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BRIEF REVIEW ON MEDICINAL POTENTIAL OF *NERIUM INDICUM*

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ABSTRACT

Nerium indicum (mill) belonging to the family Apocynaceae is a wild plant known kaner in Hindi as well as exile tree, Indian oleander. ,it is a well known ornamental plant according to the literature survey and also, it is an important medicinal plant .it has been found to possess major therapeutic activity such as analgesic, anti-ulcer and antinociceptive , antibacterial, neuroprotective, molluscicidal, and depressant activity, anti-diabetic ,antioxidant activity and many more. *Nerium indicum* contain glycoside, oleandrin , tannin, volatile oil,0.25%. leaves contain two principle neriin and oleandrin , glucosides with properties similar to digitalin the main toxin ofs oleander is oleandrin. The methanolic extract of the plant Nerium is used for the treatment of cell proliferation disease in animals and humans. Leaves and flowers are considered cardi tonic diuretic and emetic. Whole plant believed to have anticancer properties. The pharmacologic actions of neriin and oleandrin resemble those of digitalis glycosides.

INTRODUCTION

Nerium indicum is a well known ornamental plant with leathery evergreen leaves and handsome clusters of red or pink or white flower. The plant originates from the Mediterranean region and is indigenous to Indo-Pakistan subcontinent [2] *Nerium indicum* belongs to the family Apocynaceae. The plant is commonly known as “Kaner”. This is an erect, smooth shrub 1.5 – 3 meters in height and contains a cream colored, stick, resinous juice. The leaves are mostly in whorls of 3 to 4, linear lanceolate and 10-15 centimeters long with numerous horizontal nerves. The flowers are showy sweet scented, single or double 4-5 centimeters in diameter, white, pink or red and borne on terminal inflorescences (Cymes). The fruit is cylindrical, in pairs with deep linear striations, slightly twisted and 15-20 centimeters long. The seeds are numerous and compressed with white and grayish silky hairs. A wide spectrum of biological activities has been reported with various constituents isolated from different parts of the plant. Root, bark and seeds contain cardiac glycosides that have a paralyzing action on the spinal cord. Oleandrin, a pure component from the plant has a stimulating action on the heart and also a pronounced diuretic effect. The alcoholic extract shows antibacterial activity and oil obtained from the root is used in leprosy and skin diseases. [1]

The plant contains cardiac glycosides in its leaves, stems and flowers. *Nerium oleander's* or *Nerium indicum* leaves contain two principles: neriin and oleandrin, glucosides with properties similar to digitalin the main toxin of oleander is oleandrin. the plant having digitoxin properties like steroidal glycosides. The bark contains toxic glycosides: rosaginin and nerlin, volatile oil, fixed oil. The bark contains toxic glycosides: rosaginin and nerlin, volatile oil, fixed oil[2]. Also flower contain alkaloid, glycoside, carbohydrates, flavonoid and tannins and phenolic compound.[4]

The herbal medicines have wide therapeutic actions and safety profile. This makes the herbal therapies to be successful. One of these can be the use of *Nerium indicum*, the shrub commonly grows and has many therapeutic indications. It is in leaf all year, in flower from June to October. The flowers are hermaphrodite. Leaves are powerful repellent. A decoction of the leaves has been applied externally in the treatment of scabies and to reduce swellings. The leaves and the flowers are cardiogenic, diaphoretic, diuretic, emetic, expectorant and sternutatory. It has also being reported to have antibacterial 2 and antidiabetic 3 activities. [3]

Photochemistry of *Nerium indicum* Mill

We quantify that *N. indicum* contain many primary metabolites like carbohydrates, proteins, phenols, lipids, etc. Numerous polysaccharides purified from Leaf and flower of *N. indicum*

contain higher soluble sugar as compared to other plant parts in sufficient amount. Sugar has large numbers of stereo-isomers, because they contain several asymmetric carbon atoms. *N. indicum*'s stem contain higher level of phenol. Leaf and flower of *N. indicum* contain higher soluble sugar as compared to other plant parts in sufficient amount. Sugar has large number of stereo-isomers, because they contain several asymmetric carbon atoms. The stem *N. indicum* contain higher level of phenol. Therefore, biochemistry and medicine are intimately related health depends on harmonious balance of biochemical reaction occurring in the body, disease reflects abnormalities in biomolecules in biochemical reaction. The *N. indicum* flower contain higher level of lipids. Lipids.[5]

