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PHYTOCHEMICAL CONSTITUENTS OF *JUSTICIA ADHATODA* LINN. FOUND IN MANIPUR

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ABSTRACT

Justicia adhatoda Linn. a well-known evergreen shrub belonging to Acanthaceae family is a plant species which is commonly used in preparation of indigenous medicine. In Manipur *Justicia adhatoda* Linn. locally known as non gmangkha angouba is used as remedy for various disorders by the local people. In the present paper, the leaf and flower of the plant *Justicia adhatoda* Linn. which is used as medicine by the local folk of Manipur were assessed for its phytochemical components and was found to have significant amount of carbohydrate, protein, total phenolics, flavanoids and alkaloid.

Keywords: *Phytochemicals, Justicia Adhatoda,, Manipur.*

INTRODUCTION

Justicia adhatoda linn is a shrub widespread throughout the tropical regions of Southeast Asia (Chakrabarty and Brantner, 2001). It is a perennial, evergreen and highly branched shrub (1.0 m to 2.5 mm height) with bitter taste. It has opposite ascending branches with white, pink or purple flowers (Patel and Venkata-Krishna- Bhatt, 1984). Inflorescences which are in spikes or panicles cymes and the species rarely has solitary, terminal or axillary flowers. The species can be easily recognised by their bilabial corolla (figure1), with a posterior lip that is generally two lobed,an anterior lip that is three lobed, two stamen, a capsule with four seeds,and a basal sterile portion. *J. adhatoda* is a well-known plant drug in Ayurvedic and Unani medicines (Claeson *et al.*, 2000). It has been used for the treatment of various diseases and disorders, particularly for the respiratory tract ailments like bronchitis, asthma, tuberculosis, cold and cough (Sharma *et al.*, 1992). Its main action is expectorant and antispasmodic (bronchodilator) (Karthikeyan *et al.*, 2009). In Manipur, *Justicia adhatoda* Linn. locally known as nongmangkha angouba is used as an herbal remedy for treating cold, cough,whooping cough and chronic bronchitis and asthma, as sedative expectorant, antispasmodic and anthelmintic. The leaves (figure2) are used for treating respiratory disorders and the juice from its leaves are used as remedy in treating diarrhoea and dysentery. The alkaloids, vasicine and vasicinone present in the leaves possess respiratory stimulant activity (Baquar, 1997). Whereas vasicine at low concentrations, induced bronchodilation and relaxation of the tracheal muscles. Preparation made from its flower are used to treat tuberculosis. The flower, fruits, and roots are also extensively used for treating cold cough, chronic bronchitis and asthma (Aswal *et al.*, 1984, Joshi & Joshi, 2000). The present investigation was conducted to evaluate the presence of some of medicinally important phytochemicals present in leaf and flower of the plant, *Justicia adhatoda* Linn. which is used as an important medicine by the local folks so as to evaluate its medicinal properties.

MATERIALS AND METHODS

Plant Material

The leaves and flower of *Justicia adhatoda* Linn. were collected from the Langol hill, Imphal west district and dried in shade. The plant sample were then made into powder form by grinder and kept in a dry airtight sample container for further analysis.

Phytochemical Analysis

Analysis of Total Carbohydrate

Total carbohydrate contents were determined by Anthrone method (Sadasivam and Manickam, 1992). using anthrone in 20% concentration H₂SO₄. The samples were prepared in 50% ethanol. The samples

Research Article

and the standard glucose solutions were measured at wavelength 620 nm in a spectrophotometer. Total carbohydrate was calculated and expressed in mg/g using a standard curve prepared from Glucose.

Analysis of Total Soluble Protein

Estimations of phosphate buffer soluble proteins were done in fresh plant samples by Lowry's *et al.*, methods (1951). The optical density was measured at 660 nm. Calculations were done from the standard curve prepared by using BSA (Bovine Serum Albumin) as the standard solution and expressed as mg/g fresh wt.

Analysis of Alkaloids Content

Alkaloids content were determined titrimetrically (Rastogi and Mehrotra, 1993) using 0.1N NaOH as the titrating reagent. The samples were prepared in 90% ethanol thoroughly mixed with 0.1N HCl. Methyl red was used as the indicating reagent for the colour changed from red to yellow as the end point.

Analysis of Total Phenols

The dried powdered plant samples were extracted in 10ml of methanol by intermittent maceration up to 48 hours, centrifuged and the supernatants were used for the estimations of total phenols. Total phenolic contents were determined by folin-ciocalteu method with sodium carbonate solutions following Donald *et al.*, (2001). The absorbance was measured at 765nm using chlorogenic acid as the standard.

Analysis of total flavonoids content

The dried powdered rhizomes were extracted in 10ml of methanol by intermittent maceration up to 48 hours, centrifuged and the supernatants were used for the estimations of Flavonoids. Flavonoids content were determined by Aluminium chloride method following Chang *et al.*, (2002). The calibration curved was prepared by different concentrations of Quercetin in methanol. The absorbance was measured at 415nm in a spectrophotometer.



Figure 1: Flower of *Justicia adhatoda* Linn.



Figure 2: *Justicia adhatoda* Linn vegetative portion

RESULTS AND DISCUSSION

From the results it was observed that the leaves portion of the plant has higher contents of total carbohydrate (16.1 mg/g fresh wt.) as compared to that of the leaves (08.2 mg/g fresh wt.). The leaves also has high soluble protein (7.82 mg/g fresh wt.), total phenolics (32.1 mg/g dry wt.) and flavonoids (37.9 mg/g dry wt.) than the flower parts which has soluble protein (2.5 mg/g fresh wt.), total phenolics (22.8 mg/g dry wt.) and flavonoids (29.2 mg/g dry wt.). But in alkaloid content it is having more or less same content (1.09 and 1.08 mg/g dry wt.). In the present study, it was found that the leaves and flowers of *Justicia adhatoda* Linn contain significant amount of phenols, flavonoids and alkaloid in addition to protein and carbohydrate. The presence of these bioactive secondary metabolites in the leaves and flower of *Justicia adhatoda* Linn are correlated with their medicinal applications. The present findings provide basic information that makes *Justicia adhatoda* Linn a suitable plant of economic importance having medicinal values.

Further research for isolation and differentiation of the different bioactive ingredient compounds of *Justicia*.are still in progress.

Research Article

Table 1: Phytochemical components in leaves and flower of *Justicia adhatoda* Linn. (nongmangkha angouba)

Plant part of. <i>Justicia adhatoda</i> Linn.	Total carbohydrate (mg/g fresh wt.)	Soluble protein (mg/g fresh wt.)	Total phenols (mg/g dry wt.)	Flavonoids (mg/g dry wt.)	Alkaloids (mg/g dry wt.)
Leaf	16.1 ±0.21 *	7.8 ±0.14	32.1 ±0.31	37.9 ±0.14	1.09 ±0.22
Flower	08.2 ±0.003	2.5 ±0.04	22.8 ±0.72	29.2 0.032	1.08 ±0.22

* Standard error of the mean (n=3)

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