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A Review on Divine Tree Nyctanthes Arbor-Tristis Linn – A Treasure House of Therapeutic Components

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Abstract: ***Nyctanthes arbor-tristis Linn is a short ancient tree believed to be a divine tree in India. The tree bears beautiful white flowers known for its aura. It is extensively cultivated in tropical and subtropical regions across the world. Since time immemorial, crude extracts of each part of the tree is used as a classical medicine in treatment of organ disorders, fevers, infections, expectorant, allergies, gynaecological problems, and various other diseases. Nyctanthes arbor-tristis Linn possess phytochemicals such as Alkaloids, steroids, Glycosides, flavonoids, Terpenes, essential oils, proteins that exhibit pharmacological activities like anti-inflammatory, anti-cancer, anti-diabetic, hepato-protective, CNS depressant, anti-anaemic, antipyretic, sedative and many more. This review article has included all the possible details about the plant, its distribution phytochemical constituents, and pharmacological activities. Phytochemical studies and Nyctanthes arbor-tristis Linn's pharmacological activities indicated it as a potential medicinal plant for various elements. However, more research is crucial to investigate the mode of action of the plant's bioactive constituents and its therapeutic potential.***

Key Words: ***Nyctanthes arbor-tristis Linn, Ancient divine tree, Classical medicine, Organ disorders, phytochemical.***

I. INTRODUCTION

Nyctanthes arbor-tristis Linn (NAT), is one among the most important medicinal trees known. The flowers of this tree bloom during night and spread its pleasant fragrance the whole night [1, 2]. Hence, it is popularly known as "Night Jasmine".

The generic name 'Nyctanthes' is taken from two Greek words 'Nykhta' meaning 'Night', and 'Anthos' meaning 'flower' [3, 4]. The specific name 'arbor-tristis' means 'the sad tree'' because the tree loses all its brightness and looks dull during the daytime.

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Nyctanthes arbor-tristis, a large shrub grows up to 10m tall, it has flaky grey bark, young branches, rough leaves [5], and beautiful white flowers with orange tube. It is often seen growing near temples, as it is considered as a divine tree.

Different parts of *Nyctanthes* arbor-tristis leaves, flowers, fruits, bark, root, and seeds had been investigated, which revealed important pharmacological activities hidden within and exposed potential phytochemicals such as alkaloids, flavonoids, steroids, terpenoids, saponins, essential oils and phenolic compounds [6, 7]. The crude extracts which were used since ancient period and the pure bioactive components that are being tested on various laboratory models have the potential to treat a wide range of diseases starting from acute ailments to chronic diseases. This signifies its major applications in medical field. The aromatic flowers can also be commercially exploited in manufacture of perfumes and its bright orange tube is used in dyeing of fabrics. It is noted that *Nyctanthes arbor-tristis* is at present listed under endanger species according to IUCN read data book. So, it is very to safeguard this species and further steps to be taken for its micropropagation.

II. SCIENTIFIC CLASSIFICATION

Kingdom: Plantae.
Division: Magnoliophuta
Class: Mannoliopsida
Order: Lamiales
Family: Oleacea.
Genus: Nyctanthes
Species: arbor-tristis
Binomial name: Nyctanthes arbor-tristis Linn.

A. Vernacular Names of Night Jasmine in India

Bengali – Harisinghar, Sheoli
Guajarati – Jayaparvati, Parijatak
Hindi – Harisinghar, Sihavu
Kannada – Goli, Parijatha
Konkani – Pardik, Parzonto
Malayalam – Mannappu, Pavizhamalli
Marathi- Kharbadi, Khurasli
Oriya – Godokodiko, Singaraharo
Punjabi – Harisinghar
Sanskrit – Parijatah, Siphalika
Tamil – Manjhapu, Pavala-malligai
Telugu – Kapilanagadustu, Pagadamalle
Urdu – Gulejafari, Harisinghar

III. SIGNIFICANCE OF PARIJATA TREE IN HINDU MYTHOLOGY

Nyctanthes arbor-tristis has great significance and sacred believes in Hindu mythology. One of the mythological stories tells that, when Gods and demons were performing Samudra Manthan, Parijata tree come along with many other things, it bore beautiful white flowers which had divine fragrance. Lord Indra took this tree, gifted it to his wife Indrani and planted it in his garden in Indrapuri. Hence, this tree is considered as. Tree of Universe' Parijata was brought by Arjuna (one among Panadava's), son of Indra and Kunti to Earth. Kunti, used to worship Lord Shiva by offering these flowers to him. Hence, called 'Jewel of God'. According to one of the mythologies, the tree originated from ashes of Kunti.

