

ANALYSIS OF PERGULARIA DAEMIA'S PHYTOCHEMICAL AND PHARMACOLOGICAL CAPACITY (FORSK)

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Abstract

In India and other tropical and subtropical areas of the world, *Pergularia daemia* forsk (Asclepiadaceae) is a hispid perennial herb that is commonly found growing along the sides of roads. The whole plant has powerful therapeutic effects and is therefore traditionally used to cure a variety of illnesses, including infantile diarrhoea, jaundice, anthelmintic, laxative, antipyretic, and expectorant. The plant has been examined for alkaloids, flavonoids, saponins, and terpenes phytochemically. The plant has been shown to have a variety of pharmacological effects, including analgesic central nervous system depressant action, anti-inflammatory, hepatoprotective, anticancer, antidiabetic, antioxidant, antibacterial, antifungal, and anti-infertility effects. The taxonomic, phytochemical, pharmacological, and other significant elements of *Pergularia daemia* are covered in this review paper.

Keywords: phytochemistry, pharmacological activities, *pergularia daemia*, Ethnobotanical uses

Introduction

There are several uses for plants and plant products. Since ancient times, nature has been a significant source of therapeutic agents. Many natural products have been discovered and developed from natural sources based on their use in traditional medicine. Today, many medicinal plants are of global interest due to their therapeutic and commercial importance. The World Health Organization estimates that between 85 and 90 percent of people worldwide use traditional herbal remedies, and the business for herbal drugs has experienced rapid expansion since the late 1990s as a result of the rising demand in both developing and industrialised nations [1]. Ayurveda, Unani, Siddha and Tibetan and other ancient systems of medicine have all benefited from the abundance of plant life in India [2]. The use of alternative medicinal therapy has increased the interest of pharmacologist over the past decades. Historically plants have provided a source of inspiration for Novel Drug components as plant-derived medicine have made large contribution to human health and well-being. In general, biological studies are very much essential to substantiate therapeutic properties of medicinal plants. The potential of medicinal plants as a source of new drugs is still largely unexplored. Research in medicinal plants has gained a renewed focus recently. The efficacy and safety of herbal medicine have turned the major pharmaceutical population towards medicinal plant research and so there are considerable evidences of increase in demand of medicinal plants [3]. Plant based system of medicine being natural does not have this serious problems. *Pergularia daemia* belongs to the family Asclepiadaceae. Generally the family Asclepiadaceae includes more than 2000 species under 280 genera are distributed worldwide in the tropical and subtropical regions [4]. The purpose of the present study is to gather together the available published information on the constituents of the plant and its pharmacological and chemical properties.

Taxonomy classification [5]Table-1 Taxonomic classification of Pergularia daemia

Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Super division	:	Spermatophyta
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Subclass	:	Asteridae
Order	:	Gentianales
Family	:	Asclepiadaceae
Genus	:	Pergularia
Species	:	P.daemia (Forsk) Chiv

Vernacular Names [6]

P.daemia (Forsk) Chiv or P.extensa N.E.Br or Daemia extensa R.Br [7]

Bengali	:	Chagulbanti, Changulbat
Guajarati	:	Amaradudheli, Chamardudheli, Nagaladudhi, Nagaladhdheli
Hindi	:	Utranajutuka, Utran, Dudhi, Dudhibel, Jutuk, Sagovani
Kanada	:	Haalu koratige, Hala koratige, Juttuve balli, Kurudigana balli, Alavaarana balli, Talayarana balli
Malayalam	:	Veliparatti, Veliparuti,
Marathi	:	Utaranavel, Uturhi
Oriya	:	Juktiruhi, Uttruri, Uturdi
Sanskrit	:	Uttaravaruni, Kurutakah, Yugaphala, Yugmaphala
Tamil	:	Veliparuthi, Uthamani, Beliparti, Nandamani
Telugu	:	Dushtupatige, Gurtichettu, Guruti, Jittupaku

