JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

THERAPEUTIC PROFILING OF *Ipomoea obscura* (THIRUTHALI) POWDER

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INTRODUCTION

Plant-derived medicines have been integral to human healthcare since antiquity, forming the foundation of many traditional medical systems worldwide. In countries such as India, the use of medicinal plants remains deeply embedded in cultural practices, supported by the nation's vast biodiversity and long-standing traditions of Ayurveda, Siddha, and Unani medicine. In recent decades, there has been renewed scientific interest in medicinal plants as alternative and complementary sources of therapeutic agents, particularly in response to increasing drug resistance, adverse effects of synthetic drugs, and the growing demand for natural health products.

Medicinal plants are known to contain a wide range of bioactive phytochemicals, including flavonoids, alkaloids, phenolic compounds, tannins, and saponins, which contribute to their antioxidant, antimicrobial, anti-inflammatory, and anticancer properties. Systematic investigation of such plants has led to the identification of several pharmacologically active compounds that now serve as lead molecules or raw materials in pharmaceutical development. Advances in analytical and screening techniques have further strengthened efforts to scientifically validate traditional medicinal knowledge.

Ipomoea obscura (L.) Ker Gawl., belonging to the family Convolvulaceae, is commonly known as "Lakshmana" in Ayurveda. It is a small, fast-growing creeping or climbing herb characterised by pointed leaves and delicate, funnel-shaped flowers composed of five fused petals. The plant is widely distributed in tropical and subtropical regions, particularly throughout India, where it commonly grows along roadsides, hedges, agricultural fields, and other disturbed habitats. Ecologically, *I. obscura* plays a role in supporting biodiversity by providing nectar for pollinators such as bees and butterflies, although its rapid growth habit may also classify it as a weed in certain agricultural contexts.

Traditionally, the powdered form of *Ipomoea obscura* has been extensively used for medicinal purposes. In Ayurvedic practice, the plant powder is employed in the management of dysentery, fever, inflammatory conditions, pustules, and various skin disorders. Powdered leaves are applied externally for wound healing, haemorrhoids, and skin infections, while powdered seeds and fruits are used as cleansing agents and to alleviate respiratory difficulties. The plant is also reported to provide analgesic effects, improve vision, and support central nervous system function. Despite its widespread traditional use, scientific evidence supporting the therapeutic efficacy of *I. obscura* plant powder remains limited.

The medicinal value of *Ipomoea obscura* powder is closely associated with its phytochemical composition. Secondary metabolites present in the plant exhibit strong antioxidant and anti-inflammatory activities, enabling

the neutralisation of free radicals and protection against oxidative stress–induced cellular damage. These properties are particularly important in the prevention and management of chronic diseases, including cardiovascular disorders, metabolic syndromes, and certain cancers. Given the increasing interest in plant-based therapeutics, systematic evaluation of *I. obscura* powder is essential to bridge the gap between traditional knowledge and modern scientific validation.

Therefore, the present study focuses exclusively on the development, physicochemical characterisation, and therapeutic profiling of *Ipomoea obscura* plant powder. Emphasis is placed on its proximate composition, antioxidant activity, anti-inflammatory potential, and anticancer properties, while excluding any analysis related to plant extracts.

The objectives of the present study were:

1. To develop *Ipomoea obscura* plant powder.
2. To evaluate the proximate composition of the developed powder.
3. To assess the antioxidant, anti-inflammatory, and anticervical cancer properties of *Ipomoea obscura* plant powder.

MATERIALS AND METHOD

Collection and preparation of plant material

Healthy, mature, and fresh *Ipomoea obscura* plants were collected from a local garden. The collected plant material was thoroughly washed under running water to remove adhering soil and impurities, followed by rinsing with clean water. The plants were then shade-dried under ambient conditions until a constant weight was achieved. The dried material was finely ground using a mechanical grinder and sieved to obtain a uniform powder, which was stored in airtight containers for further analysis.

Physicochemical analysis of *Ipomoea obscura* powder

The developed *Ipomoea obscura* powder was subjected to proximate analysis to determine its nutritional and physicochemical properties. The parameters analysed included moisture content, carbohydrate content, fat content, and total antioxidant activity, following standard analytical procedures.

Estimation of moisture content

Moisture content was determined according to the Association of Official Analytical Chemists (AOAC, 2005) method. Clean moisture dishes were dried in a hot air oven at 105°C overnight, cooled in a desiccator, and weighed. Approximately 1 g of the sample was placed in the dish and dried at 105 ± 2°C for 16–18 h until a constant weight was obtained. The dried samples were cooled in a desiccator and reweighed. Moisture content was calculated using the standard formula.

Estimation of carbohydrate content

Carbohydrate content was estimated using the anthrone method as described by Hedge et al. (1962). The powdered sample (100 mg) was hydrolysed with 2.5 N hydrochloric acid in a boiling water bath, neutralised, and made up to a known volume. After centrifugation, the supernatant was reacted with anthrone reagent, heated, and the absorbance was measured at 630 nm using a UV–visible spectrophotometer. Glucose was used as the standard.

Estimation of fat content

Fat content was determined using a modified batch solvent extraction method (Min et al., 1998). One gram of homogenised sample was mixed with distilled water and extracted with hexane in a separatory funnel. After phase separation, the organic layer was collected, and the solvent was evaporated. The residue obtained was weighed, and fat content was expressed as a percentage of the initial sample weight.

