

# PERGULARIA DAEMIA- AS AN EXCELLENT PHYTOMEDICINE

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**Abstract:** Medicinal plants are the gift to human beings to lead a disease free healthy life. They play a major role in maintaining human health. One such medicinal plant is *Pergularia daemia*. It is a perennial herb belonging to Asclepiadaceae family which is distributed in tropical and sub tropical regions. The whole plant is used to treat Jaundice since ancient times. It has anthelmintic, laxative and anti pyretic properties. It has phytochemicals like alkaloids, triterpenes, saponins and cardenolides. It has many pharmacological activities like anti inflammatory, hepatoprotective, anti cancer, anti diabetic, antioxidant, antifungal, antibacterial, analgesic, antifertility and central nervous system depressant activity. The present review aims to provide detailed survey of literature on the phytochemical and pharmacological properties of *Pergularia daemia*.

**Key words-** Medicinal plant, *Pergularia daemia*, Phytochemical studies, Pharmacological studies, Traditional uses.

## I. INTRODUCTION

Nature has been an important source of medical products since ancient times. It is estimated that there are more than 45,000 species of medicinal plants present in our country. Of these only 60% of plants are officially used by practitioners and 40% of plants are used traditionally. According to World Health Organization, approximately 80% of world's population uses herbal medicine (Archana Sharma *et al.*, 2013). The medicinal plant sector is a part of time honoured tradition in our country (Farnsworth, 1990). One such ethnomedicinal plant is *Pergularia daemia* which is used to treat various ailments.

*Pergularia daemia* belonging to Asclepiadaceae family is a latex perennial twinning herb. It is commonly present along the roadsides of tropical and subtropical regions (Pankaj, 2003). It is commonly known as "Veliparuthi" in tamil and "Hariknot" in English. In tamil, the term "Veli" denotes "a guardian" or "a protector". It is interesting to note that siddha medicine had named only two medicinal plants which can act as a shield for humans. One is Veliparuthi (*Pergularia daemia*) and the other is Kodiveli (*Plumbago zeylanica*), as they both have multiple valuable properties.

The purpose of the present study is to highlight the existing information particularly on the phytochemistry and various pharmacological properties of *Pergularia daemia* which is used to evaluate the plant as a medicinal agent.

## II. HABITAT

This plant is widely distributed in the tropical and subtropical areas of India. It is commonly found in hedges throughout most of country at an altitude of about 1000m in Himalayas and 900m in southern India (Karthishwaran and Mirunalini 2010). It is widely distributed in tropical Africa, extending to Arabia (Parrotta A John, 2001).

## III. VERNACULAR NAMES

**Table 1. Vernacular names of the plant *Pergularia daemia* (Karthishwaran and Mirunalini, 2010)**

Tamil	Uttamani, Seendhal kodi, Veliparuthi
English	Hariknot plant
Sanskrit	Kurutakah, visamika, kakajangha
Hindi	Utaran, Sagovam, Aakasan
Bengali	Chagalbati, Ajashringi
Gujarathi	Chamardudhi
Marathi	Utarn
Oriya	Utrali, Uturdi
Malayalam	Veliparatti
Telugu	Dustapuchettu, Jittupaku, Gurtichettu
Kannada	Halokoratige, Juttuve, Talavaranaballi
Punjab	Karial, Silai, Trotu

#### IV. TAXONOMIC DESCRIPTION

Table 2. Taxonomic classification of *Pergularia daemia* (Parrotta A John, 2001)

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

#### V. BOTANICAL DESCRIPTION

*Pergularia daemia* is a slender, hispid, fetid- smelling perennial herb. The leaves are thin, opposite, membranous, 3-9 cm long, broadly ovate, orbicular or deeply cordate, acute or short-acuminate at apex, pubescent beneath. Flowers are greenish-yellow or dull white tinged with purple, sweet scented born in axillary, long-peduncled, drooping clusters. Fruits are paired with follicles, lanceolate, long-pointed, about 5 cm long, covered with soft spines and release many seeds with long white hairs when they split open. Seeds are densely velvety on both sides. Flowering may occur each year between August and January in central India, with fruits maturing from October to February. In central Indian deciduous forests, the stems typically die down in February and reappear with the onset of the rainy season. The entire plant constitutes the drug which is used as a medicine.

#### VI. PHYTOCHEMISTRY

Medicinal values of this plant are determined by their phytochemical and other chemical constituents. Most commonly found phytochemicals from the leaves of *Pergularia daemia* are flavonoids, alkaloids, terpenoids, tannins, saponins, steroids and carbohydrates (Aanjaneyuju *et al.*, 1998). The seeds of *Pergularia daemia* contain uzarigenin, coroglaucigenin, calactin, calotropin, pergularin and have cardiotoxic action (Patel And Rowson, 1964; Rowson, 1965). It has been suggested that the plant seed action similar to pituitrin and is not inhibited by progesterone (Dutta and Gosh, 1947; Paris and Moyses, 1971).

