓ Amplifies caffeine's nootropic benefits
- ✓ Supports brain and cognitive function

ALPINIA GALANGA KEY MECHANISMS:

COGNITIVE FUNCTION: -

- ✓ Supports mental alertness
- ✓ Supports attention
- ✓ Supports memory

BRAIN FUNCTION: -

- ✓ Neuroprotective effects
- ✓ CNS stimulant activity
- ✓ Supports locomotor activity and motor coordination
- ✓ Downregulates acetylcholinesterase (AChE) levels/activity in the brain
- ✓ Downregulates monoamine oxidase (MAO) A and B levels/activity in the brain

ANTIOXIDANT DEFENCES: -

- ✓ Upregulates antioxidant enzymes in the brain (superoxide dismutase [SOD], catalase [CAT], glutathione peroxidase [GPx])
- ✓ Replenishes glutathione (GSH) levels
- ✓ Downregulates lipid peroxidation

OTHER EFFECTS: -

- ✓ Supports healthy cardiometabolic parameters
- ✓ Immunostimulant activity

SYNERGIES: -

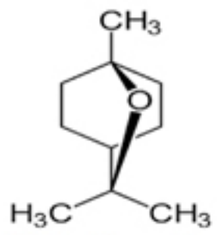
- ✓ Caffeine — supports sustained attention

According to a study, it can be concluded that, galangal rhizome (*Alpinia galanga* L.) can be formulated into cream preparation.

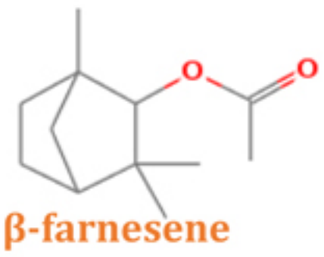
ACTIVE COMPOUNDS:

Active compounds from the various parts *A. galanga* were widely studied by many researchers. Many active compounds were successfully isolated and identified by previous researchers. The major active compounds found in *A. galanga* are 1, 8-cineol, α-fenchyl acetate, β-farnesene, β-bisabolene, α-bergamotene, β-pinene and 1'-acetoxychavicol acetate. 1, 8-cineole known as marker compound for *Alpinia* spp and was reported as most abundant compound in most of the studies on *A. galangal*.

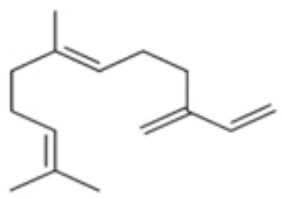
Feature



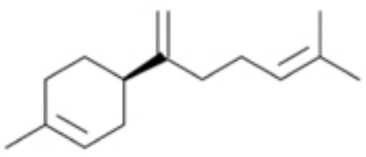
1,8-cineole



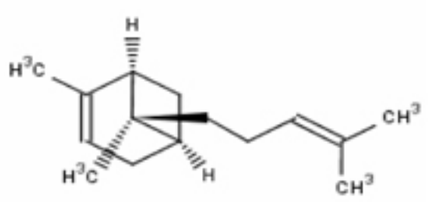
β-farnesene



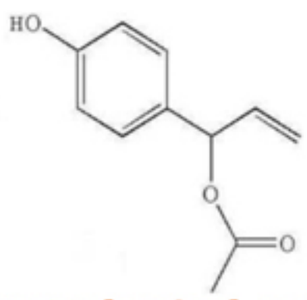
α-fenchyl acetate



β-bisabolene



α-bergamotene



1'-hydroxychevicol acetate

Alpinia galanga have excellent antioxidant activities and are important bioactive components in rhizomes which can cause inhibition of the oxidative modification of the human lipoprotein.