Evaluation of Medicinal Properties

Total antioxidant activity

Total antioxidant activity of *Ipomoea obscura* powder was evaluated using the phosphomolybdenum method (Prieto et al., 1999). The sample was reacted with a reagent solution containing sulfuric acid, sodium phosphate, and ammonium molybdate, followed by incubation at 95°C for 90 min. Absorbance was measured at 695 nm, and antioxidant activity was expressed as ascorbic acid equivalents.

Anti-inflammatory activity

Anti-inflammatory activity was assessed using the protein denaturation method with bovine serum albumin. The reaction mixture was incubated and heated, and absorbance was measured at 660 nm. Percentage inhibition of protein denaturation was calculated relative to the control.

Anticancer activity (MTT assay)

The anticancer potential of *Ipomoea obscura* powder was evaluated using the MTT assay on HeLa cervical cancer cells following the method of Mosmann (1983). Cells were treated with varying concentrations of the powder (6.25–100 µg/mL), and cell viability was determined by measuring absorbance at 570 nm. Cell viability was expressed as a percentage relative to untreated control cells.

Statistical analysis

All experiments were conducted in triplicate, and results were expressed as mean values. Statistical analysis was performed using WASP statistical software, and differences between treatments were evaluated using the t-test.

RESULTS AND DISCUSSUION

Proximate Composition of *Ipomoea obscura* powder

The proximate analysis of *Ipomoea obscura* powder revealed its nutritional and functional properties. Moisture, carbohydrate, and fat contents are presented in Table 1.

Table 1
Proximate analysis of Ipomoea obscura *plant powder*

Parameter	Powder (% w/w)	P value
Moisture	6.7	1072.87**
Carbohydrate	33.22	1.54 ns
Fat	7.7	226.46**

Note. **Significant at 5% and 1% levels; ns = not significant.

The moisture content of 6.7% indicates relatively low water content, which is favourable for storage stability, although proper packaging is still required to prevent microbial spoilage. Variations in moisture content among *Ipomoea* species have been attributed to differences in plant parts, drying methods, and environmental conditions.

The carbohydrate content of the powder was found to be 33.22%, indicating moderate energy value. Differences reported in earlier studies may be due to the use of specific plant parts such as leaves rather than whole plant powder. The fat content (7.7%) suggests the presence of lipophilic compounds that may contribute to the plant's nutritional and therapeutic value.

Antioxidant activity

The total antioxidant activity of *Ipomoea obscura* powder was determined to be 28.08 µg/mg, indicating a substantial presence of antioxidant compounds capable of scavenging free radicals. Antioxidants play a crucial role in protecting biological systems against oxidative damage and are associated with reduced risk of chronic diseases.

Anti-inflammatory activity

The powder exhibited concentration-dependent inhibition of protein denaturation, with inhibition ranging from 2.80% at 6.25 µg/mL to 37.73% at 100 µg/mL. Although the IC_{50} value exceeded 100 µg/mL, the results indicate moderate anti-inflammatory potential, supporting the traditional use of *Ipomoea obscura* in inflammatory conditions.

Anti-Cancer activity

Cell viability results obtained from the MTT assay are presented in Table 2.

Table 2

Concentration (µg/mL)	Cell viability (%)
6.25	99.35
12.5	96.77
25	93.96
50	90.38
100	86.92
IC_{50}	>100 µg/mL
Concentration (µg/mL)	Cell viability (%)

Cell viability of HeLa cells treated with Ipomoea obscura *plant powder*

A gradual, dose-dependent reduction in cell viability was observed, with 86.92% viability at the highest concentration tested. The IC_{50} value above 100 µg/mL indicates low cytotoxicity, suggesting that *Ipomoea obscura* powder is relatively safe and biocompatible, with potential for further therapeutic exploration.

CONCLUSION

The present study provides scientific evidence supporting the nutritional and therapeutic potential of *Ipomoea obscura* (L.) Ker Gawl. plant powder, a traditionally valued medicinal formulation. The successful development of a stable, uniform powder with low moisture content highlights its suitability for storage and potential incorporation into functional or therapeutic products. Proximate analysis revealed moderate carbohydrate and fat contents, indicating both nutritional relevance and the presence of bioactive, lipophilic constituents that may contribute to the observed biological activities.

Evaluation of medicinal properties demonstrated that *I. obscura* plant powder possesses appreciable antioxidant activity, suggesting its ability to neutralise free radicals and mitigate oxidative stress. This finding aligns with its traditional use in managing conditions associated with inflammation and chronic disease. The moderate, concentration-dependent anti-inflammatory activity further substantiates its ethnomedicinal application in inflammatory disorders, even though the inhibitory effects were less pronounced at lower concentrations.

The anticervical cancer assessment using the MTT assay showed a gradual reduction in HeLa cell viability with increasing concentrations of the powder. The IC_{50} value exceeding 100 µg/mL indicates low cytotoxicity, implying that the powder is relatively safe and biocompatible. While the anticancer activity was mild, these results are significant as they demonstrate biological interaction without severe cytotoxic effects, which is desirable for long-term or supportive therapeutic use.

Overall, this study bridges traditional knowledge and experimental validation by demonstrating that *Ipomoea obscura* plant powder exhibits antioxidant and anti-inflammatory properties with low cytotoxicity. Further studies involving detailed phytochemical profiling, in vivo investigations, and clinical evaluation are recommended to fully elucidate its mechanisms of action and therapeutic applicability. The findings support the potential of *I. obscura* plant powder as a natural, plant-based adjunct in health promotion and disease management.

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