

# Phytochemical Screening of *Solanum nigrum* L and *S.myriacanthus* Dunal from Districts of Upper Assam, India.

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## ABSTRACT

The present investigation designed to evaluate the phytochemical screening on leaf extract of *Solanum nigrum* L and *S.myriacanthus* Dunal from districts of Upper Assam. Three districts were selected such as Sivasagar, Dibrugarh and Lakhimpur etc. The phytochemical constituents like alkaloids, saponins, tannins, flavonoides and proteins of both species in dry and shady areas was investigated qualitatively. The results reveals that the protein is more abundant on *Solanum nigrum* L of shady areas than *S. myriacanthus* Dunal as comparatively of dry areas of three different districts of the same. Apart from protein, other phytochemical constituents such as alkaloids, saponins, tannins, flavonoides are more or less presence in both species of the study areas. The study scientifically validates the use of both species in traditional medicine.

**Keywords:** Phytochemicals, *Solanum nigrum* L, *S.myriacanthus* Dunal, Upper Assam.

## 1. INTRODUCTION

Medicine from plant sources have been in use in Homeopathy, Ayurvedic, Allopathy and in traditional medicine since time immemorial. Medicinal plants plays a significant role among the traditional and modern systems. Their use have been multiplied through various researches and application due to a number of side effects from use of synthetic drugs, antibiotics and high cost. The people of rural area are mainly depending on the traditional medicine for curing their ailments because of the non availability of modern medicines and hospitals. In developing countries, 80 % of the population still use traditional folk medicines obtained from natural resources [1]. In India, with more than 75 % of the population residing in rural areas [2] close to the natural resources, rich traditions of utilizing medicinal plants have existed among indigenous peoples for age.

The curative properties of medicinal plants are mainly due to the presence of various complex chemical substances of different composition which occur as secondary metabolites [3]. Medicinal plants form a large group of economically important plants that provide the basic raw materials for indigenous pharmaceuticals [4]. The medicinal value of plants lies in some chemical substances that produce a definite physiologic action on the human body. The phytochemical research based on ethno pharmacological information is generally considered an effective approaches in the discovery of new anti-infective agents from higher plants [5].

Knowledge of the chemical constituents of plant is desirable, not only for the discovery of therapeutic drugs but also because such information may be value disclosing new sources of such economic materials as tannins, oils, gums, precursors for the synthesis of complex chemical substances. In addition, the knowledge of the chemical constituents of plants would further be valuable in discovering the actual value of folklore remedies [6].

Phytochemical which possess many ecological and physiological roles are widely distributed as plant constituents. Woody plants can synthesize and accumulate in their cells, a great variety of phytochemicals including alkaloids, flavonoides, tannins, cyanogenic, glycosides, phenolic compounds, saponins, lignins and lignans [7]. Phytochemical exhibit a wide range of biological effects as consequences of their antioxidant properties. Several types of Polyphenols (Phenolic acid, Hydrolysable tannins and Flavonoids) shows anticarcinogenic and anti mutagenic effects [8].

Plants contain may bioactive chemical substances that produce definite physiological and biochemical actions in the human body. These bioactive constituents are alkaloids, tannin, flavonoids, phenolic compounds etc [9], [10]. Plant derived natural products have received considerable attention in recent years due to diverse pharmacological properties, including antioxidant and antitumor activity [11].

*Solanum nigrum* L and *S. myriacanthus* Dunal are also important aspects of medicinal plant resources for treatment of primary health care. *Solanum nigrum* L commonly as Black nightshade is a dicot weed in the Solanaceae family. It is an annual herbaceous plant of 10-60 cm high with a green, smooth and semi-climbing stem. The opposite leaves, with whole limb, oval and diamond shape are slightly cogged. It is a rather common species in wet woods, near river, waste land, old field, ditches roadside and cultivated land.

*Solanum myriacanthus* Dunal which is known as *Solanum khasianum* in Assamese called Kotahi bengena belonging to Solanaceae family. It is a biannual herbaceous plant. It is 1-2 m tall with young parts. hirsute pilose or glandular hairy, stem with hooked, leaves opposite upto 22 cm long, ovate, acute, sinute or pinnatifid and prickly on both surface, petiole prickly, flowers white in sessile or sub-sessile few flowered lateral cymes, berry globose, yellow when ripe. It is frequent to common along roadsides, river bund, in waste plus, infrequently in cultivated fields or frequent in tea fields.