GALANGAL STANDARDIZED EXTRACT GRADES OFFERED BY SUNPURE:

ANALYTICAL SPECIFICATIONS: -

TEST PARAMETER	SPECIFICATION	RESULT
Botanical name	*Alpinia galanga*	Complies
Common name	Galanga	Complies
Plant part used for extraction	Rhizome	Complies
Appearance/colour	Brown coloured free flowing powder	Complies
Identification	By TLC	Complies
Solvent used for extraction	Water-100%	Complies
Herbs ratio	10:1	Complies
Country of origin RM & MFG	India	Complies
Taste & odour	Characteristic	Complies
Excipients	Nil	Complies
Particle size, pass throu2h 60 mesh	>95%w/w	Complies
Solubility in water	NLT-100 %w/w	Complies

In the thin layer of skin protection, it is expected that the active ingredients of galangal can be used as an anti-bacterial, anti-fungal, anti- acne, anti-inflammatory, anti-oxidants that prevent premature aging and maintain skin youthfulness, and anti- septic that can keep skin clean and fresh.

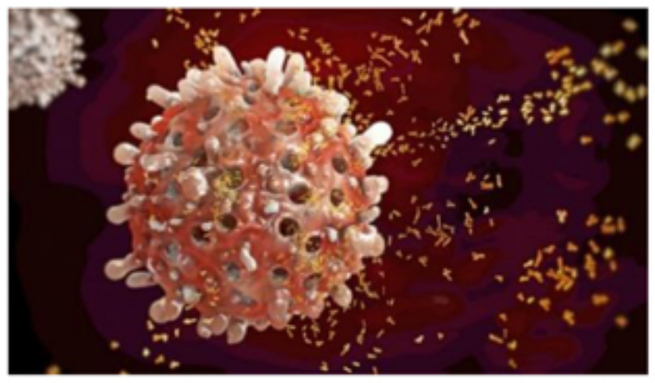
PHARMACOLOGY ACTIVITY:

ANTIMICROBIAL: -

Alpinia galanga poses antimicrobial activity against various bacteria and fungi. Essential oil from fresh rhizomes of *A. galanga* exhibits an antimicrobial activity against Trichophyton mentagrophytes. Similarly, the ether extract of *A. galanga* are more potent than ethyl acetate in antibacterial activity and significantly effective on Staphylococcus aureus and Klebsiella pneumonia. 1,8-Cineole from the ethanol extract of *Alpinia galanga* was discovered to have antibacterial activity against Staphylococcus aureus. *A. galanga* have antifungal activity against fungi resist the common antifungal products like amphotericin B and ketoconazole. It exerted a concentration-dependent inhibition of the growth of zoonotic dermatophytes and the yeast-like Candida albicans. Ethanolic extract of *A. galanga* possess phytotoxic activity against Lemna minor and significant antifungal activity against Trichophyton longifusus. The antimicrobial activity is due to composition of 1,8-cineole, 4-allyphenyl acetate and a-bisabolene. *Alpinia galanga* also been studied and found to be inhibit a wide range of human pathogenic fungi, zoonotic dermatophytes and yeast-like *Candida albicans*. The ethanolic extracts poses fungicidal activity against *Trichophyton longifusus, Colletotrichum musae* and *Fusarium oxysporum, Trichophyton mentagrophytes, Trichophyton rubrum, Trichophyton concentricum, Rhizopus stolonifer* and *Aspergillus niger.*

ANTITUMOR: -

The active compound, 1'S'-1'- acetoxychavicol acetate were found to provide inhibition of the growth of oral squamous cell carcinoma in in-vitro or in-vivo besides potentiating the effect of synthetic drug- cisplatin. It is reported that 1'-acetoxychavicol acetate inhibits the NF-kB activation and demonstrates the suppression on the generation of tumor in the mice.