In Harivansh Puran, the tree is referred to as the 'Kalpa-vriksha'. This is known as wish bearing tree and therefore newly married couples are advised to worship this tree and seek blessings from the same to ensure eternal love and marital bliss.

The flowers of this tree bloom during night and fall on ground without any external force. Therefore, these are the only flowers that can be offered to God, even if they are picked up from the ground.

A. Morphological Characteristics of Nat

LEAVES: Leaves are oppositely arranged, simple, upper surface is dark green with rough texture, lower surface is light green with soft texture. It has reticulated venation with entire margin [8, 9, 10].

FLOWERS: Flowers distinctly grow at the tips of branches in clusters of 2 to7 [29]. They are small, bright with white corolla and orange centre. Individual flowers open at dusk and fall off at dawn [11, 12].

FRUITS: Fruits are laterally compressed, bilobate, brown, heart-shaped to round capsule (2 cm) in diameter, each lobe containing single seed [13, 14, 15, 16, 17, 18].

SEED: Seed is compressed and one per cell [19]. Seeds are exalbuminous, testa thick, the outer layer of large transparent cells and heavily Vascularised [20, 21, 22, 23, 24, 25].

BARK: NAT grows up to 10m (33 cm) tall, with quadrangular branches, Bark is dark grey or brown in colour, rough and firm, Bark surface is dip pled due to scaling off the bark by circular flakes. Inner bark is creamy white, soft, and collapsed and no collapsed phloem zone distinctly visible [26].

B. Phytoconstituents from Different Parts of Nat

Plant parts	Phytoconstituents
Leaf	Steroids - B- sitosterol, D-mannitol B-sitosterol, Astragaline, Nicotiflorin, Oleanalic acid, Nyctanthic acid, Tannic acid, Ascorbic acid, Methyl salicylate, Volatile oil Friedeline Label Mannitol, Glucose [27, 28]. Glycosides - Flavanol Glycosides - astragaline, nicotiflerine. Eroded Glycosides - arborsides A, B, C, 6 B hydroxyloganin, Desshamnosylverbacoside, 6,7-Di-Obenzovynycthanoside, 6-0-trans-cinnamoyl-6B-hydroxyloganin, 7-0 transcinnamoyl-6B – hydroxyloganin [29, 30]. Flavonoids – Nicotiflorin [31, 32] Terpenes - Triterpenes -B-amysin, oleanolic acid, friedeline, lupeol [33, 34].
Stem	Steroids - B-sitosterol [35, 36] Alkaloids - Nactanthine [37, 38] Glucosides - Naringenin-4'-OB-glucopyranosyl A-xylopyranoside [39, 40]
Flower	Glucosides - Cardiac glycosidenympharin Irridoid Glycosidesarbotristoside C, 6B hydroxy loganin, 6-0 trans-acetyl-7-Ocinnamoy 1 - 6 B hydroxyloganin, nyctanthoside, isoarborside C [56]. Flavanoids – Quercetin, kaemferol, Apigenin, Anthocyanin (flower oil) [41, 42] Terpenes - Diterpene – Nyctanthin, A-pinene, pcymene (flower oil) [43, 44]
Seed	Steroids - B-sitosterol [45, 46] Glucosides - Phenylproponoid Glycoside – nyctoside A Eroded Glycosiderarbortristosides A, B, C, D, E [47, 48] Terpenes - Triterpenes - 3, 4 secotriterpene acid, nyctanthic acid [49, 50]

IV. PHYTOCHEMICAL AND PHARMACOLOGICAL STUDY OF NAT

The leaves of NAT had various applications in curing wide range of diseases, but intense research has to undergo to reveal more phytochemical and pharmacological properties. The purification and extraction of antioxidative polysaccharide from its leaves by water, revealed the presence of highly branched polysaccharide containing esterified phenolic acids was displayed by chemical, chromatographic and spectroscopic analysis. ESMS analysis of per acetylated oligomeric fragments derived by Smith degradation furnishes a crucial structural information on a spectrum of glycerol tagged oligosaccharides. This poly saccharide exhibited dose dependent free radical scavenging ability as evidenced by DPPH and Ferric reducing power assay. This pharmacologically active compound formed a water-soluble complex with bovine serum albumin. This could incorporate smart approach in phototherapeutic management [51].