Several workers have studied the phytochemical constituents of different plant species from time to time in different parts of the world. Certain authors have reported phytochemical studies of *Solanum nigrum* L.[12],[13],[14]. Other workers have worked on phytochemical constituents of different medicinal plants such as [15],[16],[17],[18],[19],[20],[21],[22],[23][24]. The phytochemical studies of *Solanum nigrum* L and *Solanum myriacanthus* Dunal of districts of Upper Assam areas is so far limited. Therefore, an attempt was made to evaluate the phytochemical constituents of *Solanum nigrum* L and *Solanum myriacanthus* Dunal from districts of Upper Assam in the present investigation.

## 2. Materials and Methods

### 2.1 Plant Collection and Identification

Fresh samples of *Solanum nigrum* L and *S.myriacanthus* Dunal free from disease were collected from dry and shady areas of different localities of Sivasagar, Dibrugarh and Lakhimpur districts etc. The plant materials were identified as per method [25] and herbarium deposited in Department of Life Sciences, Dibrugarh University, Assam.

### 2.2 Preparation of Plant Material

The leaves were washed thoroughly 2-3 times with running tap water, leaf material was then air dried under shade. After complete shade drying the plant material was grinded in the mixer, the powder was kept in small plastic bags with proper labelling.

### 2.3 Extraction of Plant Material

Preparation of aqueous extracts: In the first grinded leaves materials of 5 gm weighed using an electronic balance & 5gm of plant material were crushed in 25 ml of sterile water, then heat at 50- 60 c and it was filtered using Whatman filter paper no.1. then filtrate was centrifuged at 2500 rpm for 15 minutes & the filtrate was collected in sterile bottles and was stored by refrigeration at 5° C until use [26].

### 2.4 Preliminary Phytochemical Analysis:

This was carried out according to the methods described by [27]. Qualitative phytochemicals analysis of the crude powder of the *Solanum nigrum* L and *S.myriacanthus* Dunal for the tests of phytochemicals as a alkaloid, saponin, tannins, flavonoides and protein etc [28] were made as shown below

#### 2.4.1 Test for Alkaloides:

200 mg plant material were taken and added 10 ml Methanol and then filtered. After that 2 ml filtrate were taken and added 1 % HCL with steam 1 ml filtrate and 6 drops Mayer's reagent/Wagners reagent/ Dragendorffs reagent. It produced Creamish/Brown/Red/Orange precipitate indicate the presence of alkaloids.

#### 2.4.2 Test for Saponins:

Approximate 0.5 ml filtered were taken and added 5 ml distilled water. Frothing persistence indicate presence of Saponins.

#### 2.4.3 Test for Tannins:

200 mg plant material were taken and added 10 ml distilled water and then filtered. After that 2 ml filtered were taken and added 2 ml FeCl<sub>3</sub> Blue. Then black precipitate indicate the presence of Tannins & Phenols.

#### 2.4.4 Test for Flavonoides:

200 mg plant material were taken and added 10 ml Ethanol, then filtered. After that 2 ml filtrates were taken and added conc HCL and magnesium ribbon. Pink, Tomato, Red colour indicate the presence of Flavonoides, Glycoside.

#### 2.4.5 Test for Protein :

Take 3-5 ml of the plant extract or filtrate and added few drops of Millons reagent and mix thoroughly and heat. White precipitate is formed and the precipitate turns brick red after boiling.

### 3. RESULTS:

After the analytical study, the different phytochemical constituents analysed from *Solanum nigrum* L and *S.myriacanthus* Dunal are shown in table 1 and 2.

**Table 1**, showed that Tannins were abundant on leaf extract of *Solanum nigrum* L of Dibrugarh district but alkaloid,saponin,tannins,flavonoids are moderately present in shady of 3 different districts as comparatively due to the presence of dry area of the same. The results also revealed that protein is abundant on leaf extract of *Solanum nigrum* L in shady areas as comparatively in dry areas of 3 districts.

