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Blackberry Nightshade: An Updated Overview on Solanum Nigrum

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ABSTRACT:
Herbal medicines have been used for variety of aliments since ancient times. Herbal medicines are commonly used to treat a variety of infection diseases in humans. Solanum nigrum, additionally referred to ask black nightshade, is a plant species that belongs to the Solanaceae family and is cultivated globally for its possible medicinal properties. In the conventional medical systems, it is also utilized as a food source and as a fruit supply. it has medicinal properties that include diuretic, antipyretic, hepatoprotective, tonic, antioxidant and anti-inflammatory properties. A range of aliments, including tonsilitis, wing worm, pneumonia, hurting teeth, stomach aches, inflammation, fever and tumour, can be treated with it. A phytochemical analysis found that the plant was rich in phenol, alkaloids, terpenoids, flavonoids, saponins and steroids.

KEYWORDS: Blackberry nightshade, Phytoconstituents, Anticancer, Extraction.

I. INTRODUCTION:

History:

The historical Unani medical literature refers to it as Inabus Salab. It takes on several shapes. Mako is an upright-growing, small, delicate Unani herb. It is found all throughout the planet. It grows in India's desert regions. The herb does not last very long. Solanum Nigrum is one species of the Solanaceae family. The plant's many activities have been linked to a multitude of chemical components, including proteins, carbohydrates, coumarins, alkaloids, flavonoids, tannins, saponins, glycosides, and phytosterols. [1, 5, 7]

Biological source:

Synonyms:

Kannada: Ganike, Elachi, and Ganikesopu Gida Garden night shadow, garden night shade, and black night shade plant In Hindi: In Malayalam, Makoya, mokiki Manatakkali, mulaku-thakkali; in Sanskrit, Dhvansamaci. Black night shadow in the USA, Lung-kwel in Taiwan, and Yerba mora in Argentina Sort natskgge in Denmark; Makhoi, Nunununia in India; Kanper makoo in Pakistan; Black berry night shade in Australia. [6, 9]

Biological source: Its biological source is the dried whole plant of the species Solanum nigrum Linn. [2, 3, 6, 10]

Family: This plant belongs to the family Solanaceae. [2, 3, 6, 10]

Taxonomy:

Table 1.1[8, 9, 10, 11]

• Kingdom	Plantae
• Subkingdom	vascular plants
• Division	Magnoliophyte
• Super division	seed plants

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• Class	Magnoliopsida
• Subclass	solanales
• Genus	Solanum
• Species	Nigrum
• Authority	Linn.

Microscopy:

Black nightshade is one common herb or short-lived perennial. They live in many wooded places and disturbed environments. The length and width of its leaves were measured at 4.0 to 7.5cm (1.6 to 3.0 inches) and 2 to 5cm (one to two inches), respectively. Its height varied from 12 to 47 inches (30 to 120 cm). They resemble an oval to a heart. The broad, serrated edges are uneven. There are hairs on both surfaces, or none at all. The petiole bears wings on top and is 0.5–1 inch (1-3 cm) length. The blossoms' recurved petals turn from green to white with age. Then they surround the strikingly bright yellow anthers. Most of the berries are 6 to 8 mm (0.24 in) in size and are dull black or purplish black in colour.

It features a single layer of oval or tangentially oriented epidermis in the petiole area, which is visible on both the petiole and the midrib of the leaf. It should be covered by the cuticle layer; the top and bottom epidermis cells should be rounded and oval-shaped when viewed through the midrib of a leaf; the epidermis layer should be in a single layer; the collenchyma's layer should be two to three layers; The parenchyma's spherical cells have incredibly thin cell walls. On both the upper and lower surfaces of the leaf lamina, anisocytic stomata are occasionally observed, with a higher concentration on the lower surface. There are between seven and ten vein islets, and the palisade ratio is 2-4. [6, 8, 9]

