

QUANTITATIVE PHYTOCHEMICAL ANALYSIS OF SOLANUM NIGRUM PLANT  
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## ABSTRACT

Solanum Nigrum plant is an important medicinal plant. The present study deals with the analysis of Phytochemical constituents such as Alkaloids, flavonoids, glycosides, steroids, carbohydrates, protein, and amino acids were analysed. Alkaloids, flavonoids, Phenolic, diterpenes and saponin were present in ethanol extracts of the plant. These phytochemical constituents used for treatment of many diseases. This plant can be utilized and used in the pharmaceutical and cosmetic industries.

**KEYWORDS:** Solanum Nigrum, phytochemical, medicinal plant.

## INTRODUCTION

Herbal medicines are currently in demand and their popularity is increasing day by day. About 500 plants with medicinal use are mentioned in ancient literature and around 800 plants have been used in indigenous systems of medicine. India is a vast repository of medicinal plants that are used in traditional medical treatments (Chopra *et al.*, 1996). The various indigenous systems such as Siddha, Ayurveda, Unani and Allopathy use several plant species to treat different ailments (Rabe and Staden, 1977).

Medicine from plant sources have been in use in Homeopathy, Ayurvedic, Allopathy and in traditional medicine since time immemorial. A medicinal plant plays a significant role among the traditional and modern systems. Their use has 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 (Arokiyaraj, S. (2013). In India, with more than 75 % of the population residing in rural areas (Ashalatha and Gopinath) close to the natural resources, rich traditions of utilizing medicinal plants have existed among indigenous peoples for age, (pranob gogoi and M islam, 2012).

*Solanum nigrum* is a medicinal plant member of the Solanaceae family of plants. *Solanum nigrum* commonly known as *Makoi* or black nightshade, Black nightshade is a fairly common herb or short-lived perennial shrub sometimes purple-green, hairy with glandular and simple, non glandular hairs; prickles absent. It has a height of 30-120 cm, leaves 4-7.5 cm and 2-5 cm wide; ovate to heart shaped, with wavy or large-toothed edges; both surfaces hairy or hairless; petiole 1-3 cm. The berry is mostly 6-8 m, dull black or purple black. The flowers have petals greenish to whitish, recurved when aged and surround prominent bright yellow anthers (Zubair and Anwar, 2012).

*Solanum nigrum* is an erect annual herb. The juice of the plant is diuretic and used to cure chronic enlargement of liver, piles, dysentery and fever (Kumar *et al.*, 1997). The drug made from this plant acts as laxative, improve appetite and this is administered against asthma, leprosy skin diseases (Bhattacharjee 2001). Due to large scale and unprohibited exploitation of the natural resource by the pharmaceutical industry, the wild stock of this medicinally important plant has been markedly depleted. *S. nigrum* can be propagated by seeds and vegetative cuttings. Root behaviour of stem cutting and non availability of seeds due to over exploitation are major get back for plant propagation processes are season dependent and can be achieved only during monsoon period. The application of *in vitro* techniques might be of great value as an alternative method to achieve rapid multiplication independent of Season (Fay, 1994). *Solanum nigrum* different parts of plant are traditional used in the oriental systems of medicine for various

purposes, leaves are used for treatment of ringworm and for dressing of warts, stomachache, stomach ulcer, liver tonic, indigestion, Fruits are given to kids to stop bed wetting, blindness, conjunctivitis, glaucoma, trachoma, cataract, Leaf paste are used to rabies, wound healing, and whole plants are used to cough, burns and dermal affections, snake bite, Roots are used to increase fertility in women, asthma and whooping cough (Jain *et al.*, 2011).

## MATERIAL AND METHOD

**Plant Collection and Identification** Fresh samples of *Solanum nigrum* L and *S.myriacanthus* Dunal free from disease were collected.

**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 labeling.

**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.

### Preliminary Phytochemical Analysis

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 were made as shown below

#### A. Test for Carbohydrates

**Molisch's test:** In a test tube containing extract of drug, added two drop of freshly prepared 20% alcoholic solution of  $\alpha$ - naphthol and mixed concentrated sulphuric acid along the sides of the test tube. If carbohydrate present purple color or reddish violet color produce at the junction between two liquids.

