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SOLANUM NIGRUM ACTIVITY FOR THE TREATMENT OF JAUNDICE

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ABSTRACT

Jaundice is yellow discoloration of the skin and mucus membrane by increasing the bilirubin level and also due to bile pigment diposition. Any quiet found to have a raised serum convergence of bilirubin will be researched further, since infections mindful for hyperbilirubinaemia range from the insignificant to the grave. The way to deal with finding depends intensely on three methods that portray the life structures of the biliary lot: ultrasonography, percutaneous transhepatic cholangiography, and endoscopic retrograde cholangiopancreatography. Hyperbilirubinemia might be characterized as either unconjugated or formed, contingent upon which part of bilirubin is dominating. Along with chronicled highlights and discoveries on assessment. This review paper help to define the solanum therapeutic activity for jaundice.

KEYWORDS: Jaundice, Hyperbilirubinemia, Hepatic, Herbal plant, Solanum nigrum, Extract.

INTRODUCTION

Jaundice is a symptom or sign of disease that is characterised by yellowish skin and a yellow bile-colored mucus layer. bilirubin, for example. Bilirubin is an endogenously combined drug that is potentially harmful to children. (Pandey and colleagues, 2008).

Jaundice is a subordinate or combined form of the French word Jaune, which means yellow. Jaundice is a symptom of hyperbilirubinemia (excess bilirubin in the bile duct), and the bilirubin can be in a conjugated or unconjugated form.

- Normal level of bilirubin 0.3 – 1.2 mg/dl.
- Elevated levels of bilirubin 2 – 2.5 mg/dl

(A) **(B)**

Figure 1: (A) Yellowish Discoloration of eye, (B) Affected area of Stomach.

When bilirubin levels reach 34.2 mol/L or 2 mg/dL, clinical manifestations of jaundice occur. Heme group is used as a medium for the synthesis of bilirubin.

Bilirubin is formed by An enzyme called heme oxygenase catabolizes the heme at the alpha carbon bridge, releasing the Iron, Carbon monoxide, and Biliverdin. Then, Biliverdin is transformed from that bridge to bilirubin with the help of enzyme Biliverdin Reductase (which breakdown biliverdin). Bilirubin accounts for 80% of all bilirubin. 20% of bilirubin is remained that come from various source such as Myoglobin, Cytochrome etc. (Smant S.S; 2007)

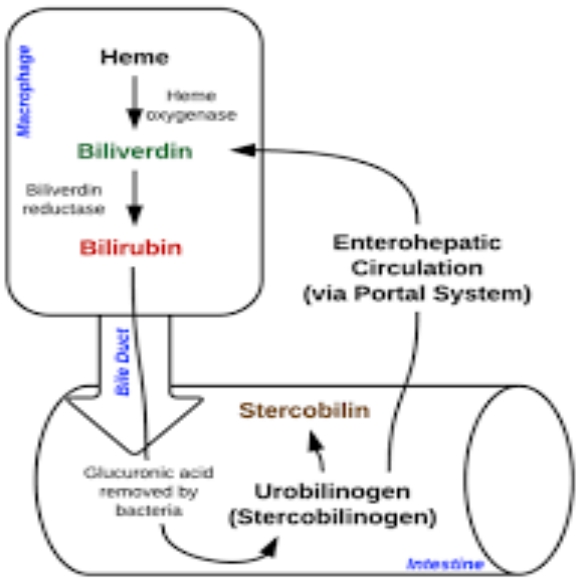

Figure 2: Bilirubirin metabolism.

Types of Jaudice

Jaundice is of 3 types on the basis of cause

[1] Pre Hepatic

[2] Hepatic

[3]Post hepatic

Pre-hepatic jaundice: - This kind of Jaundice is called as Hemolytic Jaundice because there is hemolysis and that's why it is occurring. A defect in the Membrane of Plasma of red blood cell is the most common cause of increased hemolysis. This thin cell membrane can't withstand Stress and Ruptures, future result in Hemolysis and an increase in serum bilirubin. (Abbas et al; 2016).

