Pharmacognostic studies on *Persicaria odorata* (Lour.) Sojak

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**ABSTRACT**

**Background:** *Persicaria odorata* (Lour.) Sojak (Family: Polygonaceae), commonly known as ‘Vietnamese coriander’ or ‘Daun Laksa’ in Malaysia, often used in culinary and salads, is an important medicinal plant having its application in the traditional system of medicine in treating swelling and inflammation, diarrhoea and excessive bleeding, sores, ulcers and wounds. Earlier reported biological activities of the plant include algaecide, anti-diabetic, antibacterial and antifungal, antioxidant and anticancer activities. In spite of several uses of this plant, there are no reports on the pharmacognostic studies about this plant in the literature. **Methods:** In the present paper, we report some pharmacognostic studies on the leaves using standard recommended procedures. **Results and Discussion:** The transverse section of the leaves showed the characteristics of a dorsiventral leaf with numerous oil glands present in the mesophyll region. Presence of uniseriate multicellular covering trichomes and calcium oxalate crystals (rosettes) were identified in the powder microscopy. The preliminary phytochemical screening of different extracts revealed presence of steroids, terpenoids, flavonoids, tannins and phenolic compounds, carbohydrates, mucilages, proteins and amino acids respectively in the plant. **Conclusion:** The findings of the study can be useful in establishing pharmacognostic standards for the plant.

**KEYWORDS:** *Persicaria odorata* (Lour.) Sojak, Macroscopy, Microscopy, Physicochemical parameters, Preliminary phytochemical studies.

**INTRODUCTION**

Plants either used for medicinal purposes or consumed as vegetables have always played a pivotal role in sustaining disease free human existence on the earth. Several plants are believed to be source of antioxidants like polyphenols and flavonoids that can protect the body against oxidative stress which otherwise may lead to ageing, cardiovascular problems and cancer. Standardization herbal drugs has become an integral part in quality assessment. The World Health Organization emphasizes the need for standardization of medicinal plants and has laid down suitable guidelines to ensure the quality of medicinal plants and products containing them.

*Persicaria odorata* (Lour.) Sojak (Family: Polygonaceae), earlier known as *Polygonum odoratum* Lour. and reclassified in to the present name, is a perennial aromatic shrub native to Southeast Asia where it grows in wet environments in moist soils. The plant is commonly known as ‘Vietnamese coriander’ or ‘Daun Laksa’ in Malaysia. Vietnamese coriander has no GRAS (generally recognized as safe) status, but it is often used in culinary and commonly eaten fresh in salads. The plant finds its application in the traditional system of medicine. In Vietnam, the herb is believed to limit sexual urges. Many Buddhist monks eat this plant frequently to assist them live in celibacy. A poultice made from the plant is applied to relieve swelling and inflammation, while a decoction is used to treat skin itch, diarrhoea and excessive bleeding. The plant is used to treat nausea, fever and to promote hair growth. As *P. odorata* possesses anti-inflammatory attributes, it is used for treating sores, ulcers and wounds. Several compounds like caryophyllene, alpha- caryophyllene, drimenol and decanal, (Z)-3-hexenal, (Z)-3-hexenol, decanal, undecanal, dodecanol and 3-sulfanyl-hexanal and 3-sulfanyl-hexanol have been reported from this plant. Presence of flavonoids viz. rutin, catechin, quercetin, kaempferol andisorhamnetin have also been reported. Few reported biological activities of the plant include algaecide, anti-diabetic, antibacterial and antifungal activities.

In spite of several uses of this plant, there are no reports on the pharmacognostic studies about this plant in the literature. In the present paper we report some pharmacognostic studies of the leaves of *P. odorata*.

**MATERIALS AND METHODS**

**Plant material**

The fresh leaves were collected and authenticated. Histological studies were performed on fresh plant material. The plant material was
collected in bulk, washed, shade dried and pulverised in to coarse powder and used for other studies.

**Macroscopy**
The colour, odour, taste and texture of the leaves were examined.

**Microscopy**
Thinnest possible transverse sections of the leaf samples carefully collected and boiled in chloral hydrate solution for 10 min. The sections were then stained with phloroglucinol and concentrated hydrochloric acid (1:1) and mounted on microscopic slide. The sample was covered with glycerin and a cover slip, followed by examining the section under a binocular compound optical microscope (OLYMPUS; CX21FS1). The images were photo documented using a camera.

**Powder microscopy**
A small amount of the dried leaf powder was heated with chloral hydrate solution for 5 min. Microscopic observation of lignified tissues were confirmed after staining with a mixture of phloroglucinol-Conc. HCl (1:1). Presence of starch grains were confirmed when the powders were separately stained with N/20 iodine solution and observed under the microscope. Calcium oxalate crystals were detected in the powdered sample when mounted with distilled water.