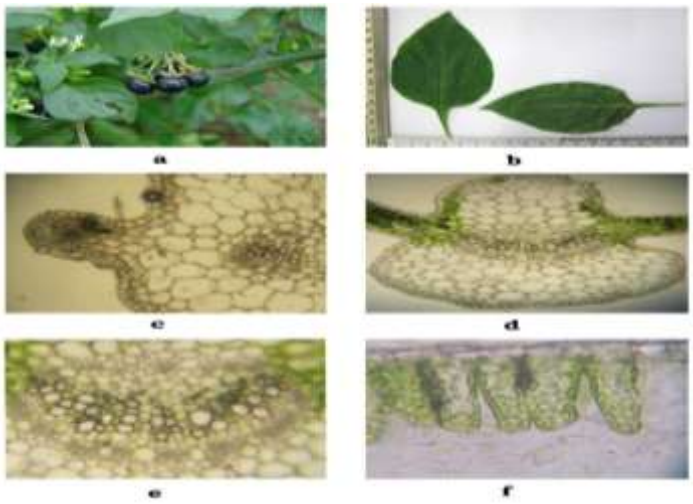

Figure 1.1

Different parts of a selected plant that has medicinal values:

Table 1.2[7]

State and country	Part used	Preparation	Conditions	References

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• Tanzania, Africa	Leaf	Leaves are pounded and applied topically	Treatment of ringworm	Moshi et al (2009)
	Leaf	Leaves are pounded and baked	Used for dressing of warts	
	Fruit	Ripe fruits in edible form	Given to kid to stop bed wetting	
• Tunisia, Africa	Sap	maceration	Erysipelas (acute streptococcus bacterial infection)	Lepromata and ghedria (2009)
• United republic of Congo, Africa	Whole plant	Maceration	Snake bite/sting by a venomous animal	Chifundera (1998)
• Algeria, Africa	Fruit	Diluted infusion of berries	Blindness; conjunctivitis; glaucoma; trachoma; cataract	Boulos (1983)
	Whole plant	Decoction	Burns and dermal affections	
• Tamil Nadu, India	Leaf	Fresh leaves cooked with onion bulbs and cumin seeds or leaf juice can also be taken orally	Stomach-ache; stomach ulcer	Sivaperumal et al (2010) Ramya and Jayakumar (2009); Ignacimuthu al (2006); Muthu et al (2006)
	Leaf paste	Applied directly	Rabies; wound healing	
	Whole plant	Taken as food	cough	
• Himalayan region, India	Leaf	---	Liver tonic; indigestion	Kala (2005)
• Thar desert, India	Roots	Roots are boiled with a little sugar	Increase fertility in women	Parveen et al (2007)
• Assam, India	Roots	Juice of roots is extracted	Asthma and whooping cough	Sikdar and Dutta (2008)

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Substitute/adulteration:

- Phytolacca americana
- Ailanthus glandulous. [1,2,9]

GEOGRAPHIC DISTRIBUTION:

Several countries, including Europe, North America, South America, Brazil, Peru, Colombia, India, Afghanistan, Bangladesh, Bhutan, Indonesia, Iraq, Iran, Japan, and Pakistan, were among those that first reported on its finding. It is a common plant found throughout India, growing on plains, hills, and disturbed places. The plant can withstand a wide range of environmental conditions and flourishes in both cultivated and uncultivated places.[9]

Figure 1.2

COLLECTION AND CULTIVATION:

To begin with, select fragile, young leaves for harvesting; take care not to overstress the roots; harvest the plant early in the morning when the nutrient content is highest. Additionally, clean the entire plant by running water twice to get rid of any contaminants, debris, and pesticides. In order to protect the beneficial components, we must dry in a well-ventilated environment and stay out of direct sunlight.[12]

PHYTOCONSTITUENTS:

Flavonoids, tannins, proteins, carbohydrates, coumarins, phytosterols, steroidal alkaloids, steroidal saponins, and glycoproteins are a few of the key components. Solamargine, solasonine, and solanigrine are steroidal alkaloids and glycosides found in the berries of the Solanum nigrum Linn plant. Trace levels of these substances may also be present. The concentration of solasodine in the fruits of the Solanum nigrum plant decreased with age, yet generally, the fruits had more solasodine when they were younger. Fruits of the Solanum nigrum species have a high concentration of solasodine; however, as the fruit ages, so does its overall amount and concentration. [1, 3, 5, 7, 8, 9, 10,12]