Description

A slender, hispid, foul-smelling perennial climber. Leaves are opposite membranous, 3-9 cm long and about as wide, broadly ovate, orbicular or deeply chordate, acute or short acuminate at apex, pubescent beneath, petioles 2-9cm long. Flowers are greenish, Yellow or dull white tinged with purple, borne in axillary, long peduncled, drooping clusters. Fruits (follicles) lanceolate, long pointed, about 5cm long, covered with soft spines and seeds are pubescent, broadly ovate. Flowering may occur each year between August and January in Central India, with fruits maturing from October to February. in Central Indian deciduous forest, the stems typically die down in February and reappear with the onset of the rainyseason.

Habitat:

A widely distributed in the tropical and subtropical areas in India it is very commonly found in hedges through cut most of cenfry to an altitude about 1000m in Himalayas and 900m in Southern India.

Ethno medicinal uses:

Numerous medicinal uses have been reported for all parts of the plant throughout its distribution area. The Crushed leaves, or sometimes the crushed young fruits are applied externally to boils abscesses, subcutaneous worm infections and Eczema. Leafy twig infusions and decoctions are widely used as an appetitive, anthelmintic [8], expectorant, emetic [9], emmenagogue [10] and to

treat diarrhoea [9], dysentery, colic rheumatism, painful joints and Limbs, cramps in the legs, Malaria, appendicitis, amenorrhoea [8]. The latex is applied to sore eyes [11] and aching teeth and to treat rheumatism, asthma, Snake bite [12] and to remove Thorns from the skin. In Ghana Crusher leaves with capsicum peppers are given as an enema of a leaf in fusion is giving to facilitate childbirth [13]. Infusion of roots is taken against stomach ache, colic and cough and also as abortifacient [14]. Stem bark has been used to treat malaria [15]. Fresh leaf used as fish poison [16].

Pharmacological activity:

Pharmacological investigations have revealed that *pergularia daemia* exhibit a wide 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.

Antioxidant activity:

In vitro screening of antioxidant activity on *pergularia daemia* root extract was reported [17] in which preliminary phytochemical test both aqueous and ethanolic extract indicated the presence of alkaloid, glycoside, steroid, flavonoid, saponin, terpenoid and phenolic compound. The results obtained from their study shows that *Pergularia daemiae* exhibited antioxidant activity.

Anti diabetic activity:

Ethanol and aqueous extract of *pergularia daemia* plant was investigated against alloxan-induced hyperglycemia. 200mg/kg of the Extract significantly reduced blood sugar levels to normal which proved hypoglycemic activity [18] it is due to the presence of β -sitosterol and quercetin.

Anti bacterial activity:

The antibacterial activity was observed in ethyl acetate and ethanol extract of *pergularia daemia* which showed significant antibacterial activity against *S. aureus*, *P.aeruginosa*, *A.hydrophila*, *E.coli* and *S.typhi* [19]. In addition to recent report also showed the antibacterial activity of the *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 [20].

Antifungal activity:

The antifungal activity was reported [21] that sensitivity of the keratinophilic fungi in *Pergularia daemia* extracts 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 does not showed any Inhibitory activity against the other test pathogen such as *Cryptococcus neoformans*, *Candida albicans* [22].

Anticancer activity:

Anticancer activity of *pergularia daemia* was screened against 60 human cancer cell lines and was organised into sub panels representing leukaemia, Melanoma and cancer of lungs, colon, kidney, ovary and central nervous system. In their results, it was found that α -amyrin exhibited anticancer activity [23]. Triterpenoids play a vital role as anticancer agents and structural modification of this class of compounds can result in the establishment of an innovative drug for the treatment of cancer.

Hepatoprotective activity:

Pergularia daemia is traditionally used as a folk medicine for treating jaundice. A preliminary Investigation on aerial parts of *pergularia daemia* showed significant hepatoprotective activity at a

fixed dose level of 200 mg/kg [24] further the work was extended to identify the active compounds of *pergularia 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 results suggest that presence of flavonoids in *pergularia daemia* could be responsible for hepatoprotection. In addition in vitro evaluation hepatoprotective activity of *pergularia daemia* was also investigated in this study, acetone and ethanolic extract obtained from total ethanolic extract was carried out using CCL4 induced toxicity in primary cultured rat hepatocytes. The result of the 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 diseases [25].

