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Review Article

Systemic Review on *Jasminum Polyanthum*

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ABSTRACT

Jasmine plants are grown in Asia and used for religious offering, is known to have wide range of bioactive compounds and its properties. Most of these species have been evaluated its bioactive properties and found positive results. This work consists of evaluating bioactive properties of jasmine species called *Jasminum polyanthum* and finding its potential medicinal uses. The plant flowers were powdered and added water to prepare extract. The flower extract was evaluated for phytochemical compounds, anti-oxidant, anti-diabetic, anti-inflammatory, anti-microbial, anti-cancer and DNA nicking assay. The flower extract contained most of the phytochemical compounds which leads to presence of various bioactive properties. Flower extract consists of higher antibacterial activity than leaf, while in antifungal it is vice versa.

***Keywords*:** *Jasminum polyanthum*, Anti- fungal, Anti-diabetic, Anti-inflammatory, Antioxidant activity.

INTRODUCTION

From olden days, plants are used for treating various disorders. The ancient medicine like Ayurveda and siddha mostly involve plant as curative substances. Medicinal plants have chemical components which produce physiological actions in body like elimination of ROS, inhibiting enzymes which increase blood glucose level (anti-diabetic), inhibiting inflammatory action, killing pathogens, inhibiting cell proliferation etc[1]. So there is a need to explore bioactive compounds in plants as they contribute to medicinal properties and find usage in treating human diseases. These components form class of phytochemicals like alkaloids, steroids, saponin, flavonoids etc[2]. If higher level of any bioactive property was found, then it can be used for applications to treat against human physiological diseases provided it does not cause any side effects[3,4].

Jasmine flowers are widely distributed and each species has its own native (mostly Asia). There are about 200 species existing in the world. Its fragrance is well known and so it is popular. These are cultivated in garden and also grown as house plant. It grows on sunny areas and soil must be fertile, well drained. Almost all jasmine species are ingredient for Ayurvedic species having curing qualities. It is used for removing intestinal worms. It is widely used for venereal diseases. Flowers are used to treat ulcers, vesicles, boils, skin diseases and eye disorders. Leaf extract are effective against breast tumours, aphthous, stomatitis, toothache, ulceration in mouth, throat and gums[5].

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In olden days leaves were grind into juice and treated for urinary tract infections as sedative, mild anaesthetic and astringent. Jasmine species also finds place in cosmetics and used for making perfumes and scents. Flowers are used for skin toner, conditioner and also used in shampoos, soaps, creams etc and also used as folk remedy for hepatitis, stomatitis, and duodenitis in China[6] Jasmine flowers are also used for decorative purpose.Oils extracted from flowers are widely used in cosmetic and pharmaceutical industry [7].

Jasmine tea is consumed for *Jasminum polyanthum*, also known as pink jasmine, is a fast growing evergreen creeper. Its native is china and hence also called Chinese jasmine. It produces pinkish white flower buds in early spring, followed by 5 petalled flowers (white and pink mixed) which are 2 cm in diameter[8]. It develops into dense bush and produces fragrance wherever it is present. Since it grows extremely fast, It also acts as invasive species in some countries. It is propagated through seeds, suckers, and stem cuttings. It grows in moist, fertile, well drained soils and tolerates wide range of pH. It grows well in subtropical climate. *Jasminum polyanthum*, Chinese (*Duōhuāsùxīn*),[8] the many-flowered jasmine or pink jasmineis a species of flowering plant in the olive family Oleaceae, native to China and Myanmar**.** A strong evergreen twining climber, it is especially noted for its abundant, highly fragrant pink to white flowers.