PHARMACOLOGICAL ACTIVITY

Analgesic activity

In acetic acid induced writhing model, the flower extract of *Nerium indicum* showed All the fractions of crude leaf extract of *Nerium indicum* showed 100% inhibition of writhing reflex. This indicates that administration of the fractions of crude leaf extract inhibited the pain sensation produced by acetic acid The response is thought to be mediated by the prostaglandin pathways. The promising antinociceptive activity of the methanolic extract of flower and root of *Nerium indicum* might be due to Analgesic Activity of Methanolic Extracts of *N. indicum*[6]

Anti diabetic activity

The activity *Nerium indicum* observed in chloroform extract diabetic rats had lower body weights, high blood glucose level as compared to normal rats. However, orally administered NIEE and NICE significantly increased the body weight and decreased blood glucose level in diabetic rats. This may be due to improving the glycemic control mechanisms and insulin secretions from remnant pancreatic - cells in diabetic rats. The exact biologically active constituents responsible for the said effect have not been reported nor was the exact mode of action of the ant diabetic activity reported earlier, with the lone observation that it is used in folklore diabetic treatments.[7]

Anti ulcer activity

Pylorus ligation induced ulcer was used to study effect on gastric secretion. Ligation of pyloric end of stomach causes accumulation of gastric acid in the stomach that produces ulcers. Agents that reduce secretion of gastric aggressive factor such as acid and pepsin and/or increase secretion mucin are effective in reduction in ulcer index when compared to control ($p < 0.001$). Both dose of flower extract of *Nerium indicum* (500 and 1000 mg/kg, p.o.) showed a significant reduction in free acidity and total acidity ($p < 0.001$) when compared to control.[8]

Anti oxidant activity

The Methanolic extract of leaves (LE) and Methanolic extract of flowers (FE) of *Nerium indicum* (Arali) was analysed for Antioxidant activity (AOA) in terms of DPPH free radicals, Total Phenolic Content (TPC) was measured in terms of Gallic acid equivalent and Flavonoide content was analysed in terms of Quercetin equivalent. The antioxidant activity Lipid Peroxidation showed higher activity in flowers than leaves. Enzymatic antioxidant activity such as Superoxide Dismutase, Glutathione peroxidase and Catalase of *Nerium indicum* flowers were around 10% to 30% higher than that of leaves. The results clearly indicate that the methanol extracts of *Nerium indicum* flowers have more potent antioxidant activity than leaves.[9]

Anti bacterial activity

The antimicrobial activity of methanol extract of *Nerium indicum*, *Tagetes erecta*, *Chrysanthemum leucanthemum*, *Rosa centrifolia*, *Jasminum angustifolium*, *Torenia fournieri* against Gram negative and Gram positive bacteria were studied invitro. The objective of this research was to confirm the antibacterial activity and perform HPTLC analysis of methanolic extracts of various flower extracts. The methanolic extracts of *Nerium indicum*, *Tagetes erecta*, *Rosa centrifolia*, *Torenia fournieri* exhibited growth inhibition on selected bacterial strains viz., *Bacillus* sp., *Escherichia coli*., *Klebsiella* sp., *Yersinia* sp., *Enterococcus* sp. Based on the results, the methanol extract of *Rosa centrifolia* was considered to be the most effective and also indicated that all the flower extracts exhibited inhibitory action against the growth of *Lactobacillus* [10]

CNS activity

Extracts of flowers of *N. indicum* has tested orally in albino mice at the dose level of 400 mg/kg body weight for Central nervous system activity. Significant anticonvulsant activity was seen as there was a delay in the onset of Pentylene tetrazole and Maximal electroshock induced seizures as well as decrease in the severity. Significant decrease in the locomotor activity. These results reveal the anticonvulsant and sedative activity of the extract. extract of *N. indicum* possess anticonvulsant and CNS depressant activity[1]

