

Anti-weeding effect of the extract of leaves of *Alpinia galanga* L. Willd collected from kodavoor region of udupi district over the growth of other angiospermic weeds

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Abstract

The analysis of the substantial growth of *Alpinia galanga* L. Willd in Kodavoor region was carried out. The soil parameters responsible for the growth of the Angiospermic weeds and its adverse effects on the plant growth were recorded. The medicinal properties of galanga responsible for retarded growth of weeds under controlled condition along with the comparative account was noted. The changes through the morphological, histological and anatomical studies were distinguished. The histochemical detailed analysis revealed that utilizing the leaf extract, the growth of weeds under control was observed and nature of Anti-weeding effect of *Alpinia galanga* L. Willd were well defined and proved.

Keywords: *Alpinia galanga* L. Willd, morphological, histological, histochemical, anti-weeding effect

Introduction

***Alpinia galanga* L. Willd:** (Family: Zingiberaceae)

Synonym: *Amomum galanga* (Linn.) Lour. Vernacular Name: Eng: Greater galangal, Siamese ginger, Java galangal, Siamese galangal; Beng, Hin and San: Barakulanjar, kulanjan; Kan: Dumparasm; Mal: Arattha, Kolinji, Peratta; Tam: Peraratthei; Tel: Pedda dumparashtram. A moderate shrub mostly referred as galangale or galanga, is a very popular spice in whole South East Asia and especially typical for the cuisine of Thailand. It is also known and used in Malaysia, Indonesia, Cambodia, Vietnam and Southern China. Chinese five spice powder is sometimes enhanced with galangale. In Western countries, however, galanga is not well known, at least in recent days; it has, however, been a valued spice in the early Middle-ages. Galangale is sometimes confused with other spices of the ginger family. Its taste and appearance are, however, characteristic; it cannot be substituted by any other spice. It is a rhizomatous herb which grows in dry deciduous forests, it almost resembles that of ginger plant but it can be differentiated by the presence of minor hairs on leaf blades, broad leaves than ginger, inflorescence is in a cluster, flowers are pinkish white in color.

In India it is grown in south Kerala upto Wynad, Karnataka (Udupi, Sirsi, Hassan) and parts of Tamil nadu. It is cultivated in december 2009 in Kerala.

The rhizome contains essential oils (1, 8 cineol, α -pinene, eugenol, camphor, methyl cinnamate and sesqui terpenes). In dried galanga, the essential oil has quantitatively different composition than in fresh one. Whereas α -pinene, 1,8-cineol, α -bergamotene, trans- β -farnesene and β -bisabolene seem to contribute to the taste of fresh galanga equally, the dried rhizome shows lesser variety in aroma components (cineol and farnesene, mostly).The resin causing the pungent taste (formerly called galangol or alpinol) consists of several diarylheptanoids and phenylalkanones (the latter are also found in ginger and grains of paradise). Furthermore, the rhizome is high in starch (Narayan Das Prajapati, 2003) [1].

Materials and Methods

The leaves of *Alpinia galanga* L. Willd were collected from Udupi Shankaranarayana temple, Kodavoor region.

The leaves were air dried under shade for a duration of 14 days. The dried leaves were crushed with a mixture of ethanol and acetone in the ratio 3:1.

The crude extract was collected after filtration, stored in air tight isolation test tube and subjected for hot water bath for 4 hours. Later the filtrate to distilled water was subjected for dilution in the ratio 9:1, 8:2, 7:3, 6:4 and 5:5 respectively. This ratio of dilution was added to the soil evenly to the roots of weeds grown in the pot trials. The initial growth of the weeds and the growth after duration of 7 and 14 days were measured. The changes in the growth were recorded. The histochemical analysis were carried out and the details interpreted.

Results

From the above results, it was evident that the growth of the angiospermic weeds was retarded due to the action of the leaf extract of *Alpinia galanga* L. Willd. was found to be less efficient during initial period, later it was effective in controlling the growth of the weed. Interesting feature was the leaves of the angiospermic weed tend to be dried after a duration of 14 day treatment. The histochemical analysis revealed that the components were responsible for the retardation of the growth.