#### VII. ETHNOMEDICINAL USES

*Pergularia daemia* is used as medicinal plant since ancient times. The whole plant is used to treat snake bite, expectorant, emetic, anthelmintic and leucodermal dysentery (Burkil, 1985) malaria and fever (Bruce, 1998), catarrhal infection and infantile diarrhoea (Thatoi *et al.*, 2008), rheumatism, uterine and menstrual disorders (Singh *et al.*, 2002). Leaves are used to treat catarrhal infection and infantile diarrhoea (Dalziel *et al.*, 1937), stomach ache and tetanus (Irvine *et al.*, 1952), leprosy and haemorrhoids (Thatoi *et al.*, 2008), nasobronchial disease (Chitravadivu *et al.*, 2009) stomach pain (Sandhya *et al.*, 2006), antihelminthic and expectorant (Ndukwu and Ben –Nwadibia 2005), headache (Omobuwajo *et al.*, 2008), cough and chest pain (Iganacimuthu *et al.*, 2008), alopecia (Kshirsagar and Singh 2001). The decoction of the roots is used to treat venereal diseases, arthritis, muscular pains, asthma, and rheumatism (Royen *et al.*, 2001). The latex of the plant is used to treat venereal diseases, arthritis, muscular pains, asthma, and rheumatism and snake bites and can act as fish poison (Van Damme *et al.*, 1922). It is also used to treat toothache (Hebber *et al.*, 2004). The milky sap from the leaves are used to cure sore eyes (Irvine *et al.*, 1952), rheumatism, oedema and kidney pains (Burkil, 1985). The roots are used to cure gonorrhoea (Haardi, 1964) ulcer and respiratory problems (Chitravadivu *et al.*, 2009). The bark of the stem is used to cure cold (Dokosi, 1998) and to treat fever and diarrhoea in infants (Ndukwu and Ben –Nwadibia, 2005). The fruits are used as digestive and thermogenic (Thatoi *et al.*, 2008). Plant extract is useful in uterine and menstrual disorders and in facilitating parturition.

#### VIII. PHARMACOLOGICAL ACTIVITY

The pharmacological studies of *Pergularia daemia* confirm that it exhibits a broad range of biological properties. The crude extract of the plant have been used as an ethno medicine for treating various medical ailments. Some of the activities are given below.

### 8.1 Anti inflammatory, analgesic and anti pyretic activity:

Crude ethanol extract of *Pergularia daemia* leaves were successfully prepared by fractionating the solvents like petroleum ether, solvent ether, ethyl acetate, butanol and butanone. The ethanolic extract and different fractions were analysed for anti-inflammatory activities in rats. Ethanol extract and its butanol fraction showed significant results of anti inflammatory activity when compared with other fractions (Hukkeri *et al.*, 2001). The anti-inflammatory activity of *Pergularia daemia* extract is mainly due to the presence of steroids (Sutar *et al.*, 2009). Antipyretic activity was identified from the aerial parts of *Pergularia daemia* extract (Jain *et al.*, 1998). The analgesic effect was experimentally demonstrated by using eddy's hot plate and heat conduction method and analysed statistically by Turkey Kramer Multiple Comparison Test (Lokesh, 2009).

### 8.2 Antifertility activity:

The ethanolic extract of *Pergularia daemia* and its steroidal fraction were reported to have antifertility activity. In this study, Oral administration of the alkaloid fraction of ethanol extract at a dose of 200 mg/kg body weight showed significant anti fertility activity in preimplantation stage of female mice (Golam Sadik *et al.*, 2001).

### 8.3 Central nervous system depressant activity:

In this study, the roots of *Pergularia daemia* were taken central nervous system depressant activity. It was investigated on swiss albino mice using chlorpromazine and pentobarbitone sodium induced sleeping time. Alcohol and aqueous root extract showed significant activity and was compared with that of control and drug treated groups. This activity is mainly due to the presence of glycosides in *Pergularia daemia* roots (Lokesh, 2009).

### 8.4 Hepato protective activity:

In regard with literature, *Pergularia daemia* is used for treating jaundice. A primary investigation on the aerial parts showed significant activity at a dose level of 200mg/kg (Suresh Kumar and Mishra, 2006). Then they extended their study to identify the active compounds which are responsible for hepatoprotective ability. The results suggested that the presence of flavonoids were responsible for hepatoprotection (Suresh kumar and Mishra, 2007). They also performed invitro evaluation of hepatoprotective activity. The results justified that flavonoids are responsible for hepatoprotection. They proved that the flavonoids like quercetin, kaempferol and isorhammetic glycosides are responsible for liver disorders (Sureshkumar and Mishra, 2008).

### 8.5 Antibacterial activity:

The antibacterial activity was observed against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Salmonella typhi* in ethyl acetate and ethanol extracts (Senthilkumar *et al.*, 2005). Also, it exhibited antibacterial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, and *Proteus vulgaris* (Karuppusamy *et al.*, 2001). Also, a new bioactive compound 6-(4, 7-dihydroxy-heptyl) quinine was found to be responsible for antibacterial activity (Ignacimuthu *et al.*, 2009).

### 8.6 Antifungal activity:

The antifungal activity of *Pergularia daemia* was reported against keratinophilic fungi by dry weight method (Quershi *et al.*, 1997). *Pergularia daemia* plant salts were used against *Aspergillus flavus*, *Cryptococcus neoformans*, and *Candida albicans*. In this study, they showed the inhibitory effect against only *Aspergillus flavus* (Suresh *et al.*, 2010).

### 8.7 Antidiabetic activity:

It is interesting to note that the aerial parts of *Pergularia daemia* possess anti diabetic property. The ethanol and aqueous extract of *Pergularia daemia* were found against alloxan induced hyperglycemia. The hypoglycemic activity is possible due to the presence of beta sitosterol and quercetin (Wahi *et al.*, 2002).

## IX. CONCLUSION

Thus, the plant *Pergularia daemia* has a wide range of pharmacological activities. It has been used since centuries as an analgesic, antipyretic and anti-inflammatory, abortifacient, in treatment of diarrhea and malarial intermittent fever. Recent research carried out suggested that it has various phytochemicals, and pharmacological activities. Hence, it is proved that *Pergularia daemia* is an important source of various types of compounds with diverse chemical structures as well as pharmacological activities. However, very less work has been done on this plant and there is a wide scope for investigation for establishing new therapeutic drugs for various diseases.

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