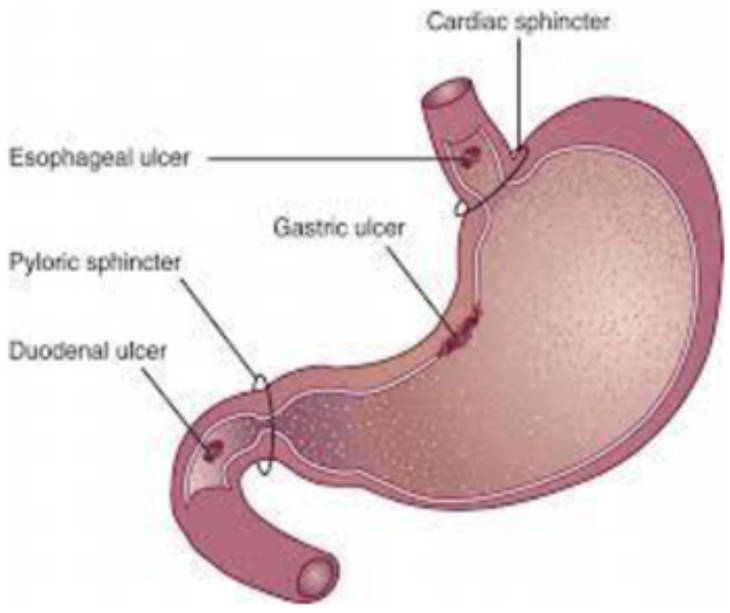


The high dose of methanolic extract of *A. galanga* treated albino mice showed no estrogenic activity rather showed decrease uterine wet weight as well as morphologically constricted uterine horns which clearly suggests anti-estrogenic activity. Two isolated compounds from the rhizomes *A. galanga*, 1,7-bis (4-hydroxyphenyl)-1,4,6-heptatrien-3-one (BHPHTO) and bisdemethoxycurcumin (BDMC) were examined for their bioeffectivenesses on the human melanoma A2058 and showed that significantly inhibited the proliferation of melanoma cells in the cell viability assay. The research was also taken on the tests to B16-F10 cell line and showed minor inhibitory consequences of cellular tyrosinase activities and melanin contents.

It is concluded that the extract of *Alpinia galanga* exerts pro-apoptotic effects in a breast cancer-derived cell line and could be considered as a potential chemotherapeutic agent in breast cancer.

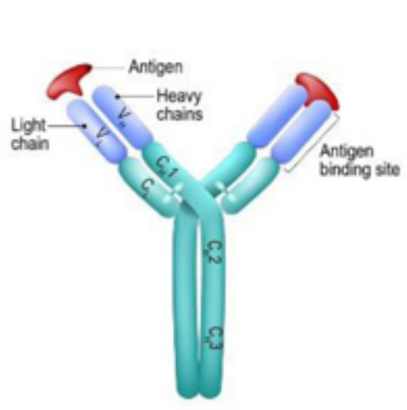
ANTIULCER: -

Phenolic compounds such as flavonoids and phenolic acids are found abundantly in this plant. The ethanolic extract of *A. galanga* significantly reduced the intensity of gastric mucosal damage induced by pyloric ligation and hypothermic restraint stress in rats. It produced a significant decrease in gastric secretion in pylorus ligated rats and a highly significant cytoprotective effect against 80% ethanol-, 0.6 M HCl-, 0.2 M NaOH- and 25% NaCl-induced cytodestruction.



ANTIALLERGIC: -

Alpinia galanga was found to be effective in treatment of allergy and the isolated compounds which extract inhibit the release of antigen IgE mediated in passive cutaneous anaphylaxis reactions in mice. A study reported that the Immunostimulating activity of the hot water-soluble polysaccharide extracts of *Alpinia galanga*. *Alpinia galanga* (L.) Willd. (family Zingiberaceae) were tested for their immunostimulating activity in mice.



ANTIOXIDANT: -

Ethanolic extracts obtained from Holy basil (*Ocimum sanctum* Linn) and Galangal (*Alpinia galanga*) showed strong antioxidant activity, acts as radical scavenger and also as lipoxygenase inhibitor. It is studied that antioxidant activities and antioxidative components in extracts of *A. galanga*. They reported 50% ethanol in water has antioxidant activity when compare with two other samples based on a water extract and the essential oil which determined using the 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and oxygen radical absorbance capacity (ORAC) methods. The ethanolic extracts showed the highest DPPH free radical scavenging ability as well as the highest ORAC value when compared to the water extract and the essential oil.

