

Pharmacology & Toxicology Research

Research Article

In-Vitro Pharmacological Activity of Essential Oil –Linalool from *Jasminum Polyantham*

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Abstract

An essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants. Linalool is a naturally occurring terpene alcohol chemical found in many flowers and spice plants with many commercial applications. In this present study the linalool was isolated from *Jasminum polyanthum* and its pharmacological activities such as Anti Spasmolytic and Anti inflammatory were analyzed by *In vitro* method. The *Jasminum polyanthum* and linolool possesses the anti spasmodic activity. The prevention value of inhibition or stimulation the *Jasminum polyanthum* and Linolool contains 50% and 65% of Activity. The *Jasminum polyanthum* shows 47.30% of anti inflammatory activity where as the Linolool shows high activity 70% respectively. From this study the isolated linalool essential oil possess the anti spasmodic activity which can be applied in pharmacy for the treatment of muscle problems and other related problems.

Keywords: Essential oil, Linalool, *Jasminum polyanthum*, Anti Spasmolytic and Anti inflammatory.

Introduction

Essential oil

An **essential oil** is a concentrated hydrophobic liquid containing volatile aroma compounds from plants. Essential oils are also known as **volatile oils**, **ethereal**

oils or **aetherolea**, or simply as the "oil of" the plant from which they were extracted, such as *oil of clove*. Essential oils, such as clove oil or eugenol, were popular for many years in dentistry as antiseptics and local anaesthetics. Thymol also is well known for its antiseptic effects [1].

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Linalool is a naturally occurring terpene alcohol chemical found in many flowers and spice plants with many commercial applications, the majority of which are based on its pleasant scent (floral, with a touch of spiciness).

Linalool is used as a scent in 60–80% of perfumed hygiene products and cleaning agents including soaps, detergents, shampoos, and lotions [2]. It is also used as a chemical intermediate. One common downstream product of linalool is Vitamin E. In addition, linalool is used by pest professionals as a flea and cockroach insecticide.

Jasminum polyanthum

Jasminum polyanthum, also known as Pink Jasmine (or White Jasmine), is an evergreen twining climber from China. It produces an abundance of reddish-pink flower buds in late winter and early spring, followed by fragrant five-petalled star-like white flowers which are about 2 cm in diameter.

Scientific classification

Kingdom	:	Plantae
Order	:	Lamiales
Family	:	Oleaceae
Genus	:	Jasminum
Species	:	<i>J. polyanthum</i>

An antispasmodic (synonym: spasmolytic) is a drug or an herb that suppresses muscle spasms. Essential oil has been traditionally used as an antispasmodic, and a review of studies on the topic found that it "could be efficacious for symptom relief in IBS"(as an antispasmodic) although more carefully controlled studies are needed.

In this present study the linalool was isolated from *Jasminum polyanthum* and its medicinal properties were analyzed by *In vitro* method.

Materials and Methods

SAMPLE COLLECTION

The Sample *Jasminum polyanthum* was collected from flower shop at Pudukottai district and it was subjected to the following analysis.

PREPARATION OF PLANT EXTRACTS

The Sample *Jasminum polyanthum* was subjected to Soxhlet extraction with petroleum ether (60°C) and methanol (60°C) for 24 hrs. Each solvent extract was distilled and condensed at 40°C. The condensed extract was stored at room temperature in air tight bottles and used for further studies

ISOLATION OF ESSENTIAL OIL:

The essential oil can be obtained by the adding sodium bisulphate to the extract of *Jasminum polyanthum* flower.