Hepatic jaundice: This kind of jaundice has a root cause in Liver, specifically in Hepatocytes. Bilirubin is taken from Plasma Proteins [albumin] and Excreate in bile through the Biliary system after conjugation. Hepatic jaundice may be caused by any liver pathology that causes a defect in capture, conjugation, or excretion. UDP-Glucronyltransferase is the only enzyme involved in conjugation. This is a good example. (Abbas et al; 2016). Hepatic jaundice may be caused by a defect in the bilirubin excretory pathway in the liver. Excretory pathways are i.e. Hepatocyte bile acid secretion (Abbas et al; 2016).

Post Hepatic Jaundice: The main cause of illness in the Biliary Portion is occurring in Hepatobiliary System. And major cause of this type of jaundice is Extra Hepatic Biliary Obstruction (Sen et al; 2009).

Table 1: Herbal plant used for Jaundice treatment.

S.no.	Plant name	Part Used	Uses	Refernce
1	Andrographis paniculata	Whole plant	jaundice	(Jyothi et al; 2007)
2	Centella asiatica	Leaf, roots	jaundice	(Jyothi et al; 2007)
3	Centella sp.Linn	Leaves, root	Liver problem (sen et al; 2007)	
4	Dioscorea belophylla	Fruits,Tubers	jaundice	(Pandey et al; 2008)
5	Dioscorea sp.	Tubers	jaundice	(Goldman et al; 2008)
6	Abroma angusta	Bark, Root	jaundice	(Rastogi et al; 2008)
7	Cajanus cajan	Leaves,Root	Liver problem	(Goldman ; 2008)
8	Emblica officinalis	Fruits	Liver problem	(Pandey et al; 2008)
9	Ficus hispida	Fruits	Jaundice	(Verma et al; 2009)
10	Morus alba	Root, Leaves	Jaundice	(Surendram; 2011)
11	Solanum nigrum	Root, fruits	Hepatoprotective	(Verma et al; 2009)
12	Ricinus communis	Leaves, Fruits	jaundice	(Jyothi et al; 2007)

Tradionally, These all plants are used for jaundice and show various therapeutic activities for jaundice. But, out of these plants *Solanum nigrum* is widely used and has least formulation available in market.

***Solanum nigrum* – Herbal plant widely used for jaundice**

Common name of this plant is Black night shade. This is a Dicot Weed come under Family-Solanaceae. This is annual Herbaceous Plant with the height of 10-60 cm and with avaibility of very Smooth and Semi Climbing Stem. Opposite side of leaf is oval and diamond shaped. Common Species present near River side, Waste land, Old field and can be grown in Cultivated Land. (Islam et al; 2012).

Plant description

S.no	Common name	Botanical name	Family	Part used	Refernce
1.	Black night shade	Solanum nigrum	Solanaceae	Fruits and seeds	(Miraj et al; 2016).

Traditional Uses of *Solanum nigrum*

The Black night shade has been used in medicine as a remedy for various diseases. Leaf of this plant are used for Rheumatic and Gout, Skin diseases and also in the treating Tuberculosis, Nausea and nervous Disorders and also has Good anti-cancerous property. The decoction and juice of the berries is useful in cough, diarrohea, inflammations and skin diseases, anti-inflammatory and anti-pyretic. (Rani et al; 2017).

Phytochemical Constituents

Alkaloids, Proteins, Saponins, Flavonoids, Tanins. (Rani et al; 2017).

Pharmacological Reports

Anti - Tumor effect

It was investigated whether the polysaccharide fraction from Solanum nigrum, SN-ppF3, has immune-modulatory activity. These findings indicated that the tumor-suppression mechanisms seen in SN-ppF3-treated mice were most likely due to an increase in the host immune response. (Miraj et al; 2016).

Anti - Cancer Activity

In MCF-7 breast cancer cells treated with AESN, the anti-cancer activity of Solanum nigrum was investigated for EMT. The findings indicated that AESN could stop MCF-7 breast cancer

cells from undergoing EMT by reducing mitochondrial activity. The current study adds to our understanding of how Solanum nigrum can be used to treat colon cancer and warrants more research. (Miraj et al; 2016).

