

## QUALITATIVE AND QUANTITATIVE PHYTOCHEMICAL SCREENING AND IN VITRO ANTIOXIDANT EVALUATION OF PERGULARIA DAEMIA

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### ABSTRACT

*Pergularia daemia* belongs to the family Asclepiadaceae, known to have anticancer, anti-inflammatory activity. Aim of the present study was to evaluate qualitative and quantitative phytochemical and antioxidant properties of ethanolic extracts of leaf, stem and root parts of *P. daemia*. Preliminary phytochemical analysis and *in vitro* antioxidant properties were evaluated by standard methods. The qualitative phytochemical analysis of *P. daemia* showed presence of flavonoids, tannins, alkaloid, phytosterol, carbohydrate, phenol, saponin, glycosides, terpenoids, steroids proteins and reducing sugars. Quantitative analysis showed polyphenol, flavonoid, flavonone, flavone and flavonol in *P. daemia* leaves, stem and root in considerable quantity. The *in vitro* antioxidant activity of *P. daemia* clearly demonstrated that leaf, stem and root parts have prominent antioxidant properties and was effective in scavenging free radicals.

Figure : 01

References : 21

Tables : 02

KEY WORDS :Antioxidant, *Pergularia daemia*, Phytochemical screening, Qualitative and Quantitative

### Introduction

India has rich heritage of traditional knowledge and folkloric claims on medicinal uses of plants<sup>14</sup>. Plant extracts comprise various kinds of bioactive compounds known as phytochemicals. Secondary metabolites, beneficial to boost up immune modulatory responses provide immunity against many diseases<sup>9</sup>. Phytochemicals are reported for their medicinal properties *i.e.* phenols, tannins, flavonoids, saponins, carbohydrates, alkaloids, phytosterols *etc*<sup>21</sup>.

*P. daemia* also known as "*Uttaravaruni*" in Sanskrit, and "*Utranajutuka*" in Hindi, belonging to the family Asclepiadaceae, distributed in plains of the hotter regions of India, mounting to an altitude of 1000 m in the Himalayas. *P. daemia* is well known for its excellent antidiabetic<sup>19</sup>, hepatoprotective<sup>16</sup> and cardio vascular effects<sup>4</sup>. The therapeutic properties of medicinal plants can be attributed to the presence of various complex chemical substances of different compositions, which

occur as secondary metabolites. In the processing of herbal drugs, the first step is the screening of phytochemicals<sup>20</sup>. The objective of this study was to perform the preliminary phytochemical screening as well as antioxidant property of *P. daemia* leaves, stem and roots extracts.

### Materials and Methods

#### Collection and Extraction:

The whole plant was collected from Bilaspur district, Chhattisgarh in India. Fresh leaves, stems and roots were separated from the plant and washed in distilled water to remove dust. Then it was dried in shade at room temperature. Dried plant parts were subsequently sieved separately to obtain a fine powder. Then 70% ethanolic extracts of the fine powder was prepared using accelerated solvent extractor. The extracts were dried at room temperature and stored in refrigerator at 4°C for their future use in phytochemical and toxicity analysis.

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**TABLE -1: Qualitative phytochemical screening of ethanolic extract of *P.daemia***

Parameter	Leaf	Stem	Root
Flavonoids	Present	Present	Present
Tannins	Present	Present	Absent
Alkaloid	Present	Absent	Absent
Phytosterol	Present	Present	Present
Carbohydrate	Present	Present	Present
Polyphenol	Present	Absent	Present
Saponin	Present	Present	Absent
Glycosides	Present	Present	Present
Terpenoids	Present	Present	Present
Steroids	Present	Absent	Present
Proteins	Present	Present	Present
Reducing sugars	Present	Present	Present

**Qualitative phytochemical analyses**

Qualitative phytochemical screening of ethanolic extract of *P. daemia* was done according to standardized protocols (flavonoids, tannins, saponins, glycosides, terpenes<sup>11</sup>, alkaloids, phytosterol<sup>6</sup>, carbohydrates, steroids, proteins and sugars<sup>5</sup>).

**Quantitative phytochemical analyses**

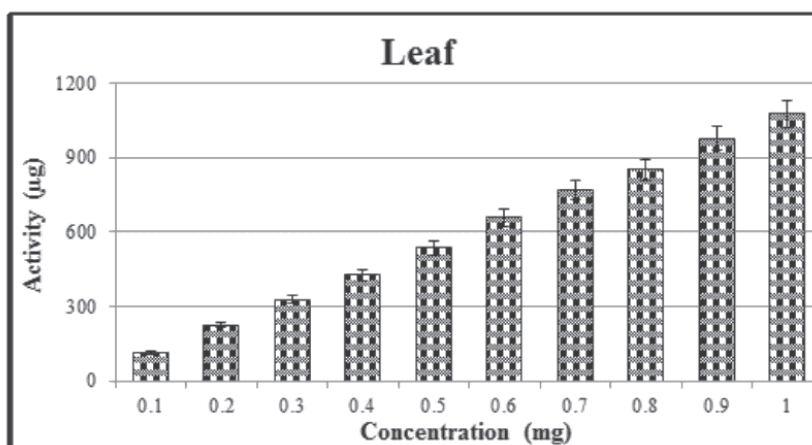
Phytochemical contents in *P. daemia* i.e. polyphenol<sup>15</sup>, flavonoid<sup>7</sup>, flavonone<sup>7</sup>, flavones and flavonol<sup>7</sup> and H<sub>2</sub>O<sub>2</sub> free radical scavenging activity<sup>13</sup> were quantified as per standard protocols.