Table 1.3

Phytoconstituents:

Chemical constitutes	structure

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• Solamargine	
• Solasodine	
• Solanine	
• solasonine	

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USES:

Anti inflammatory

Tissues and migrating cells release leukocytes together with other complex mediators such prostaglandins, leukotrienes, histamines, bradykinin, platelet activating factor, and IL-1 to cause inflammation. Leukotrienes, or LTC4, are lipid mediators that are more common in inflammatory responses. Anti-leukotrienes found in solanum nigrum are being utilized to treat a number of inflammatory diseases, such as asthma and atopic rhinitis. Since (E)-ethyl acetate, a solanum nigrum component that has been found, has the highest leukotriene inhibition, it may find application as an anti-inflammatory pharmaceutical drug. [1, 3, 5, 6-12]

Antioxidant Activity/Degenerative Disease; Anti-aging:

Exogenous antioxidants have the ability to partially control the production of free radicals, which can accelerate aging and be the initial cause of many neurological disorders. [1, 3, 5, 6-12]

Hepatoprotective Activity:

Liver dysfunction and hepatoprotective properties the protective effects of an aqueous extract of the whole plant Solanum nigrum in carbon tetrachloride were evaluated. Glutathione-S-transferases (GSTs) are a family of enzymes that aid in the detoxification of foreign substances. When subjected to CCl4, the expression of the hepatic GST isoforms GST Mu and GST Al decreases whereas GST Pi expression increases. Solanum nigrum extract restored the appearance levels of the GST subunits to regulated values. The mode of action of solanum nigrum is unknown; it may be due to its direct effect on GST subunits or to its neutralization of CCl4. Liver histology analysis provides additional evidence for solanum nigrum's ability to lower the incidence of liver lesions. Furthermore, the effect of S. nigrum extract on thioacetamide-induced liver fibrosis in mice was assessed. [1, 3, 5, 6-12]

Anti proliferative Activity:

Both the crude extracts and the purified components of solanum nigrum demonstrate the plant's antiproliferative effectiveness on a number of cancer cell lines. Dried berries can be used to make crude extracts, but the entire plant is useful. The crude organic extract or its separated components were studied for their antiproliferative effects on tumour cell lines of the cervical (U1424, 25 and HeLa27), breast (MCF-7), colon (HT29 and HCT-116), and liver (HepG2). To determine these extracts' antiproliferative qualities, it was examined how cytotoxic they were to cells. [1, 3, 5, 6-12]

Antiseizure Activity/ Epilepsy

The word "seizures" describes alterations in behaviour caused by synchronous, irregular, and rhythmic firing of brain neuron populations. Forty Modern drugs have not proven to be sufficiently effective in treating seizures; in addition, a number of side effects, such as damage to the central nervous system (CNS), In the experimental setup, picrotoxin, pentylenetetrazol, or electric shock were used to induce seizures in adult albino rats. Rats that were exposed to an aqueous extract of S. nigrum leaves showed significant dose-dependent protection against seizures. [1, 3, 5, 6-12]

Anti-ulcerogenic:

Gastric ulcers have a variety of etiopathogenic causes. Increased proximity to pepsin and corrosive substances in the stomach is the source of ulcers generated by pyloric ligation, but ulcers caused by indomethacin are caused by a decrease in prostaglandin amalgation, which is crucial for the mucosa. Both physiological and psychological aspects contribute to stress, which is detrimental to the gastrointestinal barrier and increases the buildup of pepsin, which leads the stomach mucosa to absorb itself. There are several different etiopathogenic causes of gastric ulcers. Pyloric ligation ulcers are caused by increased proximity to pepsin and corrosive substances in the stomach, whereas indomethacin ulcers are caused by a decrease in prostaglandin amalgation, which is important for the mucosa. Stress is a result of both physiological and psychological factors. Stress damages the gastrointestinal barrier and stimulates the production of pepsin, which causes the stomach mucosa to absorb itself. [1, 3, 5, 6-12]

Analgesic activity:

When the ethanolic extract of the plant Solanum nigrum Linn. is administered to mice, it has been shown to produce potent analgesic effects. The experimental animals were given daily dosages of 0.5 millilitres of one of four plant potencies (2X, 4X, 8X, and 30C) for a total of thirty days. The table presents the data in a tabular format based on performance relative to time intervals, such as the tenth, twentieth, and thirty-first days of the experiment. The aqueous extract of the leaves of the Solanum nigrum Linn. plant or the methanolic extract of the plant's seeds will have a greater analgesic effect when administered to female rats

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utilizing the tail flick method or the hot plate technique.