TLC STUDY OF LINALOOL:

The samples of *Jasminum polyanthum essential oil* was wetted with a half diluted benzene and lixiviated with ethyl acetate for 24hrs at RT. The organic phase is separated from the acidified filtrate and basified with benzene (pH 11-12). The linalool spots were separated using the solvent mixture benzene and ethyl acetate in the ratio of 15:1. The colour and R_f value of the linalool separated were recorded by adding Anisaldehyde.

$$R_f = \text{solute travel distance/solvent travel distance}$$

Antispasmodic Activity [3]

Chicken used in this study were from local breed of either sex weighing approximately 1.2-1.7 kg and purchased from the local market. These animals were acclimatized for a reasonable time before using in this study. The food of the animals was withdrawn 24 h prior to the experiment but they had a free excess to water during this fasting period. The animals were sacrificed with a blow on the back of the head. The abdomen was made open immediately and the caecum

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was pulled forward to display the length of small intestine. A piece of jejunum was then cut from animal and placed in petri dish containing Tyrode's solution. The segments of jejunum about 3-4 cm long were dissected immediately. A piece of isolated smooth muscle was mounted in organ bath (Harvard) having 75 mL capacity, filled with Tyrod's solution. Organ bath circulation temperature was maintained at 37°C throughout the experiment. The perfusion solution was bubbled with a mixture of 95% oxygen and 5% carbon dioxide.

The jejunum segment was allowed to equilibrate for 30 min before starting the experiment. The spontaneous movements of intestine were recorded using Harvard isotonic transducer and displayed on a Harvard Universal Oscillograph pen recorder device. To determine the effect of the plant extracts on the spontaneous movements of intestine, suitable amounts of the crude dried extract was dissolved in 2-3 mL of purified water which was then added to the organ bath after equilibration period. The effect of the extracts on the spontaneous contractions of the jejunum was calculated in percentage by comparison to the normal movements obtained just before the addition of the extract to the organ bath. Each experiment on smooth muscles was carried out at least three times (n = 3) and the results were expressed as mean ± S.E.M. The following formula was used for calculations:

Inhibition/stimulation (%) =

$$100 - \frac{\text{Average height of contractions after addition of extract (mm)}}{\text{Average height of normal contractions (mm)}} \times 100$$

ANTI INFLAMMATORY ACTIVITY BY HUMAN RED BLOOD CELL MEMBRANE STABILIZATION METHOD (HRBC METHOD)

To Determine The HRBC Assay of Sample by [4]

PROCEDURE:

HRBC method was used for the estimation of anti inflammatory activity *in vitro*. Blood was collected from healthy volunteers and was mixed with equal volume of sterilized alsevers solution. This blood

solution was centrifuged at 3000rpm and the packed cells were separated. The packed cells were washed with isosaline solution and a 10% v/v suspension is made with isosaline. This HRBC suspension was used for the estimation of anti inflammatory property. the herbal extract, reference sample and control were separately mixed with 1ml of phosphate buffer, 2ml of hyposaline and 0.5ml of HRBC suspension. The reference used for this study is diclorofenac sodium. All the assay mixtures were incubated at 37°C for 30 minutes and centrifuged at 3000 rpm. The supernatant liquid was decanted and the hemoglobin content was estimated by spectrophotometer at 560 nm. The percentage hemolysis was estimated by assuming the hemolysis produced in the control as 100%.

CALCULATION:

$$\text{Percentage protection} = 100 - \left(\frac{\text{OD sample}}{\text{OD control}} \right) \times 100$$

ANALYSIS OF ANTIMICROBIAL ACTIVITY KIRBY-BAUER DISC DIFFUSION METHOD [5]

Kirby –Bauer disc diffusion method is commonly employed for antibiotic sensitivity test. The test is based on the fact that for given antibiotic, the size of zone of inhibition is related to Minimum Inhibitory Concentration (MIC). MIC is referred as the lowest concentration of antibiotic that exhibit the zone of inhibition of the assay plate.

Results and Discussion

In the present investigation the following tested were analyzed for using a standard method for isolation of essential oil from *Jasminum polyanthum* and their pharmacological activity was analyzed.

Linalool

Linalool is an essential oil which is isolated from the *Jasminum polyanthum*. It is a main active ingredient used as the fragrance. The Resolution factor value of essential oil was tabulated in table 1.