Central nervous system depressant Activity:

The roots of *pergularia daemia* were evaluated for central nervous system depressant activity. This study was investigated on swiss albino mice using chlorpromazine and pentobarbitone sodium induced sleeping time. Alcohol and aqueous root extract of *pergularia daemia* showed significant central nervous system depressant activity and was compared with that of control and drug treated groups. The results concluded that both alcohol and aqueous extract showed central nervous system depressant activity is mainly due to the presence of glycosides present in *pergularia daemia* roots [26].

Antifertility activity:

The ethanol extract of *pergularia daemia* and its steroidal fraction are reported to have antifertility activity. In this study the alkaloid fraction of ethanol extract was observed for its antifertility activity. Oral administration of the alkaloid fraction at a dose of 200 mg kg b.w. showed a significant activity in preimplantation stage of female mice. The activity of the alkaloidal fraction, when compared with steroidal fraction and was found to be more pronounced since the former inhibition not only the fertility of female mice but also took short period to return the oestrous cycle to normal within 4 to 6 days of drug treatment while steroidal fraction treated mice returned to normal within 6 to 8 days [27].

Anti inflammatory Analgesic and Antipyretic activity:

Crude ethanol extract of *pergularia daemia* leaves was successfully fractionated with petroleum ether, solvent ether, ethyl acetate, butanol and butanone. The ethanol extract and various fractions were investigated for anti inflammatory activity in rats at a dose of 100 mg/kg via intraperitoneally. Ethanol extract and its butanol fraction exhibited significant anti-inflammatory activity compared with respective controls and comparable with that of standard drug Aspirin [28]. The anti inflammatory activity of *pergularia daemia* extract could be attributed due to the presence of steroids [29]. 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 analysed statistically by Tukey Kramer Multiple comparison test [26]. Antipyretic activity was also reported from the aerial parts of *pergularia daemia* extract [30].

Pergularia daemia has wide range of applications as folk medicine and even in ayurveda which have increase defence against various diseases

Phytochemistry:

Generally, medicinal values of the plants are dictated by their phytochemical and other chemical constituents. A number of phytochemical studies have demonstrated the presence of several classes of chemical compounds. It is not our intention in this review to cover all the many compounds

reported for *pergularia daemia*, but to summarise the major components that have been implicated in the pharmacological activities of the crude drug. Most commonly found phytochemicals from the leaves of *pergularia daemia* are alkaloids, terpenoids, tannins, steroids and carbohydrates [31]. Phytochemical studies have shown the presence of cardenolides, alkaloids, terpenoids, saponins, steroids [32]. The seeds of *pergularia daemia* contain uzarigenin, coroglaucigenin, calaction, calotropin, other cardenolides and a bitter resin, Pergularin and have a cardiotoxic action [33]. It has been suggested that the plant seed action on the uterus is similar to that of pituitrin and is not inhibited by progesterone [34].

Conclusion:

As can be seen from this review, we concentrated on *pergularia daemia*'s botanical description, ethnomedical uses, phytochemistry, and pharmacological characteristics. This plant is said to contain a number of phytochemicals, including flavonoids, alkaloids, terpenoids, tannins, and steroids. The plant also has a number of pharmacological qualities, including anti-inflammatory, analgesic, antipyretic, antidiabetic, hepatoprotective, antibacterial, antifungal, and action that depresses the central nervous system. *Pergularia daemia* is a plant that is a significant source of many different kinds of chemicals with different chemical structures. On this plant, however, very little research has been done, and there is a large area for exploration. This review will inform researchers about this plant, and thorough study on *Pergularia daemia* should be conducted in order to develop novel human medicinal medications.



Aerial Parts of *P. daemia*

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