



Review Article

A PHYTO-PHARMACOLOGICAL REVIEW ON *STRYCHNOS POTATORUM* LINN

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ABSTRACT

Traditional system of medicine consists of large number of plants with various medicinal and pharmacological importances and hence represents a priceless tank of new bioactive molecules. This review will be helpful to create interest towards *Strychnos potatorum* and may be useful in developing new formulations with more therapeutic and economical value.

KEY WORDS :*Strychnos potatorum*, medicinal, pharmacological importance

INTRODUCTION

Strychnos potatorum Linn (Family: Loganiaceae) commonly referred to as clearing nut tree or Nirmali is a medium sized glabrous deciduous tree having a height of 6-18 metres¹. It is a native of India and found distributed in the deciduous forests of West Bengal, central and south India up to 1,200 metres. It is also found in south tropical African countries such as Malawi, Zambia, Zimbabwe, Botswana, Namibia, Sri Lanka and Myanmar². The plant has been described as a common tree of medicinal

importance in India popularly used to purify water for drinking³. The seeds contain no strychnine, but brucine is present. They are used to clarify foul and muddy water. They are useful in conditions of hepatopathy, nephropathy, gonorrhoea, leucorrhoea, gastropathy, bronchitis, chronic diarrhoea, dysentery, strangury, renal and vesicle calculi, diabetes, burning sensation, dipsia, conjunctivitis, scleritis, ulcers and other eye diseases⁴. According to Ayurveda, the seeds are acrid, alexipharmic, lithotriptic and cure strangury, urinary discharges,

head ailments etc⁵. Roots cure all types of leucoderma whereas fruits are useful in eye diseases, thirst, poisoning and hallucinations. The ripe fruit is emetic, diaphoretic, alexiteric, cures inflammation, anaemia, jaundice⁶. According to Unani system of medicine, seeds are bitter, astringent to bowels, aphrodisiac, tonic, diuretic and good for the liver, kidney complaints, gonorrhoea, colic etc.

BOTANICAL STUDY

Kingdom : Plantae
Order : Gentianales
Family : Loganiaceae
Genus : *Strychnos*
Species : *Strychnos potatorum*



Figure 1: *Strychnos potatorum*

TRADITIONAL USES

In ayurvedic system of medicine, it is known to be used in vitiated conditions of kappa and vata, hepatopathy, nephropathy, gonorrhoea, gastropathy, bronchitis, chronic diarrhoea, dysentery, renal and vesicle calculi, diabetes, burning sensation, dipsia, conjunctivitis etc.

CHEMICAL CONSTITUENTS

Alkaloids mainly diaboline, and four triterpenes viz., isomotirol, sitosterol, stigmasterol and compesterol were reported from seeds and leaves of *Strychnos potatorum*

PHARMACOLOGICAL ACTIVITIES

Anti microbial activity

Mallikarjuna et al., reported the anti microbial activity in alkaloid fractions isolated from *Strychnos potatorum* seeds against some pathogenic gram positive, gram negative and acid-fast bacteria and fungi. These fractions have shown considerable antimicrobial activity against both bacteria and fungi at the tested concentrations (100 & 200 µg/ml). Further the growth of *Proteus vulgaris*, *Staphylococcus aureus*, *Salmonella typhimurium*, *Vibrio cholerae*, *Mycobacterium tuberculosis*, *Aspergillus niger* and *Candida albicans* were significantly inhibited. These findings have confirmed the anti microbial activity of this plant seeds⁷.

Anti bacterial activity

Sunil B. Somani reported the anti bacterial activity in water purification. Tulsi (*Ocimum Sanctum*), Neem (*Azadirachta indica*), Wheatgrass (*Triticum Aestivum*), Amla (*Phyllanthus Emblica*) and Katakphala (*Strychnos Potatorum*) were tested by Disc Diffusion Method after extracting the dried material powder of

natural herbs in 50% ethanol. An antibacterial activity was observed in all herbs used. In all herbs maximum removal of *E.coli* was found at 30 minutes contact time onwards. The percentage removal of *E.coli* was found in extracts respectively, at 30 minute optimum contact time. The optimum removal of *E.coli* was observed at 1% concentration of extract of different herbs used ⁸.

Antihyperglycemic Activity

Pandu raju et al., reported the antidiabetic activity in different solvents extracts of seeds and leaves of *Strychnos potatorum*. The administration of methanolic extracts of seeds and leaves of *Strychnos potatorum* by oral route at doses; 200 and 400 mg/kg b.w at every 3 hour interval reduced blood glucose levels by 24.23%, 25.67%, 16.47% and 17.88%, respectively in alloxan-induced diabetic rats ⁹.