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The chemical constituent reported from this plant belongs to different classes such as alkaloids, glycosides, steroids. The notable medicinal properties reported are anti-diabetic, anti-periodic, anti-spasmodic, anti-inflammatory, anti-arthritis, anti-oxidant, anti-allergic, anti-stress, anti-leprotic, anti-malarial, hepatoprotective, immunomodulatory and anti-neoplastic activities.

The greater speed of TLC is due to the more compact nature of the adsorbent, when working with labile compounds. Finally, the sensitivity of TLC is such that separations on less than mg amounts of material can be achieved if necessary [6].

Chromatography may be considered as an analytical technique used for the purification and separation of organic and inorganic substance. It is also organic and inorganic fractionation of complex mixture, separation of closely related compounds such as isomers and in the isolation of unstable substance. Chromatography encompasses a diverse and important group of separation methods that permit the scientist to separate, isolate and identify closely related compounds of complex mixtures, many of these separations are impossible by other means [7].

Anti Spasmodic Activity

One type of antispasmodics is used for smooth muscle contraction, especially in tubular organs of the gastrointestinal tract. The effect is to prevent spasms of the stomach, intestine or urinary bladder. Mebeverine is a muscolotropic spasmolytic with a strong and selective action on the smooth muscle spasm of the gastrointestinal tract, particularly of the colon. It does not have the acetylcholine side effect commonly seen in an anticholinergic antispasmodic.

The *Jasminum polyanthum* and linalool possesses the anti spasmodic activity. The prevention value of inhibition or stimulation the *Jasminum polyanthum* contains 50% respectively. Hence, Spasm may also be seen in movement disorders featuring spasticity in neurologic conditions such as cerebral palsy, multiple sclerosis, and spinal cord disease. Medications are commonly used for spastic movement disorders, but research has not shown functional benefit for some drugs. Some studies have shown that medications have been effective in decreasing spasticity, but that this has not been accompanied by functional benefits.

Anti Inflammatory Activity

The lysosomal enzymes released during inflammation produce a variety of disorders. The extra cellular activity of these enzymes is said to be related to acute or chronic inflammation. Since HRBC membrane are similar to lysosomal membrane components the prevention of hypotonicity induced HRBC membrane lysis is taken as a measure of anti inflammatory activity of drugs.

The high concentration of *Jasminum polyanthum* shows the anti inflammatory activity 47.30% where as the Linalool shows high activity 70% respectively.

Hence the Isolated compound columbine from selected plant exhibited membrane stabilization effect by inhibiting hypotonicity induced lysis of erythrocyte membrane. Stabilization of lysosomal membrane is important in limiting the inflammatory response by preventing the release of lysosomal constituents of activated neutrophil such as bacterial enzymes and proteases which cause further tissue inflammation and damage.