Anti- Fungal effect

The antifungal effect of Solanum nigrum was studied, and the results revealed that the development of solamargine by a cultivable fungal endophyte at a significant yield is a novel finding. (Miraj et al; 2016).

Anti- Allergic effect

The effectiveness of plant berries in the treatment of asthma was investigated. Asthma-related parameters have been shown to be inhibited by a petroleum ether extract of Solanum nigrum berries. (Miraj et al; 2016).

Hepato - Protective activity

It was focused on herbal-based therapeutics for liver disorders, which have been used in India for a long time and have been popularised by leading pharmaceutical companies all over the world. (Jannu et al; 2012).

Anti - Diabetic activity

The hypoglycemic behaviour of aqueous and hydro-alcoholic extracts of different parts of the Solanum nigrum plant, namely the leaf, fruit, and stem, in Sprague Dawley rats. As a result, the anti-diabetic property of Solanum nigrum can be inferred. (Ruby et al; 2012).

Immuno - Stimulant activity

Solanum nigrum was studied for its immunostimulant properties. Plant extracts have a lot of promise as an immunostimulant against microbes and may be used to treat infectious diseases caused by microbes. (Ruby et al; 2012).

Anti - Microbial activity

The antimicrobial activity of methanol and water extracts of Solanum nigrum leaves was investigated, as well as phytochemical screening to determine the compounds responsible for these activities. Methanol may be used to extract antimicrobial compounds from leaves, based on the findings. (Ruby et al; 2012).

Anti – Seizure activity

The anti-seizure efficacy of an aqueous extract of Solanum nigrum leaves was tested in Chicks, Mice, and Rats by administering the plant extract intraperitoneally. Amphetamine enhanced the extract's anti-seizure properties. (Ruby et al; 2012).

Cardio – Protective activity

The cardio-protective function of a methanolic extract of Solanum nigrum berries was studied using global in vitro ischemia-reperfusion injury at doses of 2.5 and 5.0 mg/kg for 30 days at 6 days per week. (Ruby et al; 2012).

Analgesic activity

The analgesic effect of ethanolic extracts of Solanum nigrum was examined. Using Eddy's hot plate and acetic acid induced writhing, the extract's analgesic activity was assessed for both central and peripheral pharmacological activities. (Ruby et al; 2012).

Cytotoxic activity

The cytotoxic activity of an ethanolic extract of Solanum nigrum dried fruit was tested. The extract displayed strong cytotoxicity in the brine shrimp lethality test. (Ruby et al; 2012).

Anti - Inflammatory activity

On experimental animal models, the antiinflammatory function of a methanolic extract of whole Solanum nigrum plants was investigated. The edoema in the hind paw was reduced by the methanolic extract. The anti-inflammatory activity of Solanum nigrum methanolic extract (375 mg/kg b.w.) (Ruby et al; 2012).

Anti - Larvicidal effect

The biocontrol potential of an active ingredient isolated from Solanum nigrum mature leaf ethyl acetate extract was investigated. The results showed that there is a strong dose-dependent mortality, with a regression coefficient value close to 1. (Miraj et al; 2016).

Marketed Products – Made up of *Solanum nigrum* plant

Many products containing Solanum nigrum are formulated as immune boosters and hepatoprotectives due to the numerous uses mentioned.

Manathakkali powder

Makoy Panchang

Manatakkali capsules, etc.

Other Marketed Products for Jaundice Treatment

Livful-DS tablets

Cytozen capsules

Livomyn tablets

Liv.52 tablets and syrup

Jaundinil capsule

Hepatoplex syrup

Jaundice drops

Liver tonic

Raskalp,

Liver drops, etc.

MATERIAL AND METHOD

Take the following items: test tube, Soxhlet apparatus, Desiccators, Distillation assembly, Digital electronic weighing instrument, Chromatography paper, TLC plates, and conical flasks. (Ravi et al; 2009).

