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PRELIMINARY PHYTOCHEMICAL SCREENING OF TWO MEDICINAL PLANTS-*SOLANUM NIGRUM* LINN. AND *LEUCAS ASPERA* (WILLD.) LINN.

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ABSTRACT: The medicinal plants are useful for healing, as well as, for curing of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables, and roots that have defense mechanism and protect from various diseases. The leaves of *Solanum* are used to treat mouth ulcers that happen during winter periods in Tamil Nadu. Leaves of *Leucas* are considered useful in chronic rheumatism, psoriasis, and other skin eruptions. The preliminary phytochemical screening showed the presence of almost all the phytoconstituents in the different solvent extracts used. Protein and carbohydrate were found to be absent only in chloroform, petroleum ether, and benzene extracts. The presence of various other phytoconstituents such as alkaloids, flavonoids, steroids, terpenoids, quinone, phenols, starch, cellulose, oil, and fat shows the therapeutic use of the plants both *S. nigrum* as well as *L. aspera* for accelerating the wound healing process.

INTRODUCTION: Phytochemicals are primary and secondary compounds. Secondary compounds include terpenoids, alkaloids and phenolic compounds¹⁶. The increasing the use of herbs for healthcare and the herbal medicine boom in recent years has imposed a great threat to the conservation of natural resources and endangered plant species. The high demand of medicinal plants in both domestic and international markets has resulted in the over-harvesting of certain limited natural resources, thus depriving the forest resources at an unprecedented rate and causing serious ecological damage. Important components of the forest ecosystem are trees, which provide food, fuel, construction, industrial and medicinal products.

Also, they are recognized as the critical elements in maintaining the stability of the world atmosphere⁷. The World Health Organization supports the use of traditional medicine, provided they are proven to be efficacious and safe. Phytochemicals are active components found in plants that act against diseases. They are non-nutritive compounds that contribute to flavour, color. Many phytochemicals have antimicrobial activity and reduce the risk of many diseases.

S. nigrum has been extensively used in traditional medicine for various ailments such as pain, inflammation and fever¹⁷. Evaluation of phytochemical constituents of the leaves, flowers, and fruits of three valuable medicinal species of the genus *Solanum* has been carried out by Gnana Sundari *et al.*⁵ Solamargine is the main constituent responsible for its anticancer activity⁸. This herbal plant is used to treat asthma, blood vomiting, reducing blood glucose level and bilious matter phlegmatic rheumatism and ulcer¹³. The leaf

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extract of *Leucas* contains chemical constituents such as sterols, fatty acids, lactones, long chain compounds, aliphatic ketols and phenols^{10, 11}. Leaf juice is used by villagers to arrest bleeding from cuts and bruises in animals. The phytochemical components of the aqueous leaf extracts of *Leucas martinicensis* have been analyzed by Eze *et al.*⁴The present study deals with the screening of phytoconstituents present in the two test plants.

MATERIALS AND METHODS:

Collection of Plant Samples: The fresh leaves of *Solanum nigrum* and *Leucas aspera* were obtained from Nelliyalam village in Nilagiri District of Tamil Nadu, India.

Preparation of Leaf Powder: The leaves of both the medicinal plants taken for the present study were collected, cleaned and air dried, under shade for about three weeks. After drying, the leaves were then powdered using a mixer. This fine powder was analyzed for the presence of various phytoconstituents.

Preliminary Phytochemical Analysis: The leaf powders of both the plants were dissolved in various solvents, and the preliminary phytochemical tests were carried out using Harborne⁶.

RESULTS AND DISCUSSION: The phytochemical screening study carried out on the two medicinal plants showed the following results.

Preliminary Phytochemical Analysis of Leaves of *Solanum nigrum* and *Leucas aspera*: In the present study, a preliminary phytochemical analysis was carried out using dry leaf powder to identify the active constituents such as, alkaloids, flavonoids, steroids, terpenoids, quinone, oil and fat, phenols, starch, anthocyanin, protein, carbohydrate and cellulose present in the leaves of both the medicinal plants. The dried and powdered leaves of *L. aspera* and *S. nigrum* were extracted using various solvents *viz.*, water, ethanol, chloroform, petroleum ether, and benzene and the extracts thus obtained were analyzed for the presence or absence of secondary metabolites.

