WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 19, 504-510. Review Article ISSN 2277–7105

A REVIEW ON PHARMACOLOGICAL ACTIVITY OF PERGULARIA DAEMIA

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Article Received on
26 Sept. 2018,

Revised on 16 Oct. 2018,
Accepted on 07 Nov. 2018

DOI: 10.20959/wjpr201819-13745

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ABSTRACT

The plant *Pergularia daemia* has been traditionally used as anthelmintic, laxative, antipyretic expectorant and also used to treat infantile diarrhea and malarial intermittent fevers. It is widely distributed in the tropical and sub tropical regions of the world. Various phytochemical including terpenoid, flavonoids, sterols and cardenolids have been isolated and identified from the various parts of the plant (leaves, stems, shoots, roots, seeds and fruits). *P. daemia* widely used by various tribal communities in Western Ghats of India for the treatment of variety of ailments, while predominantly the roots of the plant have been used to treat liver disease and jaundice. The present review article aims towards medicinal properties, chemical constituents and other important aspects of *P. daemia*.

KEYWORDS: Ethnobotanical uses, *Pergularia daemia*, pharmacological activities, phytochemistry.

INTRODUCTION

Plant medicine is used worldwide in the traditional treatment of some renal diseases and for dieresis. The plant *Pergularia daemia* (Family: Asclepiadaceae) is known as "Uttaravaruni" in Sanskrit and "Utranajutuka" in Hindi. In ethanomedicinal practices the traditional healer use *Pergularia daemia* (Asclepiadaceae) as anthelmentic, emetic, thermogenic, expectorant, antipyretic and laxative. Leaves juice is given in catarrahal affections, asthma, and infantile diarrhoea and is applied to inflammatory swelling in combination lime. Aerial parts of the plant used for snake bit. Latex of this plant used for boils and sores. Fresh roots of plant used as an abortifacient and used to treat gonorrhea. The latex or a decoction of the roots is used in many countries as a medicine to treat

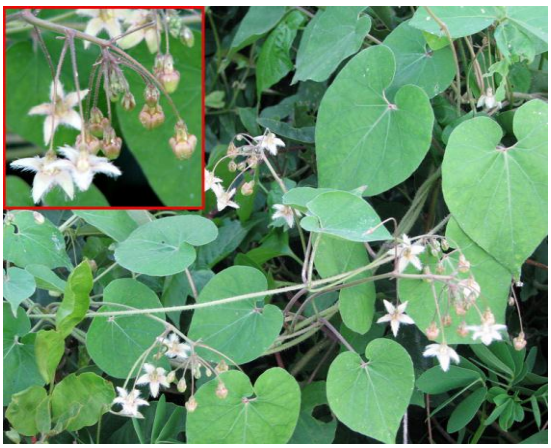
several illnesses, such as veneral diseases, arthritis, muscular pains, asthma, rheumatism, snake-bites. The latex may also be used as a fish poison and toothache. Plant has been documented for antidiabetic,woundhealing, hepatoprotective activity, antibacterial, anti-urolithiatic, diuretic and antifertility. Plant has been documented for presence of presence of triterpenes, saponins cardenolides and alkaloids, while Anajanyulu et al. (1998) reported the presence of triterpenes and steroidal compound. In attendance, study was undertaken to examine and to validate the diuretic properties of aqueous extract of *Pergularia daemia* and to verify or contradict the claims made in the traditional medicine

Taxonomic Description

The plant is classified as shown in Table 1.

Table. 1: Taxonomicalclassification of Pergularia daemia.

Kingdom	Plantae
Subkingdom	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Asteridae
Order	Gentianales
Family	Asclepiadaceae
Tribe	Asclepiadeae
Subtribe	Asclepiadinae
Genus	Pergularia
Species	Daemia



Pharmacological studies have confirmed that *Pergularia daemia* exhibit a broad range of biological effects. However, the crude extract of the plant have been used as a traditional

medicine for the treatment of various diseases. Some of which are very interesting for possible future development.

Pharmacological Activity

Anti-inflammatory, analgesic and antipyretic activity

Crude ethanol extract of *Pergularia daemia* leaves was successively fractionated with petroleum ether, solvent ether, ethyl acetate, butanol and butanone. The ethanolic extract and various fractions were investigated for anti-inflammatory activity in rats at a dose of 100 mg kg^{-1} via intraperitonially. **Ethanol extract** and its butanol fraction exhibited significant anti-inflammatory activity when compared with respective controls and were comparable with that of standard drug aspirin. Another study was also demonstrated on the anti-inflammatory activity of *Pergularia daemia* by using various solvent extracts. In the result they found that alcohol extract of *P. daemia* showed significant reduction in swelling of paw at a dose of 300 mg kg^{-1} b.wt. which was equivalent to diclofenac sodium as a standard in a dose of 15 mg kg^{-1} b.wt. The anti-inflammatory activity of *Pergularia daemia* extract could be attributed due to the presence of steroids. Analgesic effect of aqueous and ethanol extract of *Pergularia daemia*was demonstrated in the experimental models using Eddy's hot plate and Heat conduction method using thermal stimuli. Both extracts showed the analgesic activity when compared with control and analyzed statistically by Tukey Kramer Multiple Comparison Test. Antipyretic activity was also reported from the aerial parts of *Pergularia daemia* extract.