Nephroprotective activity

Varghese et al., reported the nephroprotective activity of ethanolic extract of *Strychnos potatorum seeds* in rats. The ethanolic extract at a dose level of 200mg/kg/body weight was found to normalize the raised blood urea, blood protein and serum creatinine. Investigation of the possible protective effect of *Strychnos potatorum* revealed that 10days administration of 200mg/kg of alcoholic extract along with gentamicin reduced the gentamicin induced renal injury.

Pharmacological studies were carried out to evaluate the haematological and biochemical parameters, followed by histopathological examination. The study concluded that the seeds of *Strychnos potatorum* possess marked nephroprotective activity and could have a promising role in the treatment of acute renal injury induced by nephrotoxins, especially gentamicin ¹⁰.

Anti ulcer activity

Sanmugapriya and Venkataraman reported the anti-ulcer activity of *Strychnos potatorum* seeds on aspirin plus pyloric ligation (Aspirin+PL)-induced gastric ulcer model. The seed powder and aqueous extract of the seeds at two doses 100 and 200 mg/kg, p.o. prevented ulcer formation by decreasing acid secretory activity and increasing the mucin activity in rats. The anti ulcerogenic potential was further confirmed by the histopathological studies of stomach mucosa. The results indicate that seed powder and aqueous extract exhibit anti ulcerogenic activity by both antisecretory and mucoprotective actions. The mucoprotective action of seed powder and aqueous extract may be due to the presence of polysaccharides in seeds. The anti ulcerogenic potential of seed powder and aqueous extract was compared with the standard antiulcer drug, ranitidine ¹¹.

Anti-arthritic activity

Ekambaram et al., reported the anti-arthritic activity of *Strychnos potatorum* Linn seeds in Freund's adjuvant induced arthritic rat model. There was significant increase in rat paw volume and decrease in body weight increment, whereas aqueous extract and whole seed powder extract treated groups, showed significant reduction in paw volume and normal gain in body weight. The altered haematological parameters (Hb, RBC, WBC and ESR) and biochemical parameters (blood urea, serum creatinine, total proteins and acute phase proteins) in the arthritic rats were significantly brought back to near normal by the aqueous extract and whole seed powder extract treatment at the dose of 200 mg/kg/p.o in both developing and developed phases of arthritis. Further the histopathological and radiological studies revealed the antiarthritic activity of aqueous extract and whole seed powder extract by indicating fewer abnormalities in these groups when compared to the arthritic control¹².

Anti anaphylactic activity

Patil et al., reported the anti-anaphylactic activity of chloroform, petroleum ether, and methanolic extract of *Strychnos potatorum* Linn seed extract was evaluated by using compound 48/80 (8 mg/kg) induced anaphylaxis and mast cell stabilization was studied by using peritoneal mast cells of rats. The animals

were treated with *Strychnos potatorum* seeds extract administered orally 1 h before administration of compound 48/80, the rate mortality was observed in each group of animals. Mast cell stabilization was seen by pre incubation of mast cells with the compound 48/80 and the extracts. The chloroform, petroleum ether, and methanolic extracts were shown potent and has significant ($P < 0.01$ and $P < 0.001$) inhibitory effects on compound 48/80 induced anaphylactic reaction and mast cell activation. The inhibitory effect of *Strychnos potatorum* on release of histamine and nitric oxide protects from compound 48/80 induced anaphylactic reaction may be through blocking vasodilatation, decrease vascular resistance, hypotension and tachycardia¹³.

Antinociceptive and Antipyretic activity

Sanmugapriya and Venkataraman reported the antinociceptive and antipyretic activities of seed powder and aqueous extract of *Strychnos potatorum* Linn seeds in experimental wistar albino mice and rats, respectively. The antinociceptive activity was studied in both chemical [acetic acid (1 mL/100 g b.wt.) induced writhing] and thermal (hot plate and tail immersion technique) models of inducing nociception. Administration of seed powder and aqueous extract at two dose levels (100 and 200 mg kg⁻¹p.o.)

significantly ($p < 0.001$) decreased the abdominal contractions in acetic acid induced writhing model and significantly ($p < 0.001$) increased the reaction time in both hot plate and tail immersion techniques, when compared with the standard drug Aspirin (100 mg kg^{-1} , p.o.). Thus seed powder and aqueous extract were found to exhibit antinociceptive activity in both chemical and thermal models. The antipyretic activity was studied by injecting TAB vaccine at the dose of 1 mL kg^{-1} b.wt., where the pyresis was induced after 6 h. Both seed powder and aqueous extract exhibited dose dependent activity in reducing the pyrexia which is comparable to that of Paracetamol (100 mg kg^{-1} , p.o.)¹⁴.

CONCLUSION

The extensive literature survey revealed that *Strychnos potatorum* is important medicinal plant with diverse pharmacological spectrum. The plant shows the presence of many chemical constituents which are responsible for varied pharmacological and medicinal property. The evaluation needs to be carried out on *Strychnos potatorum* in order to uses and formulation of the plant in their practical clinical applications, which can be used for the welfare of the mankind.

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