Anti allergic activity:

It has been shown that a petroleum ether-based extract from the berries of Solanum nigrum is helpful in reducing the factors related to asthma. In order to better understand the potential medical benefits of treating asthma with berries from the Solanum nigrum plant. [1, 3, 5, 6-12]

Anti-microbial activity:

It has been shown that Solanum nigrum Linn. is active against several types of bacteria. In accordance with CLSI guidelines, an extract's efficacy against E. Coli, Bacillus subtilis, and pseudomonas aeruginosa was evaluated at doses of approximately 10 micrograms, 50 micrograms, and 100 micrograms, respectively. The table was initially used to identify the obstruction zones. Next, it was tested against streptomycin in addition to the usual control. When carrying out the experiment, solvents such as ethanol, petroleum ether, chloroform, ethyl acetate, and isobutanol are typically used. [1, 3, 5, 6-12]

Anti-fungal activity:

Three fungus strains—Penicillin notatum, Aspergillus Niger, and fuserium oxisporium—are employed in the agar diffusion method to evaluate the antifungal activity of the plant extract. Compared to the other leaf and root extracts, the ethanolic seed extract exhibited the maximum activity (about 6.0–16.7 mm) against all of the examined fungal strains. Compared to other strains, ethyl acetate root extracts had a much lower penicillin notatum resistance (4 -4.5mm). [1, 3, 5, 6-12]

Anti-cancer activity:

Three fungus strains—Penicillin notatum, Aspergillus Niger, and fuserium oxisporium—are used as test subjects in the agar diffusion technique, which determines whether or not the plant extract has antifungal activity. Ethanolic seed extract exhibits the maximum activity (about 6.0–16.7 mm) against all other fungal strains examined when compared to the other leaf and root extracts. Compared to strains 4–4.5 mm, cultures of bacteria isolated using ethyl acetate have much lower penicillin notatum resistance. [1, 3, 5, 6-12]

Anti- oxidant activity:

The solanum nigrum linn. extract's capacity to scavenge free radicals is tested using the stable DPPH radical, which would result in a notable absorption band at 517 nm. This indicates that when a free radical scavenger is present, this electron will pair off with another electron, causing decolorization and an increase in the number of electrons taken up. The final product contains a DPPH concentration of 86 micromilligrams along with various additional concentrations of each extract. [1, 3, 5, 6-12]

Anti-larvicidal activity:

Each plant part's crude extract (2, 2.5, 3, 3.5, and 3%), as well as its ethyl acetate solvent extract (40, 60, 80, 100, and 120 ppm), were made in varied concentrations for the testing. Next, 100 millilitres of each extract were put into a different, sterile glass beaker that held between 120 and 150 millilitres. Each beaker is filled with 20 mg of larval feeding, which consists of yeast and powdered dog biscuits, once the larvae have been collected and placed inside. 24 hours after the study began, 48 hours, and 78 hours later, the death rate was noted. When a larva reaches the stage of immobility, it is deemed dead. [1, 3, 5, 6-12]

Anti- diabetic activity:

Oboh et al. (2013)'s descriptions of the -amylase inhibitory test was utilized to evaluate the anti-diabetic activity. "-amylase (0.5 mg mLG1) at 25° C for 10 minutes and 500 litres of extract concentration (10-100 g mLG1)." 500 L of a 1% starch solution is mixed with 0.02 M sodium phosphate buffer, and the combination is then incubated at 25 °C. Following five minutes of boiling in water, one millilitre of 3,5-Dinitrosalicylic acid was added. Ten millilitres of double-distilled water were then added to dilute the mixture, and it was allowed to cool to room temperature. The absorbance at 540 nm was then measured using a spectrophotometer. The alpha amylase inhibitory activity was then calculated and recorded, [1, 3, 5, 6-12]