Antifertility activity: The ethanol extract of *Pergularia daemia* and its steroidal fraction are reported to have antifertility activity. In this study the alkaloidal fractions of ethanol extract was observed for its antifertility activity. Oral administration of the alkaloidal fraction at a dose of 200 mg kg b. wt. showed a significant activity in preimplantation stage of female mice. The activity of the alkaloidal fraction, when compared with the steroidal fraction, was found to be more pronounced since the former inhibited not only the fertility of the female mice but also took short period to return the oestrous cycle to normal, with in 4 to 6 days of drug treatment while steroidal fraction treated mice returned to normal within 6 to 8 days.

Central nervous system depressant activity: The roots of *P. daemia* were evaluated for central nervous system depressant activity. This study was investigated on swiss albino mice using chloropromazine and pentobarbitone sodium induced sleeping time. Alcohol and aqueous root extract of *P. daemia* showed significant central nervous system depressant

activity and was compared with that of control and drug treated groups. Their results concluded that both alcohol and aqueous extract showed central nervous system depressant activity and this activity is mainly due to the presence of glycosides present in *P. daemia* roots.

Hepatoprotective activity: *Pergularia daemia* is traditionally used as a folk medicine for treating jaundice. A preliminary investigation on the aerial parts of *Pergularia daemia* showed significant hepatoprotective activity at a fixed dose level of 200 mg kg^{-1}. Furthermore, extended their study to identify the active compounds of *P. daemia* which are responsible for hepatoprotection. They investigated on both aqueous and **ethanolic extract** which showed the presence of triterpenoids and flavonoids in **ethanolic extract**. Their result suggests that presence of flavonoids in *P.daemia* could be responsible for hepatoprotection. In addition, an *in vitro* evaluation hepatoprotective activity of *Pergularia daemia* was also investigated. In this study, acetone and ethanolic fraction obtained from total **ethanolic extract** was carried out using CCL_4 induced toxicity in primary cultured rat hepatocytes. The result of this study also justify that flavonoids are responsible for hepatoprotective activity. Thus, it is evident from these studies that flavonoids like quercetin, kaempferol and isorhammetic glycosides could be liable for various liver disorders.

Antioxidant activity

An experiment carried out an **in vitro** screening of **antioxidant activity** on *P. daemia* root extract. In their preliminary pytochemical test, both aquous and ethanolic extract indicated the presence of alkaloid, glycoside, steroid, flavonoid, saponin, terpinoid, tannin and phenolic compound. The result obtained from their study shows that *P. daemia* exhibited **antioxidant activity**which may be attributed to the presence of polyphenolic and other pytochemical constituents. This may be used in preventing oxidant stress related degenerated diseases.

Anticancer activity: Anticancer activity of *Pergularia daemia* was screened against sixty human cancer cell lines and was organized into sub panels representing laukaemia, melanoma and cancer of the lung, colon, kidney, ovary and central nervous system. In their result, it was found that α-amyrin exhibited anticancer activity in low potency. Triterpenoids play a vital role as anti-cancer agents and structural modification of this class of compounds can result in the establishment of an innovative drug for the treatment of cancer.

Antidiabetic activity: Ethanol and aqueous extract of *Pergularia daemia* plant was investigated against alloxan induced hyperglycemia. 200 mg kg^{-1} of the extract significantly reduced **blood glucose** levels to normal which proved hypoglycemic activity. The hypoglycemic activity of *P. daemia* extract is possibly be due to the presence of β-sitosterol and quercetin.

Antibacterial activity: The promising **antibacterial activity** was observed in ethyl acetate and ethanol extracts of *Pergularia daemia* which showed significant **antibacterial activity** against *S. aureus, P. aeruginosa, A. hydrophila, E. coli* and *S. typhi*. Similarly, have reported that the ethanol extract of *P. daemia* exhibited **antibacterial activity**. In addition, recent report also showed the antibacterial activity of *Pergularia daemia* leaf extract was tested by using various solvents such as hexane, chloroform and ethyl acetate against *B. subtilis, S. aureus, E. coli* and *P. vulgaris*. Their experiment was determined by disc diffusion method and their results showed that ethyl acetate extract of *Pergularia daemia* was found to be effective. They have also isolated a new bioactive compound, 6-(4, 7-dihydroxy-heptyl) quinine, a novel agent which is proved to be responsible for **antibacterial activity**.

Antifungal activity: Qureshi reported that sensitivity of the Keratinophilic fungi in *Pergularia daemia* extract by dry weight method. A recent study was investigated on *Pergularia daemia* against antifungal activity. In their study, the sensitivity of the keratinophilic fungi and inhibition of **mycelial growth** were evaluated by dry-weight method. The antifungal activity of *Pergularia daemia* plant salts was shown against only one fungal pathogen ***Aspergillus flavus*** and doesn't showed any inhibitory activity against the other test pathogens such *Cryptococcus neoformans, Candida albicans*.

CONCLUSIONS

The plant P.daemia has awide array of pharmacological activities. It is widely used in various traditional system of medicine. It has been used since centuries as ananalgesic, antipyretic and anti inflammatory, abortifacient, in treatment of diarrhea and malarial intermittent fever. Recent research carried out indicates its other uses such as hepatoprotective, antisterility and anti-diabetic. The plant P.daemia is an important source of various types of compounds with various pharmacological activites. It is believed that detailed information presented in this review would help the researchers to get aware of this plant and extensive research should be undertaken on *P. daemia* for estabilishing new therapeutic drugs for mankind.

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