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Review Article

Ethanobotanical, Phytochemical and Pharmacological Review on Strychnous Nuxvomica

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ABSTRACT

Strychnous nux-vomica (KUCHLA) belongs to the family Loganiaceae used in folklore and traditional medicines. The objective of present review on kuchla outcomes the agronomy, phytochemical constituents, structures and used for treatment of antioxidant, hepatoprotective, antisnake venom, anticonvulsant, antimicrobial, antipyretic, analgesic, neuropharmacological, gastritis, antialcoholic, larvicidal activities. This studies provides valuable information of kuchla for future research and helpful for the other studies to be carried out.

Keywords: Strychnousnux-vomica; Ethanobotanical; Phytochemical; Pharmacological

INTRODUCTION

Strychnosnux-vomica also known as poisonousnut, Dog button, Kuchla, Kanjiramfits to the family of Loganiaceae. It is an evergreen and medium size tree that is native to South Africa and India. The seeds and barks acquire various components that are used in folklore and traditional medicines in different countries. Now-a-days Nuxvomica is used in 60 formulations of Indian systems of medicine (Ayurveda, Homeopathy, Siddha, Unani and Yoga) out of the 30 of them are used in the disorders of vatadosha [1]. Principally this doesn't possesses a role in modern medicine but it has been reported that it is widely used in elevation doses before 2nd worldwar. The effect of Nuxvomica is due to the presence of Strychnine and Brucine which are indole alkaloids. Strychnine stimulates the motor or sensory ganglia of spinal cord that consequences in fiery convulsions whereas Brucine causes paralysis of peripheral motor nerve and is not as much of harmful than the Strychnine [2]. At low doses it acts as stimulant, laxative and for the treatment of other stomach ailments. Various phytochemical constituents have been isolated and there is progression of investigation on this plant in research of dynamics and kinetics but there is no detailed review about the pharmacological aspects and medicinal uses. Therefore the present review is about the cultivation and its geographical distribution, folklore usage, ethnobotanical characters, pharmacognostical characters, phytochemical and pharmacological aspect.

Topographical distribution

This plant is commercially cultivated in European and United States, Fujian, Taiwan and throughout Tropical Asia. Fundamentally it is indigenous to east India and found profusely in south India largely collected from forests of Tamilnadu, Kerala and Malabar coast. The annual production of StrychnosNuxvomica seed in India was estimated at 2000 tones at the beginning of 1970`s. In the period of 1965 to 1971 the average production of StrychnosNuxvomicaseeds in India was 18,000 kg/year. Most of this are exported to European and United States. Currently in 2000 as the technology has been improvised there is increase in exporting of Nuxvomica in India by export houses situated in Mumbai, Hyderabad, Kolkata [3].

Agronomy properties

The climate and soil should be favorable for the plant to grow well in dry humid tropical areas of the country. It grows over laterite, sandy and alluvial soils [4-6].

Ethnobotanical characters

1. Domain: Eukaryote
2. Kingdom: Plantae
3. Division: Magnoliophyte
4. Class: Magnoliopsida
5. Order: Getianales

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6. Family: Loganiaceae

7. Genus: Strychnos

8. Species: Nuxvomica

MATERIALS AND METHODS

Pharmacognostical Characters

The plant is about 25 meters height and evergreen. Fruits are about equal to or more than 140 g that possesses smooth and hard shell during the early stage and when ripened it has a mild shade orange colour. Flowers are pale green in colour with small size and funnel shaped. The leaves are 10 cm long and 7.6 cm wide which are ovate, shiny and smooth on both sides. The young shoots are deep green in colour. The branches are shiny and deep green in colour [7-8]. (Figures 1-3).

Figure 1: Nuxvomica fruit.

Figure 2: Leaves.

Figure 3: Entire tree.

Phytochemical constituents

These are the compounds that are naturally present in the plants which impart the colour, flavour, smell and taste. They help for the defensive mechanism of plants and helps to treat the diseases for humans and animals. Various numbers of phytochemical constituents have been isolated since decades a few of them are listed below from various plant parts of Nuxvomica.