Neuroprotective activity

Nerium indicum exert partial protection in cortical neurons stressed by beta-amyloid ($A\beta$) peptides or deprivation of nutrition from serum. In this study, we have isolated and characterized a new polysaccharide from the flowers of *N. indicum* (named as J6) and aimed to investigate its neuroprotective effects against $A\beta$ -induced apoptosis. Pretreatment of the polysaccharide J6 significantly decreased the activity of caspase-3 as well as the cytotoxicity

triggered by A β peptides in a dose-dependent manner. In contrast to the activation of survival signaling such as Akt found in J2, J3 and J4 fractions, neuroprotective effects of J6 markedly inhibited A β peptide-stimulated phosphorylation of c-Jun N-terminal kinase (JNK-1) as determined by Western blot analysis. Taken together, the polysaccharide J6 isolated from the flowers of *N. indicum* can serve as potential neuroprotective agent against neuronal death in Alzheimer's disease[11]

Molluscicidal activity

Nerium indicum is an important source of a botanical molluscicide. The toxicity study revealed that the toxic component of *Nerium indicum* bark is soluble both in water and ethanol. The bioactive principle present in the bark is thermostable since there was no significant decrease in the molluscicidal activity of the boiled bark extract. observed that the aqueous extract of *Nerium indicum* bark is an effective insecticide against *Blatta orientalis*. Glycosides, steroids and terpenoids have been isolated from different parts of *Nerium indicum*. The toxic effect of different bark preparations may be due to the active glycoside neriodonin or neriodonein. A comparison of the molluscicidal activity of the purified bark fraction (by columnelution) with that of synthetic molluscicidal. *Nerium indicum* bark extract may be used as a potent molluscicide since the concentrations used to kill *L. acuminata* snails were not toxic for *C. fasciatus*. [12]

Piscicidal Activity

The piscicidal and toxicological, biochemical effect of ethanolic extract of *Nerium indicum* mill against fresh water weed fish colisa fasciatus there was a significant activity ($p < 0.05$) negative correlation between L_c values and exposure period i.e L_{c50} value decreased from 14.85mg/l(24h) to 5.52mg/l (96h) exposure of ethanolic latex extract for 24 and 96h caused significant ($p < 0.055$) time alteration total protein, total free amino acids, nucleic acid, pyruvate, aspartate, acetylcholinesterase, succinic dehydrogenase and cytochrome oxidase in liver. *N. indicum* latex extract mainly suppressed energy production and shifts fish respiration towards anaerobic segment. It concluded ethanolic extract *N. indicum* latex potential piscicidal activity.[13]

Antihyperlipidemic activity

The antihyperlipidemic effect of petroleum ether, chloroform, ethanol and aqueous extracts of *Nerium indicum* leaves in triton induced and atherogenic diet induced hyperlipidemic rats. A comparison was also made between the action of *Nerium indicum* leaves extracts and a known antihyperlipidemic drug simvastatin. chloroform extract of *Nerium indicum* leaves exhibited a

significant reduction ($p < 0.01$) in serum lipid parameters like total cholesterol, triglycerides, low density lipoprotein (LDL), very low density lipoprotein (VLDL) and increase in high density lipoprotein (HDL) in hyperlipidemic rats in comparison with hyperlipidemic control in both models.[14]

Hepatoprotective activity: Methanolic flowers extract of *Nerium indicum* evaluated for hepatoprotective in rats. The plant extract showed a remarkable hepatoprotective activity against carbon tetrachloride induced hepatotoxicity in liver tissues. Carbon tetrachloride induced a significant rise in Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT) and alkaline phosphatase (ALP). Treatment of rats with different doses of plant extract significantly altered serum marker enzymes levels to against carbon tetrachloride treated rats. The activity of the extract at dose comparable to the standard drug, silymarin. Histopathological changes of liver sample were compared with respective control. The hepatoprotective properties of *Nerium indicum* against carbon tetrachloride induced hepatotoxicity in rats.[15]

CONCLUSION

Major thrust by whole of the pharmaceutical industry is focused towards design and development of new innovative/indigenous plant based drugs through investigation of leads from traditional system of medicine. In recent years, ethno-botanical and traditional uses of natural compounds, especially of plant origin received much attention as they are well tested for their efficacy and generally believed to be safe for human use. It is best classical approach in the search of new molecules for management of various diseases. *Nerium indicum* depicted the fact that it is a popular remedy among the various ethnic groups, Ayurvedic and traditional practitioners for treatment of ailments. Researchers are exploring the therapeutic potential of this plant as it has more therapeutic properties which are not known.

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