Table 1:TLC Profile on Essential oil in *Jasminum polyanthum*

S. No.	Phytochemical constituents	Rf value
1.	Linalool	0.44

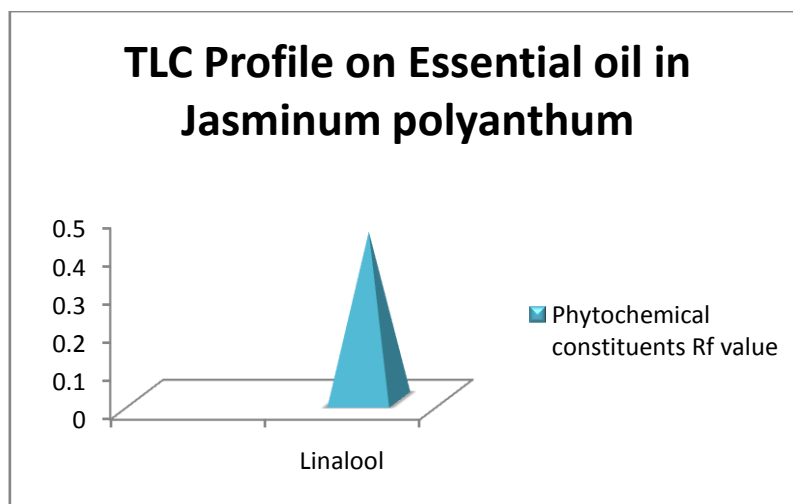


Table 2: Anti Spasmodic Activity of *Jasminum polyanthum* and Linolool

S. No.	Anti Spasmodic activity	% of Inhibition or Stimulation
1	<i>Jasminum polyanthum</i> Extract	50
2	Linolool	65

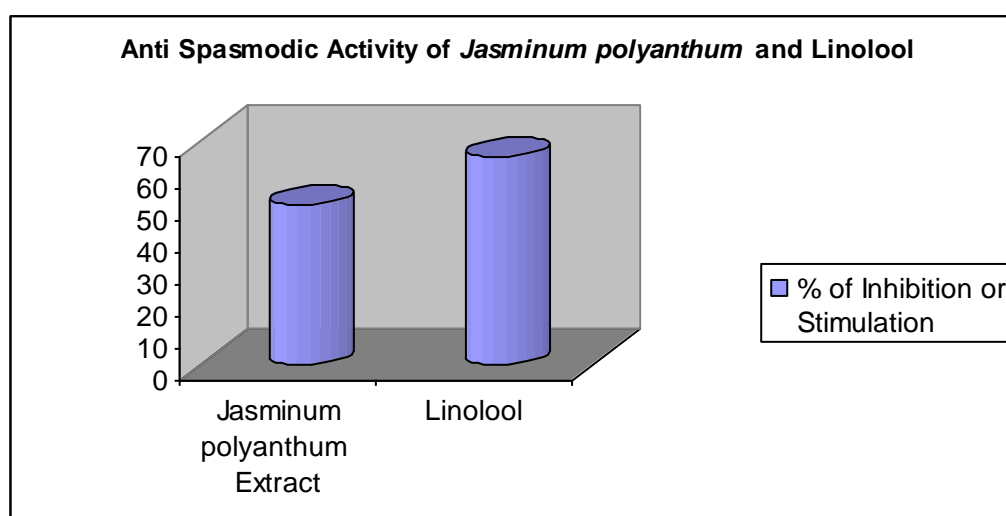
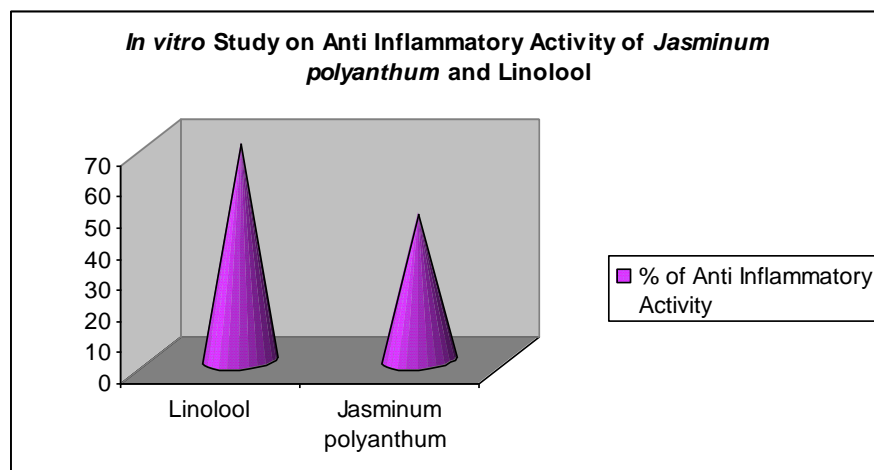


Table: 3 Shows the *In vitro* Study on Anti Inflammatory Activity of *Jasminum polyanthum* and Linolool

Samples	% of Anti Inflammatory Activity
Linolool	70
<i>Jasminum polyanthum</i>	47.30



Conclusion

The result suggested that the Linalool was present high amount in *Jasminum polyanthum*. From this study the isolated linalool essential oil possess the anti spasmodic activity which can be applied in pharmacy for the treatment of muscle problems and other related problems. The further analysis of the study is application of essential oil in various industries.

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