Seeds

The alkaloids identified by the chemical and spectroscopic analysis are the strychnine, isostrychnine, pseudostrychnine, strychnine N-oxide, isostrychnine N-oxide, Brucine, Brucine N-oxide, Isobrucine, IsobrucineN-oxide, Beta-colubrine, Novacine, Vomicine, Icajine [9].

Fruits

The phytochemicals present in the pericarp and pulp of the fruit are majorly strychnine and brucine along with the 4-hydroxystrychinine and a new base N-methyl-sec –pseudo-beta colubrine and a non-Indolicbase cantleyine. Phenolic glycosides named as salidroside and cuchiloside were present [10].

Leaves

Phytochemical investigation on leaves had an outcome of the isolation of compounds namely Kaempferol-7-glucoside, Umbelliferone, Quercitin-3-rhamnoside, kaempeferol3-rutinoside and Rutin [11].

Flower

Indole alkaloids were isolated by mass spectra like strychnine, brucine which are isolated first and by mass spectral evidence they have come to know the presence of colubrine in the mixture of strychnine. others like vomicine, icajine and novacine are present [12].

Barks

The bark contains numerous components like flavonoids, carbohydrates, tannins, triterpenoids and glycosides which was determined by the preliminary phytochemical analysis .The roots consists of the alpha colubrine, loganin, vomicine, pseudobrucine, 16-hydroxycolubrine and compounds like beta –colubrine, brucine, caffeic acid ester, strychnine, strychnocrysine pseudo strychnine, pseudobrucine, vomicine, icajine and novacine. Contemporary work on the root bark of Nuxvomica from Srilanka origin divulges the presence of thesecompoundsnor-morcusine B, O-methylmacusine B, nor-melinonineB, isostrychine,protostrychine,10-hydroxystrychine, 12-hydroxystrychnine,12-hydroxy-11methoxystrychnine, 4-hydroxy-3-methoxystrychnine,4-hydroxystrychnine along with strychnine and brucine. The stem bark consists of brucine, strychnine, mavacuriine pseudo strychnine and caffeic acid ester. Research on stem bark by 13C NMR and Mass spectroscopy analysis reveals the presence of four dimeric bisindole alkaloids which are new demethoxyguiaflavine, strychnoflavine, strychnoflavineN-methyl-longicaudatine and strychnocrysine [13].

RESULTS AND DISCUSSION

Hepatoprotective

The Indole alkaloid extracted from the fruit named as loganin has shown effective hepatoprotective activity In vitro and In vivo models of liver injury induced by the galactosamine .They established by ameroliating the galactosamine–mediated reduction of hepatocytes viability as well as bile volume and contents.

Anti microbial

The ethanolic seed extract of Strychnosnuxvomica was prepared and agar disc diffusion method test was carried out against the *Staphylococcus* aureus, Klebsiellapneumoniae, Bacillus subtilis, Proteus, Salmonella typhi, *E.coli* strains at a 1000 C which results in the inhibition of only *E.coli* , *Staphylococcus aureus* and *Klebsiella*

strains in a dose dependent manner.

Anti diarrhoeal

A research was carried out on the Strychnosnuxvomica for anti-diarrhoeal activity. The methanolic root bark extract was prepared and test was carried out against castor-oil induced diarrheoa which have the outcome of significant reduction time of diarrheoa and total weight of the faeces.

Anti convulsant

The ethanolic seed extract of Strychnosnuxvomica which has the Indole alkaloids mainly strychnine and brucine were taken and research was carried out and the outcome of there action on neurotransmitters of human alpha 1 ,alpha 1 beta glycine recepto ,alpha 7 nicotinic receptor ,5-HT3A Seratonin receptor, shown that strychnine and brucine has different stearic and electronic properties that show anticonvulsant activity.

CONCLUSION

This review will be a helpful tool for those who are interested to carry out the research work on Strychnousnux-vomica Linn which has been used in folklore and traditional medicines for several decades and this would be useful of studying different aspects towards Nuxvomica regarding its geographical, Ethanobotanical, phytochemical constituents and pharmacological activities.

CONFLICT OF INTEREST

There is no conflict of interest to be reported by any of the authors.

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