ANTI-INFLAMMATORY: -

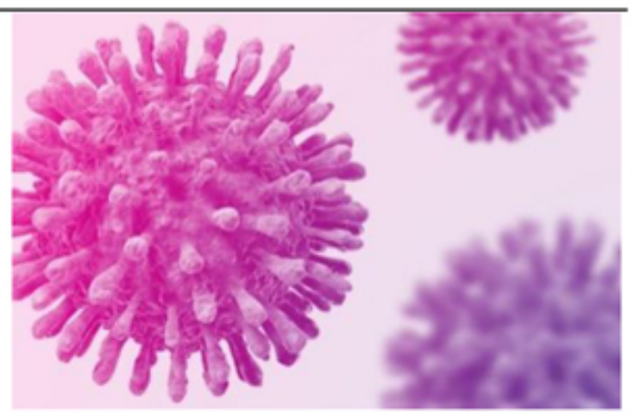
Alpinia galanga have anti-inflammatory and analgesic effects towards rheumatic condition. It acts as therapeutical agent for treating inflammatory immune disorders and induced paw inflammation and granuloma weight. Furthermore, it shows drastic significant effect on reducing symptoms of osteoarthritis. It was reported that the effects of p-hydroxycinnamaldehyde from *A. galanga* acetone extracts on human chondrocytes, Osteoarthritis (OA) is the most common form of arthritis and affects millions of people worldwide and patients have traditionally been treated with non-steroidal anti-inflammatory drugs (NSAIDs), but these are associated with significant side effects. It can be thus concluded that *A. galanga* has anti-inflammatory properties and probably acts by blocking histaminic and serotonin.

ANTIDIABETIC EFFECTS: -

The administration of powdered rhizome of *Alpinia galanga* to the normal rabbits produced significant decrease in blood glucose leve. However, it was found that the ethanolic extract

of *Alpinia galanga* exerted antidiabetic effects in rats. When compared to the diabetic control. Serum glucose level (mg/dl) was found to decrease gradually from the date of administration of the extract to the end of the study when compared to the diabetic control. Total cholesterol was also found to decrease drastically on the administration of the extract when compared with the diabetic control. The ethanolic extract of *Alpinia galanga* was found to be effective in inhibiting the α-Glucosidase when compared to Acarbose.