#### B. Test for Alkaloids

**Dragendorff's Test:** Few mg of extract of the drug dissolved in 5 ml of water added 2 M hydrochloric acid until an acid reaction occurred; 1 ml of dragendorff's reagent (potassium bismuth iodide solution) was added an orange red precipitate indicated the presence of alkaloids.

#### C. Test for Steroids and Sterols

**Liebermann's Burchard reaction:** The test extract solution was dissolved in 2 ml of chloroform in a dry test tube. Now 10 drops of acetic anhydride and 2 drops of concentrated sulphuric acid were added. The solution became red, then blue and finally bluish green in color.

#### D. Test for Glycosides

**Legal's test:** Extract solution dissolved in pyridine then sodium nitroprusside solution was added to it and made alkaline. Pink red colour indicated the presence of glycosides.

#### E. Test of Saponins

1 ml of alcoholic extract was diluted with 20 ml distilled water and shaken in graduated cylinder for 15 minutes. One cm layer of foam indicated the presence of saponins.

#### F. Test for Flavanoids

**Shinoda test:** In the test tube containing alcoholic extract of the drug added 5 - 10 drops of dil. hydrochloric acid followed by the small piece of magnesium. In presence of flavonoids a pink, reddish pink or brown color was produced.

#### G. Test for Tannins

To the sample of the extract, ferric chloride solution was added appearance of dark blue or greenish black colour indicated the presence of tannins.

#### H. Test for Triterpenoids

In the test tube, 2 or 3 granules of tin was added, and dissolved in 2 ml of thionyl chloride solution and test solution was added. Pink colour was produced which indicates the presence of triterpenoids.

#### I. Test for Protein and Amino acid

**Biuret's test:** To 2 - 3 ml of the extract of drug added in 1 ml of 40 % sodium hydroxide solutions and 2 drops of 1 % copper sulphate solution mix thoroughly, a purplish - violet or pinkish - violet colour produced that indicates the presence of proteins.

#### J. Test of Resins

Dissolved the extract in the acetone and pore the solution in the distilled water. Turbidity indicated the presence of resin.

#### K. Test of Fats or Fixed oils

Using sodium hydroxide: The extract was mixed in one ml 1 % of copper sulphate solution then added 10 % sodium hydroxide solution a clear blue solution was obtain which showed glycerin present in sample.

## RESULT

### Results of phytochemical Testing

A small portion of the dried extracts were subjected to the phytochemical test using Kokate (1994) methods to test for alkaloids, glycosides, tannins, saponins, flavonoids and steroids separately for extracts of all samples. Small amount of each extract is suitably resuspended into the sterile distilled water to make the concentration of 1 mg per ml. The outcomes of the results are discussed separately in the table.

**Table 1: Result of Phytochemical Screening of Extracts.**

| S.No. | Constituents | A   | B   | C   | D   | E   |
|-------|--------------|-----|-----|-----|-----|-----|
| 1.    | Alkaloids    | -ve | +ve | +ve | +ve | +ve |
| 2.    | Glycosides   | -ve | -ve | -ve | -ve | -ve |
| 3.    | Flavonoids   | -ve | +ve | +ve | +ve | +ve |
| 4.    | Steroids     | -ve | -ve | -ve | -ve | -ve |
| 5.    | Phenolics    | -ve | -ve | +ve | +ve | +ve |
| 6.    | Amino Acids  | -ve | -ve | -ve | -ve | -ve |
| 7.    | Carbohydrate | -ve | -ve | -ve | -ve | -ve |
| 8.    | Proteins     | -ve | -ve | -ve | -ve | -ve |
| 9.    | Saponins     | -ve | -ve | -ve | +ve | +ve |
| 10.   | Diterpines   | -ve | -ve | +ve | +ve | +ve |

A- Pet. Ether, B- Chloroform, C- Ethyl acetate, D- Ethanol, E- water

From the results obtained it is clear that the *Solanum nigrum* plant shows the presence of alkaloids, glycosides, saponins, phenols, flavonoids, amino acid terpenoids, were found present in seed parts when extracted with different solvents using soxhlet extraction procedure.

## CONCLUSION

In this study it is revealed that the *Solanum nigrum* plant important natural source for useful drugs. Because of this plant contain phytochemicals. In the treatment of many disease these plant can be utilized and used in the pharmaceutical and cosmetic industries. By performing more studies on the crude extract of these plants proper drug development is possible.

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