**Table 1:** Qualitative Phytochemical Screening of *Solanum nigrum* L from Districts of Upper Assam

Name of the Phytochemicals	Sivasagar		Dibrugarh		Lakhimpur	
	Dry area	Shady area	Dry area	Shady area	Dry area	Shady area
<b>Alkaloid</b>	+	++	+	++	+	++
<b>Saponin</b>	+	++	+	++	+	++
<b>Tannins</b>	+	++	+	+++	+	++
<b>Flavonoids</b>	+	++	+	++	+	++
<b>Protein</b>	++	+++	++	+++	++	+++

**Note Book:** +++ = Abundant, ++ = moderately presence, + = present

**Table 2**, it was observed that saponin and tannins are abundant on leaf extract of *Solanum myriacanthus* Dunal in dry areas of Dibrugarh and Lakhimpur district than Sivasagar one. On the other hand, alkaloid, flavonoids, proteins are moderately present in leaf extract of *Solanum myriacanthus* Dunal in dry areas of Sivasagar, Dibrugarh district but in Lakhimpur, the result indicate the presence of alkaloid. In shady areas, alkaloid and saponin are moderately present on leaf extract of *Solanum myriacanthus* Dunal of these study sites as comparatively than other phytochemical constituents.

**Table 2:** Qualitative Phytochemical Screening of *Solanum myriacanthus* Dunal from Districts of Upper Assam

Name of the Phytochemicals	Sivasagar		Dibrugarh		Lakhimpur	
	Dry area	Shady area	Dry area	Shady area	Dry area	Shady area
<b>Alkaloid</b>	++	+	++	+	+	+
<b>Saponin</b>	++	+	+++	++	++	+
<b>Tannins</b>	++	+	++	+	+++	++
<b>Flavonoids</b>	++	+	++	+	++	+
<b>Protein</b>	++	+	++	+	++	+

**Note Book:** +++ = Abundant, ++ = moderately presence, + = present

### 4. DISCUSSION

The qualitative screening of phytochemical constituents on leaf extract of *Solanum nigrum* L and *S.myriacanthus* Dunal reveals the presence of alkaloid,saponin,tannins,flavonoids,proteins etc.Pure isolated alkaloids and their synthetic derivatives are used as basic medicinal agents for their analgesic, antispasmodic and bacterial effects[29],[30].They exhibit marked physiological activity when administered to animals. In the present study, the observed alkaloid content in *Solanum nigrum* L and *Solanum myriacanthus* Dunal could be responsible for their much acclaimed medicinal values though the exact mode of action is poorly understood. Saponin are a special class of glycosides which have soapy characteristics [31]. It has the property of precipitating and coagulating red blood cells. Some of the characteristics of saponin include formation of forms in aqueous solution, haemolytic activity, cholesterol binding properties and bitterness [32],[7].These properties bestow high medicinal activities on the leaf extract from *Solanum nigrum* L and *S.myriacanthus* Dunal. Tannins are also known antimicrobial agent. Tannins(commonly referred to as tannic acid) are water soluble polyphenols that are present in many plant foods. Tannins are water soluble plant polyphenols that precipitate proteins. Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional protein unavailable for them[33].The growth of many fungi, yeasts, bacteria and viruses was inhibited by tannins[34].Phytotherapeutically tannin containing plants are used to tract nonspecific diarrhoea,inflammations of mouth and throat and slightly injured skins[35].In this study, the presence of tannins might have accounted for the sharp taste of both *S.nigrum* L and *S. myriacanthus* Dunal and have been reported to hasten the healing of wounds and inflamed mucous membrane[36]. Flavonoids are potent water soluble antioxidants and free radical scavengers, which prevent oxidant cell damage have strong anticancer activity[37],[7].Flavonoids in intestinal tract lower the risk of heart disease. As antioxidants, flavonoids from these plants provide anti-inflammatory activity [7].This may be reason *Solanum nigrum* L and *S.myriacanthus* Dunal have been used for the treatment of wounds, burn and ulcers in herbal medicine. Apart from these secondary metabolites, due to the abundantly presence of protein in leaf of *Solanum nigrum* L than *S.myriacanthus* Dunal which can serve many of the medicinal

properties exhibited by the plants. For example, a variety of proteins have been isolated in medicinal plants and found to be bioactive against certain ailments [38],[39].

The presence of the above said phytochemical constituents could account for the much medicinal properties of both the species for the treatment of various diseases/ailments such as cough, liver problem, stomach-ache, skin diseases, inflammation, jaundice, tooth ache etc which are reported by various workers[40],[41],[42].

## 5. CONCLUSION

The present investigation revealed that the leaves of *Solanum nigrum* L and *S.myriacanthus* Dunal have a potential source of useful drugs due to the presence phytochemicals and can be utilized in the treatment of many diseases/ailments and also be exploited for use in the pharmaceutical and cosmetic industries. However further studies required to isolate the active principle from the crude extract for proper drug development.

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