Table 1: Before treatment with the extract

Trial: 01 Extract:dist.H ₂ O	9:1	8:2	7:3	6:4	5:5	Tap water
Growth	in cms	in cms	in cms	in cms	in cms	in cms
<i>Phyllanthus niruri</i> L.	16.4	17.5	18.0	19.4	22.0	23.5
<i>Oxalis dillenii</i> Jacq	4.5	5.8	5.9	6.5	7.0	7.5
<i>Herniaria hirsuta</i> L.	4.9	4.8	5.3	6.0	8.2	8.5

Table 2: After 07 days treatment with the extract

Trial: 02 Extract:dist.H ₂ O	9:1	8:2	7:3	6:4	5:5	Tap water
Growth	in cms	in cms	in cms	in cms	in cms	In cms
<i>Phyllanthus niruri</i> L.	16.4	17.5	18.5	20.3	22.8	23.5
<i>Oxalis dillenii</i> Jacq	4.5	5.8	6.9	7.4	8.0	7.5
<i>Herniaria hirsuta</i> L.	4.9	4.8	5.3	8.0	9.2	8.5

Table 3: After 14 days treatment with the extract

Trial: 03 Extract:dist.H ₂ O	9:1	8:2	7:3	6:4	5:5	Tap water
Growth	in cms	in cms	in cms	in cms	in cms	in cms
<i>Phyllanthus niruri</i> L.	16.4	17.5	18.5	20.3	22.8	23.5
<i>Oxalis dillenii</i> Jacq	4.5	5.8	6.9	7.4	8.0	7.5
<i>Herniaria hirsuta</i> L.	4.9	4.8	5.3	8.0	9.2	8.5



Fig 4: *Herniaria hirsuta* L. growth



Fig 1: Hot decoction method of extraction



Fig 5: *Oxalis dillenii* Jacq



Fig 2: Filtration of the extract



Fig 6: *Phyllanthus niruri* L. growth



Fig 3: Pot trial on *Alpinia galanga* L. Willd

Discussion

The present study interpreted the direct effect of the leaf extract from Acetone and Ethyl alcohol of *Alpinia galanga* L. Willd. Were much effective against the growth of angiospermic weeds.

A parallel work was carried out by with Sukhirun *et al* (2011) [2]. Used hexane extract, isolated the non-polar compounds, (E)-p-acetoxycinnamyl alcohol and (E)-p-coumaryl alcohol ethyl ether and was active than total hexane extract. The compounds had additive effect in complex but not synergistic. The detoxification enzymes was acted upon by the activity of the hexane extract, also in in vitro condition, carboxylesterase (CE) and glutathione transferase (GST) were determined. About 70% CE was inhibited whereas GST was not inhibited significantly.

Apparently a different work on the antimicrobial activity of the *Alpinia galanga* L. Willd. Rhizome was reported by Bhunia *et al* (2012) [3]. *A. galanga* L., *Alpinia calcarata* Rosc. and *A. allughas* Rosc., were active against *Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli* and *Salmonella typhi* that contained constituents such as cyanidin, cinol, methyl cinnamate, amino acids, galangin flavones: alpinin, etc. by using agar well diffusion method the activity of the bacteria were analyzed.. The diameter of inhibition zone highest (15 mm) in rhizome of *A. galanga* L. Willd and *A. allughas* Rosc. A significant role against *Staphylococcus aureus* was by the selected species were notified.

Anti-oxidant activity of *Alpinia officinarum* against *Bacillus cereus*, *Staphylococcus aureas*, *Pseudomonas auroginosa*, *Escherichia coli* was moderat and exhibited potent antimicrobial activity. No significant anti-fungal activity against *Aspergillus niger* and *Candida albicans* was detected by Srividya *et al* (2010) [4].

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