**Physico-chemical analysis**
The determination of ash values, extractive values and moisture content of the leaf powder were performed according to the procedures laid down in British Pharmacopoeia. The behaviour of the powder plant materials with different chemical reagents were also studied.

**Preliminary phytochemical studies**
About 50 g of dried leaves was extracted successively with petroleum ether (40-60°C), chloroform, methanol and distilled water. The colour, consistency and extractive values of all extract were noted. Preliminary phytochemical analysis was performed on the extracts to identify different class of phytoconstituents they contain.

**RESULTS AND DISCUSSIONS**

**Macroscopy**
The colour of the leaves was green with smooth texture. Odour was aromatic with characteristic taste.

**Microscopy**
Transverse section of the leaf (Figure 1) showed upper and lower epidermis covered within cuticle. The epidermal layer consists of wavy walled and compactly arranged cells. Below the upper epider-

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**Fig. 1: Transverse section of *P. odorata* leaf**

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mis, there are few layers of elongated, compactly arranged palisade cells which are absent on the lower epidermis, indicating the characteristics of a dorsiventral leaf. There were few non lignified covering trichomes appear on both sides of the leaves. Numerous oil glands are seen in the mesophyll region. In the upper part of the midrib, two layers of xylem vessels surrounding a group of phloem fibres are seen. Numerous vascular bundles are seen at the midrib region. In the vascular bundles, the xylem vessels are surrounded by the phloem fibres. Collenchymatous tissues are observed at both the lower and upper portion of the midrib and give support to the midrib region.

Powder microscopy

The powder microscopical characteristics of the leaves are presented in Figure 2. Fragments of epidermal cells, mesophyll, oil glands, uniseriate multicellular covering trichomes, calcium oxalate crystals (rosettes), stomata, starch grains, xylem vessels and phloem fibres were identified.

Physicochemical analysis

The percentage of total ash, acid-insoluble ash, water soluble ash, water soluble extractive, ethanol soluble extractive and moisture content are presented in Table 1. Behaviour of the powdered plant material with different chemical reagents observed under visible light and UV at 366 and 254 nm respectively (Table 3). Preliminary phytochemical screening was performed on different extracts and the results are presented in Table 4.

<table>
<thead>
<tr>
<th>Extract</th>
<th>Consistency</th>
<th>Yield (%w/w)</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pet. ether</td>
<td>Greasy</td>
<td>0.433</td>
<td>Yellow</td>
</tr>
<tr>
<td>Chloroform</td>
<td>Greasy</td>
<td>0.936</td>
<td>Dark green</td>
</tr>
<tr>
<td>Methanol</td>
<td>Greasy</td>
<td>4.946</td>
<td>Dark green</td>
</tr>
<tr>
<td>Water</td>
<td>Sticky</td>
<td>5.5</td>
<td>Brown</td>
</tr>
</tbody>
</table>

Table 3: Colour, consistency and extractive values of various extracts

Test for | Extracts
---|---
Alkaloid | Pet. ether | Chloroform | Methanol | Aqueous
Carbohydrates | - | - | - | +
Flavonoids | - | - | + | +
Gums and mucilages | - | - | - | +
Protein and amino acid | - | - | - | +
Steroid and sterols | + | + | - | -
Tannins | - | - | + | +
Terpenoids | + | + | - | -

Table 4: Preliminary phytochemical analysis of various extracts of P. odorata

Results expressed as Mean ± SD from three observations

Table 2: Behaviour of the P. odorata leaf powder with different chemical reagents

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder as such</td>
<td>Green</td>
</tr>
<tr>
<td>Powder + 5% FeCl₃</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + CH₃COOH</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + 5% KOH</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + 5% NaOH</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + 50% HCl</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + 50% H₂SO₄</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + N/10 Iodine</td>
<td>Black</td>
</tr>
<tr>
<td>Powder + Ammonia</td>
<td>Dark Brown</td>
</tr>
</tbody>
</table>

Preliminary phytochemical studies

The powdered leaves, after being extracted successively with different solvent were studied for colour, consistency, extractive values of the extracts. The liquid extracts were further observed under visible light and UV at 366 and 254 nm respectively (Table 3). Preliminary phytochemical screening was performed on different extracts and the results are presented in Table 4.
CONCLUSION

P. odorata is a well-known as an edible plant and known to possess several medicinal properties. In spite of several uses of this plant, there are no reports on the pharmacognostic studies about this plant in the literature. The findings of the study may be helpful to the future investigators in the process of its identification and subsequently useful in establishing pharmacognostic standards for the plant.

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REFERENCES


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