Successive solvent extraction of plant

a) Petroleum ether extract - With the help of Hot extraction process (Soxhlet apparatus), the coarsely powdered fruits and seeds of (18 gm) Solanum nigrum was extracted with Petroleum Ether (300ml) for 24 hrs. After Extraction process, Solvent was removed by using distillation assembly. (Herrine S; 2009)
b) Methanol extract - The powdered plant was soxhlet extracted successfully with 300ml methanol following the complete removal of solvent.

Calculation of Percentage yield

'Percentage yield = Practical yield/Theoretical yield into 100 Percent'.

Yield was calculated using the above formula.

Preliminary test for Phytochemical analysis

1. Alkaloidal identification

Mayer's test- For alkaloidal presence, Plant Extract on treatment with Mayer's reagent (i.e. Potassium mercuric iodide solution) gives Cream colored precipitate if the Alkaloids are present.

Dragendorff's test- For checking the presence of alkaloids in that particular plant extract,

Plant Extract on treatment with reagent gives Reddish Brown precipitate if alkaloids are present. (Kokate et al; 2006).

2. Saponins identification

Froth test - For checking saponin presence, Took 1ml solution of drug in water, taken in Semi- micro tube was shaked well and noted the Stable Froth. (Kokate et al; 2006).

3. Flavonoides identification

Alkaline reagent test – For checking the presence the of Flavanoids, Few drops of sodium hydroxide solution is added into plant extract lead to formation of an intense Yellowish color, Which further turns colorless, on addition of dil. acid, And it shows Flavonoid presence in that particular plant extract. (Kokate et al; 2006).

4. Protein identification

Millon's test- when 2ml of Millons reagent (i.e. Mercuric nitrate in nitric acid containing traces of nitrous acid)is treated with plant extract gives a white precipitate, after heating it turns Red in colour. (Kokate et al; 2006).

(A) **(B)**

Figure 3: (A) Fruit part, (B) Leaf and Stem part of Solanum nigrum plant.

Table 2: Percentage yield of oil extracted -

S.No.	Solvent	Consistency	(%)	Refernce
1.	Methanol	Oily	15%	(Sray.F,1998)

Table 3: Characterization of oil

S.No.	Parameter	Value
1.	Organoleptic properties	Colour was dark green Taste was bitter and characteristic Odour was aromatic
2.	% yield	15%

Storage - Oil was collected and stored in a well closed container.

Table 4: Phytochemical Screening of Solanum nigrum plant.

S.no.	Phytochemicals	Test Performed	Result	Refernce
1.	Alkaloid	Dragendorff test	Positive	(D.Kaushik; 2009)
2.	Sponins	Froth test	Positive	(D.Kaushik; 2009)
3.	Tannins	Ferric chloride test	Positive	(D.Kaushik; 2009)
4.	Flavanoids	Alkaline reagent test	Positive	(D.Kaushik; 2009)
5.	Proteins	Ninhydrine test	Positive	(D.Kaushik; 2009)
6.	Glycosides	Legal's test	Negative	(D.Kaushik; 2009)
7.	Steroids	libermann's buchard test	Negative	(D.Kaushik.;2009)

Alkaloid, Saponin, Tanin, Flavonoid and Protein was found to be present in the extract as per the phytochemical tests performed and Glycoside and Steroid was found to be absent.

CONCLUSION

Jaundice is a very common disorder but can cause various serious problems like liver cirrohsis etc. It can cause liver disfuctioncting. Many ways are there to treat jaundice like Allopathic medicine, herbal plants, Surgery. But the best way to treat jaundice is herbal treatment because of no side effects, act as a natural pure healing substance and antioxidant. ‘‘The fruits and seeds of the plant Solanum nigrum was obtained from Himalyan region. The extract of the plant Solanum nigrum was extracted employing soxhlet apparatus using methanol as a solvent. Nature of extract was oily and Percentage yield of the extract was found to be 15% and also can be utilized in treatment of many diseases such as Jaundice and can be exploited for use in the pharmaceutical industries.’’

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