The botanical names of Jasminum polyanthum are

- Jasminum excellens
- Jasminum blini
- Jasminum delafieldii

BIOLOGICAL CLASSIFICATION:[8]

KINGDOM: PLANTAE
CLADE: TRACHEAPHYTES
CLASS: MAGNOLIOPSIDA
ORDER: LAMIALES
FAMILY: OLEACEACE
GENUS: JASMINUM
SPECIES: J.POLYANTHUM

PLANT DISTRIBUTION:[9]

It was native to Asia, Georgia, China, India, Afghanistan, Iran, Tajikistan, Turkey, Bhutan, Nepal and Pakistan. It was widely cultivated in Mediterranean, Caucasus, Northern Persia, Eastern Afghanistan, Hindukush, India, China and Pakistan for its attractive fragrant flowers.

Fig. 1: ***Jasminum polyanthum***

CHEMICAL CONSTITUENTS [10]

The preliminary phytochemical analysis of the aqueous extract of Jasminum polyanthum flowers indicated the presence of alkaloids, coumarins, flavonoids, tannins, teroinoids, glycosides, emodine, leucoanthcyaninis, steroids, anthocyanins, phlobatinins, essential oil and saponins. The two extracts (flower water and flower methanol) were evaluated for qualitative bioactive compounds of alkaloids (Mayer's test), terpenoids (concentrated sulphuric acid), phenol (FeCl3 test), sugar (Fehling's test), saponin (Foam test), flavonoids (concentrated HCl), quinines (NaOH test), protein and steroid (chloroform and Sulphuric acid).

TRADITIONAL USES:
The leaves were grind into juice and treated for urinary tract infections as sedative, mild anesthetic and astringent. Jasmine species also finds place in cosmetics and used for making perfumes and scents. Flowers are used for skin toner and conditioner and used in shampoos, soaps, creams etc. Flowers were used as folk remedy for hepatitis, stomatitis, and duodenitis in china, Jasmine flowers are also used for decorative purpose[1].

PHARMACOLOGICAL ACTIVITIES:

ANTIOXIDANT ACTIVITY[10]:

***DPPH assay*:** DPPH radical scavenging activity study is extensively using to screen the antioxidant properties of the sample. In this study the antioxidant concentration from plant powder were determined from ascorbic acid standard curve. Antioxidant concentration in flower is in range of 11 to 36 mg/g.

***Flavonoids*:** Flavonoids are well famous for their antioxidant properties and it is a universal plant pigment. Flavonoids content were calculated by using quercetin as standard. Flower extract has

higher flavonoid content. Flavonoid concentration in flower 19 mg/g.

***Total phenol*:** Phenolic constituents are important in plants because of scavenging activity due to the hydroxyl group. Total phenol concentrations were determined from standard curve using gallic acid as standard. Flower extract has slightly high phenol content than leaf. Total phenol content in flower is 7mg/g.

FRAP assay: Reducing power of an antioxidant reacting with the ferric cyanide was calculated with the standard ascorbic acid. From the study flower extract has higher antioxidant concentration. Antioxidant concentration in leaf and flower is 59mg/g.

ANTIDIABETIC ACTIVITY:

α-Amylase activity[12]:
Amylase activity was calculated in terms of percentage and flower extract showed 34.07% .

α-Glucosidase activity[13]: Glucosidase inhibitory properties are starch blockers, which inhibit was calculated in terms of percentage and flower extract showed 37.76%. Therefore, flower has higher anti diabetic activity.

CLINICAL STUDIES:

Anti-Diabetic Activity:
α- Amylase activity: 1ml of the sample was mixed with 0.1% starch solution in 16mM of sodium acetate buffer and 0.2 ml of the alpha –amylase enzyme which is prepared by mixing of 27.5gm in 100ml distilled water. The colorimetric reagent was prepared by mixing sodium potassium tartarate and 3,5 di nitro salicylic acid solution in the concentration of 96mM. After adding, the tubes were incubated in alkaline condition at 250C for 3-5minutes. The generation of maltose was quantified by the reduction of 3,5di nitrosalicylic acid to 3-amino-5-nitrosalicylic acid. This was detected at 540nm using spectrophotometer.