ANTI- HIV: -

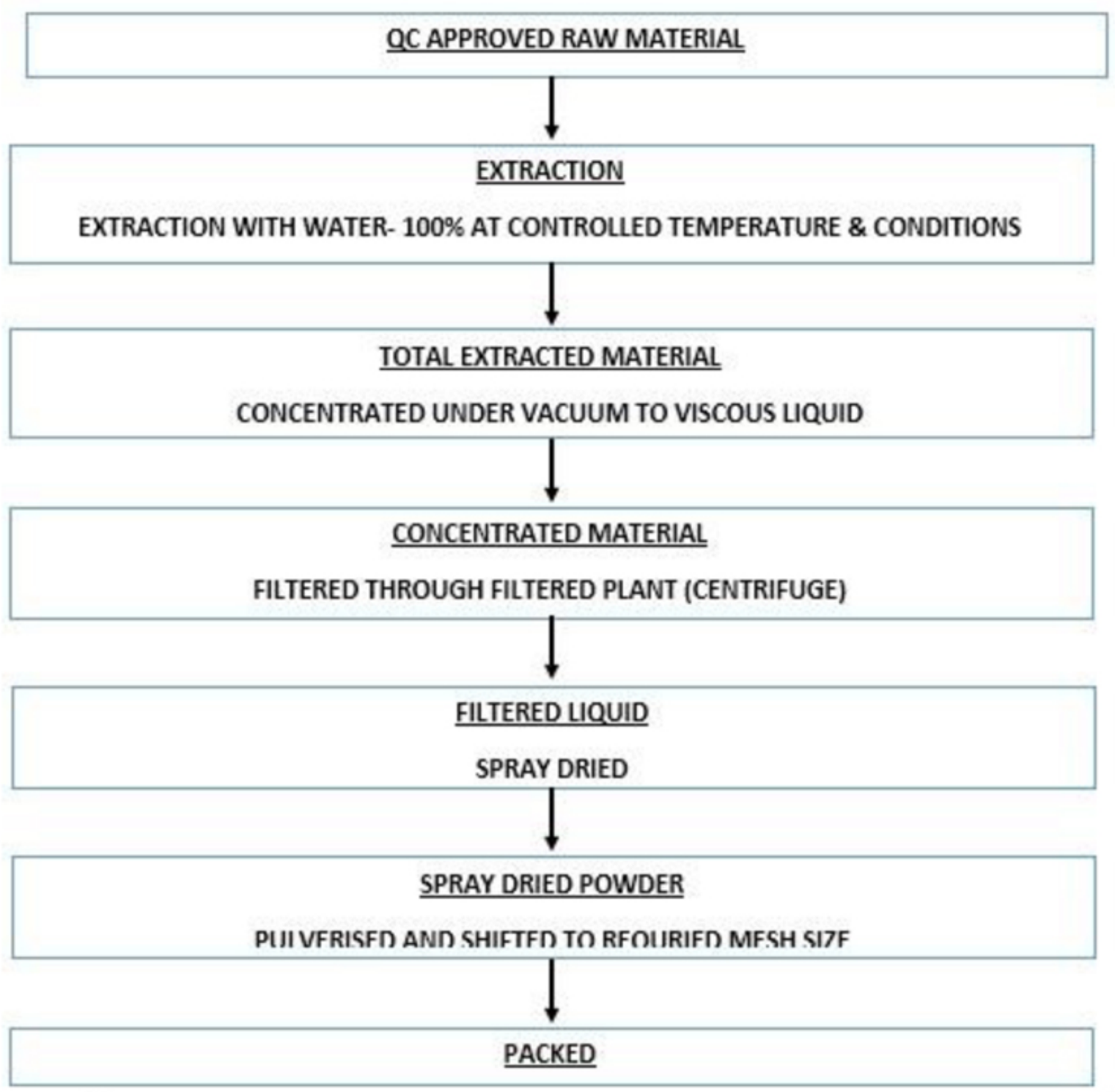


In a study it was reported that Anti human immunodeficiency virus type 1 replication by blocking Reverse Transport from 1'S-1'-acetoxychavicol acetate isolated from *Alpinia galanga* rhizomes extract.

TRADITIONAL USES OF ALPINIA GALANGA:

The rhizome of the plant is used as carminative, digestive tonic, anti-emetic, anti-fungal, antitumor, Anti-helmintic, anti-diuretic, anti-ulcerative, anti-dementia. The extract of rhizome shows anti-tubercular activity, hypothermia, bronchial catarrh, tonic, stomachic and stimulant. It is also used as pungent, bitter, heating, stomachic, improve appetite, disease of heart, aphrodisiac tonic, expectorant, use in heal, ache, lumbago, rheumatic pains, chest pain, diabetes, burning of liver, kidney disease, disinfectants. The rhizome is also used as anti-microbial, anti-bacterial, anti-inflammatory and flavouring agent.

DETAILED FLOW SHEET OF ALPINIA GALANGA EXTRACT:



CONCLUSION:

From the various scientific research based on *Alpinia galanga*, the plant has a huge biological potential. Several chemicals present in the plant shows a wide pharmacological and medicinal property. More research and evaluation need to be done to isolate and identify different chemicals present in the plant which will be used for innumerable application for human welfare in the near future.

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