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A REVIEW ON MEDICINAL PROPERTIES OF SOLANUM NIGRUM LINN

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ABSTRACT

Medicinal plants are extensively used to cure various infectious diseases in human beings, which are helpfull to minimize the adverse effects of the drugs and these are produces good therapeutic actions, hence Solanum nigrum linn. belongs to solanaceae family. It is the edible plant which is used as a food materials in Indian countries. It has been used to treat various cancers, acute nephritis, leucorrhea, sore throat, toothache, dermatitis, eczema. Approximately 188 chemical constituents have been identified from Solanum nigrum. Among that chemical constituents, steroidal saponins, alkaloids, phenols, and polysaccharides are the main bioactive constituents. In this review, we have explored the pharmacological activities of the Solanum nigrum plant and compiled its vast pharmacological applications to comprehend of multipurpose medicinal agent.

KEYWORDS: Pharmacological activity; Solanum nigrum; Solanaceae.

1. INTRODUCTION

So many varieties of therapeutic plants have been used by humans from the earlier of time, long before “medicines” or “medical science” existed. The genus Solanum contains more than 2,000 species, which are distributed throughu out the world in tropical and subtropical regions. The plant Solanum nigrum Linn. commonly called as black night shade in English, Makoi in Hindi, Kachchipandu in Telugu, Munatakali in Tamil, Piludi in Gujarati & Kamuni in Marathi, Ganake soppu in Kannada. Black nightshade is a fairly rare herb and short lived perennial shrub sometimes purple-green, hairy with glandular or simple, non-glandular hairs; prickles absent. In India, the ‘plant’ is noted for its antiseptic and also antidysenteric properties then it is given internally for cardalgia and gripe. Solanum nigrum elaborates a

wide spectrum of pharmacological properties such as antioxidant, anticancer, hepato protective, neuro protective and antiulcerogenic ones (Arulmozhi et al. 2010). Recently work has been carried on aqueous leaf extract of Solanum nigrum against CCL4-induced oxidative damage in rats (Lin et al. 2008).

2. PLANT PROFILE

2.1. Synonyms

- Kannada : Ganikesopu, Ganike gida,Elachi gida
- English : Garden night shade, black night shade plant,
- Hindi : Makoya,mokoi,
- Sanskrit : Dhvansamaci,
- Malayalam : Manatakkali,mulaku-thakkali.[1]

2.2. Biological source: It consist of the dried and full plant of solanum nigrum linn.

2.3. Family: It belongs to the family of Solanaceae.

2.4. TAXONOMY

- Kingdom: Plantae
- Division:Magnoliophyta
- Class :Magnoliopsida
- Genus :Solanum
- Species:Nigrum
- Authority: Linn.

2.5. GEOGRAPHICAL DISTRIBUTION

It is native to Eurasia and it is introduced by Americans, Australia, and south Africa. It is also distributed in other countries like India, Afghanistan, Bangladesh, Bhutan, Indonesia, Iraq, Iran, Japan, Pakistan, Europe, North America, South America, Brazil, Peru, Colombia. Etc…….[2]

2.6. MACROSCOPY

Solanum nigrum Linn. is a 25-100 cm tall. It is an annual herb with pubescent hairs. It consist of thin bark it is pale yellow in colour, angular and pubescent stems are common. The fruits are dark black in colour and it is have 8 -10mm diameter in nature, flowers are consist of 5 or more petals with regular shape. The leaves are alternate in nature and green in colour, these

are 4 to 7.5cm long and 2 to 5 cm wide; ovate to heart shaped in nature .with large toothed edges; petiole 1 to 3 cm long, base slightly unequal in nature.[3]

2.7. MICROSCOPY

It shows single layered epidermis of oval or tangentially cells in petiole region, both Petiole and midrib of leaf shows covering. T.S of leaf through midrib will shows upper and lower epidermis cells which are round oval shape in nature it should be covered with the cuticle layer, epidermis having warty and glandular trichomes, epidermis layer is in single layer; collenchymas 2 to 3 layered, parenchyma consists of round and thin walled cells.[4]

2.8. CHEMICAL CONSTITUENTS

It consists of major constituents like alkaloids, steroid alkaloids, steroidal saponins and glycoproteins, Flavonoids, tannins, proteins, carbohydrates, coumarins and phytosterols.