The phytochemical screening of *S. nigrum* leaves showed the presence of alkaloids, flavonoids, steroids, terpenoids, quinone, phenols, starch, cellulose, oil and fat in all the five extracts used **Table 1**. Anthocyanin was absent only in water and chloroform extracts. Protein and carbohydrate were present only in water and ethanol extracts **Table 1**. Dried powder of the whole plant of *Stevia rebaudiana* was extracted with *n*-hexane, ethyl acetate, and ethanol which were subjected to various chemical tests to ascertain the main constituents of the plant³. The results revealed the presence of significant amounts of alkaloids, glycosides, tannins, and flavonoids in ethanol extract, while, the other two extracts contain a moderate amount of the chemical constituents.

TABLE 1: PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *SOLANUM NIGRUM* IN VARIOUS SOLVENT EXTRACTS

Name of the phytochemical test	Water	Ethanol	Chloroform	Petroleum ether	Benzene
Alkaloids	+	+	+	+	+
Flavonoids	+	+	+	+	+
Steroids	+	+	+	+	+
Terpenoids	+	+	+	+	+
Quinone	+	+	+	+	+
Phenols	+	+	+	+	+
Starch	+	+	+	+	+
Anthocyanin	-	+	-	+	+
Protein	+	+	-	-	-
Carbohydrate	+	+	-	-	-
Cellulose	+	+	+	+	+
Oil & fat	+	+	+	+	+

“+” – Present; “-” – Absent

Sridhar *et al.*¹⁵ have shown that *Solanum nigrum* L. is an essential herbaceous medicinal plant. The herb is antiseptic, antidysenteric, antidiuretic and is recommended in Ayurveda for the management of gastric ulcers. Phytochemical screening of the

crude extracts revealed the presence of secondary compounds such as alkaloids, flavonoids, steroids, tannins and phenols. Further studies are still necessary to clear up a mechanized way how the plant contributes to cytotoxic and other

pharmacological properties². The dry leaf powder extracts of *L. aspera* showed the presence of alkaloids, flavonoids, steroids, terpenoids, quinone, phenols, starch, cellulose, oil and fat in all the solvent extracts. Protein and carbohydrates were

present in aqueous and ethanol extract **Table 2**. Ramalingam *et al.*¹² have shown the presence of alkaloids, tannins, saponins, flavonoids, phenolic compounds and glycosides in *Leucas aspera*.

TABLE 2: PRELIMINARY PHYTOCHEMICAL ANALYSIS OF LEUCAS ASPERA IN VARIOUS SOLVENT EXTRACTS

Name of the Phytochemical test	Water	Ethanol	Chloroform	Petroleum ether	Benzene
Alkaloids	+	+	+	+	+
Flavonoids	+	+	+	+	+
Steroids	+	+	+	+	+
Terpenoids	+	+	+	+	+
Quinone	+	+	+	+	+
Phenols	+	+	+	+	+
Starch	+	+	+	+	+
Anthocyanin	+	-	-	+	+
Protein	+	+	-	-	-
Carbohydrate	+	+	-	-	-
Cellulose	+	+	+	+	+
Oil & fat	+	+	+	+	+

“+” – Present; “-” – Absen

Chen *et al.*¹ have carried out analysis in *S. nigrum* fruit and has reported the presence of two novel disaccharides along with protein, fiber, carbohydrate and minerals like magnesium, phosphorus and vitamin C, B, and folic acid. Alkaloids such as soladunalinidine, solasonine and solamargine have been isolated from the leaf of *Solanum* species⁹. 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, toothache, *etc.* which have been reported by some workers¹⁵.

CONCLUSION: The naturally occurring phenolic compound in the two medicinal plants could be considered as a potential remedy for breast and liver cancer. In lieu of the nutrient and chemical constituents present in the two medicinal plants namely *S. nigrum* and *L. aspera* both the plants could be supported as safe and highly important medicinal plants for mankind.

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