**Results and Discussion**

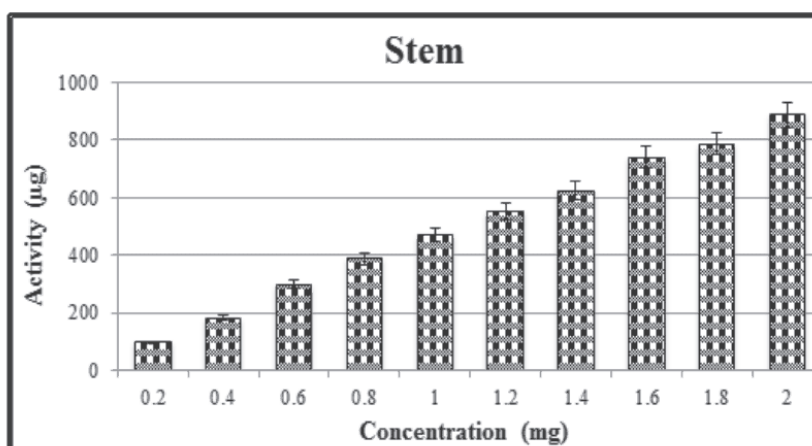
Medicinal plants are known for curing several

**TABLE -2: Quantitative analysis of polyphenol, flavonoid, flavonone, flavone and flavonol in ethanolic extract of *P.daemia***

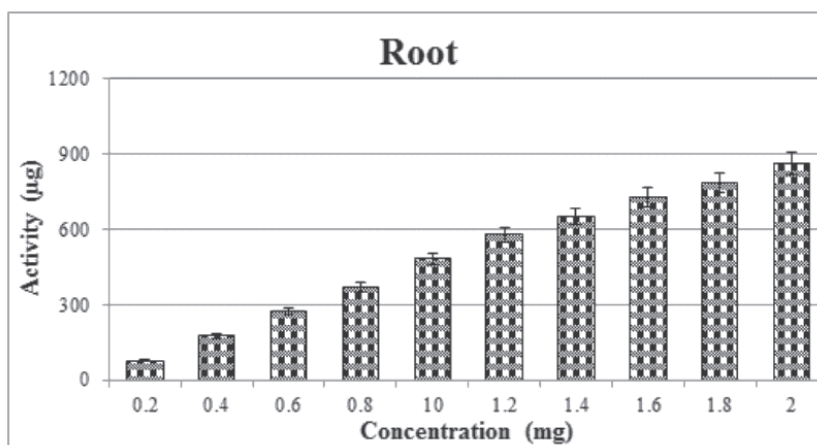
Parameter	Leaf	Stem	Root
<b>Polyphenol/ 100 mg extract</b> (Standard Gallic acid)	17.4 mg	5.6 mg	3.93 mg
<b>Flavonoid/100 mg extract</b> (Standard Naringenin))	7.70 mg	2.58 mg	1.10 mg
<b>Flavonone/100 mg extract</b> (Standard Pinostrobin)	5.61 mg	6.46 mg	11.8 mg
<b>Flavone and Flavonol/</b> 100 mg extract (Standard Quercetin)	4.17 mg	1.03 mg	0.16 mg



(A)



(B)



(C)

Fig. 1 : Free radical scavenging activity in *P. daemia* leaf, stem and root extract. (Data are expressed as mean  $\pm$  SE, n=6).

diseases due to presence of phytochemical constituents. Qualitative analysis of *P. daemia* extracts revealed presence of carbohydrates, glycosides, saponins, phytosterols, phenols, flavonoids, diterpenes, terpenoids and proteins in leaves, stem and root<sup>8</sup>. However, alkaloid, phenol and steroid were absent in stem extract of *P. daemia*. In root extract of *P. daemia*, tannin, saponin and alkaloid were absent (Table 1). These secondary metabolites are reported to have many biological and therapeutic properties<sup>3, 18</sup>. Secondary metabolites of plants such as alkaloids possess cytotoxic activity<sup>17</sup>, steroids are known for cardiotoxic and insecticidal properties<sup>2</sup> and tannins have antitumor and antiviral activities<sup>10</sup>. Flavonoids are polyphenolic compounds and are characteristically known for health enhancing properties such as antioxidant, anti-allergic, anti-inflammatory, antimicrobial and anticancer<sup>1</sup>. Terpenoids have been known for their antibiotic, insecticidal,

anthelmintic and antiseptic in pharmaceutical industry<sup>12</sup>.

*P. daemia* showed maximum quantity of polyphenol, flavonoid and flavone and flavonol components in leaves extract as compared to stem and root respectively. But flavonone content was higher in root extract in comparison to both stem and leaves (Table 2). Free radical scavenging activity of leaves was found to be better than stem and root extract in a concentration dependent manner (Fig 1). *P. daemia* exhibited free radical scavenging activity which may be attributed to the presence of polyphenolic compounds such as flavonoids (quercetin, naringenin and taxifolin)<sup>3</sup>.

Based on present experimental findings it is concluded that *P. daemia* ethanolic extract possesses secondary metabolites particularly flavonoids. Therefore, dietary supplements of the plant may have potential as therapeutic agent and would give beneficial effects against oxidative stress induced pathologies.

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