The berries of Solanum nigrum Linn. contains 4 steroidal alkaloids, glycosides, Solamargine, Solasonine, α and β- solanigrine Small unripe fruits of Solanum nigrum had a high concentration of solasodine, but the concentration and the absolute amount per fruit decreases after fruit maturation.[5]

2.9. THERAPEUTIC USES

- It is used in the treatment of tuberculosis, nausea and nervous disorders.
- It is used for rheumatic and gouty joints, skin diseases.
- It is also shows the anti cancer activity.
- It is also used in the treatment of bacterial infection cough and indigestion.
- It is also shows the antiproliferative and anti oxidant activity.
- It is used in the anti inflammatory and hepatoprotective activity.
- It acts as a antiseizure activity.
- The fruits are used in dysentery, stomach complaints[6]

3. MEDICINAL PROPERTIES OF SOLANUM NIGRUM LINN.

Solanum nigrum linn is an important medicinal plant and in recent history this plant is reported for various medical properties.

3.1 ANTI INFLAMMATORY ACTIVITY

Inflammation is disorder caused by the release of leukocytes and prostaglandins, leukotrienes, and other complex mediators, now a days pain and inflammation diseases are

common in all the persons, so here solanum nigrum Linn.is used as major role to treat the inflammation. The methanolic extract of berries of plant were administrated to the laboratory animals at the dose of 375 mg/kg body weight and it gave good anti inflammatory activity (Ravi et al., 2009). The most importantly used method to study anti-inflammatory effects in animals is by inducing local edema in rat paw by injecting an irritant agent such as carrageenan. In this method methanolic extract of the plant will shows the better anti-inflammatory activity on induced edema in rat model.[7]

3.2. ANALGESIC ACTIVITY

Ethanolic extracract of solanum nigrum Linn. plant will shows good analgesic activity on mice, Four potency of plant like 2X, 4X, 8X and 30C were administered to the experimental animals at a dose of 0.5 ml/ rat/day for 30 days. All the records are noted in the table based on their response with respect to time interval i.e. 10th, 20th, 30th day of experimental period.

Water extract of leaves and methanolic extact of seeds of solanum nigrum Linn. plant will give better analgesic activity when it is administered to female rats (500 mg/kg body weight) through hot plate method or tail flick method.[8]

3.3. ANTI ALLERGIC ACTIVITY

The petroleum ether extract of Solanum nigrum berries can helpful to inhibits the parameters linked to the asthma disease. Sepide Miraj et al., 2016 Potential of the solanum nigrum berries used in the treatment of asthma was evaluated.[9]

3.4. HEPATOPROTECTIVE ACTIVITY

Aqueous and methanollic extract of Solanum nigrum Llinn.was taken to study the hepatoprotective activity in rats by injecting 0.2ml/kg body weight carbon tetra chloride for 10 days. Solanum nigrum water extract (250 to 500 mg/kg) were administered to rats injected with carbon tetrachloride for 10 to 11 days. The aqueous extracts showed a hepatoprotective effect against carbon tetra chloride-induced liver damage. Which shows the decrease in serum aspartate amino transferase (AST), alanine amino transferase (ALT) and alkaline phosphates (ALP).[10]

3.5. ANTI SEIZURE ACTIVITY

Solanum nigrum Linn. Leaves extract shows anti-seizure activity in mice and rats by intraperitoneal administration. The antiseizure property can be potentiated by using amphetamine. It is helpful to increases the antiseizure properties.[11]

3.6. ANTI MICROBIAL ACTIVITY

Anti microbial activity of solanum nigrum Linn. Extract has been carried out against E. coli, Bacillus subtilis, pseudomonas aeruginosa, by taking extract concentration about 10ìg, 50ìg and 100ìg as per CLSI norms. The hindrance zones were first recorded in the table. Then after it was examined against streptomycin, and standard control. Commonly ethanol, petroleum ether, chloroform, ethyl acetate and iso butanol is used to carryout the experiment.[12]

3.7 ANTI FUNGAL ACTIVITY

Penicillin notatum, Aspergillus niger, Fuserium oxisporium, these fungal strains are used to carried out the antifungal activity, the plant extract is assayed by agar diffusion method. Among all leaves roots extract ethanolic seed extract will shows high activity (around 6.0-16.8mm) against all tested fungal strains. Ethyl acetate root extracts shows less activity against penicillin notatum(4 -4.5mm).[13]