Cytoprotective activity:

Potawale et al. (2008) prepared an extract of the herb Solanum nigrum Linn. using 50% ethanol. was investigated for its capacity to shield Vero cells from gentamycin damage in vitro. We performed the mitochondrial dehydrogenase activity assay and the Trypan Blue exclusion assay to see whether there was any cytotoxicity. Furthermore, the ethanol extract's potential as a hepatoprotective medication was evaluated by looking for any histology-related abnormalities in the liver under a microscope. The high hepatoprotective effect is a direct result of the

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discovery. Analyzing the liver tissue of a rat after the toxicant (Carbon Tera Chloride) was given revealed severe centrilobular necrosis. Regeneration of healthy liver cells and the removal of vacuoles and necrosis are adverse effects of the treatment. adult male albino The Wistar rats that were used in the study were between 150 and 170 grams in weight. These rats were used in the experiment. The animals were housed in polypropylene cages that had a 12-hour day and 12-hour night cycle and were maintained at a steady 25 degrees Celsius. The animals were divided into six groups, each containing a total of six animals. After that, the different groups were placed in separate cages. Each group received the medication by means of stomach intubation. This was the method of administration that was used. An injection of 0.2 ml of acacia, 20% ethanol, and SNFEt should be given to each of Groups 1, 2, and 3. Groups 2 and 3 should also receive the 20% ethanol injection. The rats were allowed to fast for the entire night prior to receiving ketamine chloride to produce anaesthesia. After blood was drawn, plasma was retrieved and used in a number of biochemical calculations. Blood was used in these computations. A few drops of heparin were given to test tubes that were sterile and totally dry after the blood was drawn. [1, 3, 5, 6-12]

ADVERSE EFFECTS

Larger doses of solanum nigrum can produce the following side effects due to its high toxicity: tachycardia, dizziness, loss of speech, fever, sweating, pupil dilation, blindness, mental confusion, convulsions, coma, and death.

Extended usage of Solanum nigrum may result in adverse effects, such as harm to the kidneys and liver. Consumed repeatedly over an extended period of time, these organs may experience cumulative damage. It is critical to comprehend these risks. and to get medical advice before beginning or extending the long-term use of solanum nigrum or any other herbal medicine.[7]

MARKETED FORMULATION:

Table 1.4

Tabulation of Marked formulations

Solanum nigrum	Types	Brand name	Company name	dose	prize
• Tincture	Mother tincture solanum nigrum (homeopathic medicine)	LDD bioscience pvt limited	LDD bioscience pvt limited	1mg	95
• Tablet	Solanum nigrum berries extract tablet	zyrex	Zyrex ayurveda india	500mg	900
• capsule	Solanum nigrum capsules	neotea	Neoteric dcba ideas	500mg	600
• powder	Solanum nigrum extract makoi extract	Zivisha	Zivisha herbal and organic private limited	Quantity sufficient prescribed by doctor	600/kg

Murakkabat (Unani Formulations) ¬Arq-e-Mako ¬ Arq-e-Birinjasif ¬ Zimad Muhallil ¬ Zimad-e-Kabid ¬ Qurs-e-Istisqa [8]

HOME MADE REMEDIES:

Black nightshade can be applied topically to the skin to treat psoriasis, haemorrhoids, and deep skin infections (abscesses). Respiratory ailments: It has been used in teas and decoctions for centuries in some traditional cultures to cure respiratory ailments like asthma and coughing. [4]

II. CONCLUSION:

Solanum nigrum is a plant that is often used in traditional medicine. plant species that belongs to the Solanaceae family and is cultivated all over the world for its possible medicinal uses. Numerous illnesses, including tonsillitis, wing worms, pneumonia, toothache, stomach discomfort,

fever, inflammation, and tumors, might be brought on by it. Important components have been found and added to several popular polyherbal treatments. This study demonstrated the possible components found in the leaves and fruits of Solanum nigrum, which are used to treat a range of ailments. Further research is required to accurately extract the active components from raw plants for the purpose of manufacturing medicines.

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