α - Glucosidase activity:

The inhibitory activity was determined by mixing of 1ml of 2% starch solution and 1ml of the sample with 1ml of the 0.2M tris buffer (pH-8), incubated at 370C for 5minutes. The reaction was initiated by adding 1ml of the alpha-glucosidase enzyme (1U/ml) incubated for 40minutes at 35^0c The reaction was terminated by adding 2ml of 6N HCl and the reading was measured by 540nm using spectrophotometer.

ANTICANCER ACTIVITY[15]:

Preparation of cell lines media:
DMEM media (19.75 g of DMEM, 3.7g of sodium carbonate, 4.5g of glucose) was prepared in T-flask and the addition of HeLa cell lines the flask was incubated in CO2 incubator with 5% CO2, 37ºC temperature, at 70-80% of humidity for 24-72hrs.

In vitro cytotoxicity Assay:
Leaf and flower extracts of different concentration (10µl, 20µl, 30µl) were taken and to that 100µl of cell lines were added. DMSO was taken as blank and cell lines were used as a control. The plate was incubated for 24 hours in CO2 incubator. DMSO and trypsin was used to lysis the cells and also for the washing. After washing 20µl MTT dye was added to all the wells and incubated for 24 hours. OD values were measured using ELISA reader.

Anti-oxidant activity[16]:

The antioxidant potential of polar extract of *Jasminum polyanthum* had been investigated. In DPPH Assay flower powder of different concentrations (10-30 mg) were taken in different test tube and 0.1ml of 0.1M DPPH solution was added and mixed well. After 5 minutes of incubation 0.4ml of 50 mM Tris HCl was added and make up to 2ml with distilled water and incubated in dark room for 30 minutes. OD reading was taken at 517 nm using spectrophotometer. Ascorbic acid was used as a standard to calculate the mg/g of DPPH.

ANTIMICROBIAL ACTIVITY[14,17]:

Agar well diffusion method was used to evaluate anti-microbial activity.
Mueller Hinton agar media was used for antibacterial study. 39gm of media was dissolved in 1000ml of distilled water and sterilised for 121ºC at 15lbs. The media was poured into sterile petri plates and 70µl of bacteria were swabbed. The samples were evaluated for antibacterial activity against Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus and Pseudomonas aeruginosa. Gentamicin was used as a positive control and sterile distilled water was taken as negative control. Wells were loaded with extracts and incubated at 37^0C for 24 hours. After incubation zone of inhibition was measured.

TOXICOLOGICAL STUDIES[18]:
Jasmine species is used as a principal ingredient in many traditional medicines or in tea industries, its toxicity has never been documented elsewhere. At

a high dose of the flower extract via intravenous injection (15 mg/mouse), no biological reactivity in male ICR mice was observed. For acute toxicity, the LD_{50} was higher than 5,000 mg/kg in both sexes of Wistar rats. In both toxicity assays, there was no statically significant difference ($P< 0.05$) in the body and organ weights between the control and treated groups. In gross examinations, the individual internal organs of the treated and the control groups displayed no significant difference. Additionally, the rats of both groups had normal behavior. For the liver function test, the activities of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were determined and there were no enzymatic difference between the control and treated groups (data not shown). As confirmed by traditional use for thousand years in many countries, the flower of *J. polyanthum* is therefore safe for general utilization in medicines or food industry.

Extract of *Jasminum polyanthum* flowers were prepared and evaluated its composition for bioactive compounds, anti-oxidant, anti-diabetic, anti-inflammatory, antimicrobial study against urinary tract infection, anti-cancer and DNA nicking assay.

CONCLUSION

This review highlights the herbal potential of *Jasminum polyanthum*. J.polyanthum which has a large number of chemical constituents which bestow medicinal value to the plant. Largely flavonoid glycosides, secoiridoids and terpenoidal molecules have been elaborated by this plant. Extraction and yield enhancement strategies and quantification of constituents have been reviewed and documented in this work.

Conflict of interest: No conflict of interest.

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