3.8. ANTI CANCER ACTIVITY

The effect of crude polysaccharide is isolated fromS. nigrum it was examined both in vivo and in vitro on U14 cervical cancer cells. No antiprolifreative effect will shows in case of in vitro at doses up to 1 mg/ml. In an earlier work by Jian et al. (2007), on the in vivo effect of a 12-13 day oral administration of SNL-P, was showed a significant growth inhibition effect on cervical cancer (U14) of tumor bearing mice with increased expression of Bax and a decreased expression of Bcl-2 and mutant p53 which had a positive correlation with the number of apoptosising tumor cells.[14]

3.9. ANTI- OXIDANT ACTIVITY

The stable DPPH radical is used to determine the free radical –scavering activity of solanum nigrum linn. extract because the DPPH will give the strong absorption band at 517nm. Hence this electron becomes paired off in the presence of free radical scavenger, the absorption vanishes, resulting decolourizing, no. of electrons will taken up. Finally the mixture contains 86 micro millimeter DPPH and other concentrations of every extract.[15]

3.10. ANTI-LARVICIDAL ACTIVITY

Different concentrations of crude extract (2, 2.5, 3, 3.5 and 3%) and ethyl acetate solvent extract (40, 60, 80, 100 and 120 ppm) of each plant part were prepared and 100 ml of each extract was transferred into separate sterile glass beaker (around 120 to 150 ml capacity) to carry out the tests. Collected larvaes are introduced into the each beaker, 20mg of larval food was added into the beaker (powdered dog biscuits and yeast). Mortality rate was noted after 24,48, and 78 hours. Death larvaes recordings are noted when they are become non motile.[16]

3.11 ANTI- DIABETIC ACTIVITY

Anti-diabetic activity was determined by "-amylase inhibitory assay as described by Oboh et al. (2013). The 500 µL extract concentration of (10-100 µg mLG1) were added to 500 µL of "-amylase (0.5 mg mLG1) and incubated for 10 min at 25o C. 500 µL of 1% starch solution is added to 0.02 M sodium phosphate buffer and incubated at 25 degree celcius. Add 1 ml of 3,5-Dinitrosalicylic acid and this mixture was incubated in boiling water bath for 5 min. then dilute with 10ml of double distilled water and cool at room temperature, The absorbance was measured at 540 nm using spectrophotometer. Later The alpha amylase inhibitory activity were calculated and recorded.[17]

3.12. CYTOPROTECTIVE ACTIVITY

Potawale et al., (2008) A 50 percent ethanol extract of the of Solanum nigrum Linn. Was examined in vitro to protect Vero cells from gentamycin toxicity. The Trypan Blue exclusion assay, mitochondrial dehydrogenase activity assay, method were used to determine cytotoxicity. By determinig the liver for histological alterations, the ethanol extract was also tested as a hepatoprotective agent. As from the result, it has a strong hepatoprotective effect. The liver of a rat is treated with the toxicant (Carbon tera chloride) revealed severe centrilobular necrosis, as a result it gives the production of normal hepatic cards and the absence of necrosis and vacuoles. Adult male albino wistar rats weighing (150-170g) were used for the study. The animals were housed in polypropylene cages maintained under the temperature of 25 oC and 12 h light/12 h dark condition. Animals were categorized into six groups of six animals each. The route of administration to all the groups was given through gastric intubation. For Group 1 0.2 ml of acacia, group 2 20% of ethanol, group 3 20% ethanol with SNFEt will be injected. all the rats were kept overnight fast and anesthetized using ketamine chloride, Blood was collected in clean dry test tubes with few drops of heparin and plasma obtained was used for various biochemical estimations.[18]

CONCLUSION

Solanum nigrum linn is acts as a good medicine for hepatitis, fever, ulcers, and a variety of immunological disorders and conditions. According to the research, the plant is help full in the prevention of hepatotoxicity and cytotoxicity, and also for the improvement of liver and kidney functions. It has also anti diabetic, anti inflammatory and analgesic properties. It has the power to make a big difference in clinical and pharmacological studies. It is an attractive plant for formulating targeted drugs. It also shows the hepatoprotective, anti seizure, anti allergic properties.

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