A fungus of NAT-PM0409092, the cytotoxic compound Altersolanol A, an anthraquinone derivative was isolated. The Fungus was identified to be *Phomopsis species* through DNA amplification and sequencing of ITS region. Through 2D NMR spectroscopy and other spectroscopic data, the chemical structure of Altersolanol A was explained with regard to its physicochemical properties. The compound exhibited cytotoxic activity against 34 human cancer cell lines with mean IC50 (IC 70) values of 0.005 µg ml-1 (0.024 µg ml-1).

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A kinase inhibitor, Altersolanol A, induces cell death by apoptosis from the cleavage by Caspase 3 and Caspase 9 and also by decreased anti-apoptotic protein expression. This study authenticates the cytotoxic effect of Altersolanol A, isolated from endophyte *Phomopsis species* of NAT. This study also indicates the utilisation of Altersolanol A for development of Chemotherapeutics [52].

The analysis of n-alkane profile of epicuticular wax that was extracted from mature leaves NAT revealed hentriacontane (n-C31), tritriacontane (n-C33), tetratriacontane(n-C35) and nonacosane (n-C29) as the important constituents with tritriacontane (n-C33), being a presiding constituent. The collective percentage of these four alkanes exhibited phenological variation being elevated during the fruit ripening stage (average value 63.29%) followed by flowering stage (mean value 60.74%)

The rest of the year it exhibited moderate values around 54.31%. The study authenticates the xerophytic features of plant having greater portion of longer carbon chain n-alkanes greater than C31[12]. The orange-coloured tubular calyx of NAT flower contains A carotenoid aglycone Ag-NY1, which was isolated for comprehensive spectroscopic study of the structure, which exhibited that the carotenoid molecule is Crocetin, which is a crucial aglycone existing in the stigma of Crocus statives. The compound manifested a good membrane stabilizing activity as compared to corresponding glycoside Crocin [53].

A. Classical Uses of Nyctanthes Arbor-Tristis

Plant Parts	Treatment
Leaves	Anti-helmintic, antimicrobial, antidote to reptile Venoms, spleen diseases, sciata, fungal skin infections, arthritis, dry cough, liver disorders, diabetes, piles, malaria, gynaecological problems.
Flowers	mouth ulcers, expectoration from lungs, gout, opthalmic purposes, in preventing greying of hair and baldness or hair related problems
Bark	Rheumatic joint pain, bronchitis, snakebite, Malaria
Seeds	Scalp scurvy, alopecia skin diseases, anti-helmintic, piles, bilious fever.
Roots	Antihelmintic

B. Therapeutic Applications of Nyctanthes Arbor-Tristis Linn:

The table below gives a brief idea of the parts of the plants, their extracts, and therapeutic applications of NAT. Study has been done on different parts of plant like leaf, stem, flower, seed. Phytochemicals are extracted using various chemical compounds such as ethanol, methanol, ethyl acetate, Chloroform and are successfully tested on experimental models by *in vitro* and *in vivo* techniques which was helpful in revealing its potential therapeutic effects.

Plant Part	Extract	*In vitro/ In vivo study*	Therapeutic Application
Fruit, Leaf, Stem	Methanol	*In vitro (Cell lines)*	Anticancer
Stem Bark, Root	Ethanol Methanol	*In vivo (Rat)*	Antidiabetic
Leaves	Ethanol Petroleum ether	*In vitro*	Analgesic
Whole plant Stem, Leaf	Aqueous Alcoholic	*In vivo (Rat)*	Anti-inflammatory
Leaves, flowers, fruits, seeds	Chloroform and ethyl acetate	*In vitro*	Antimicrobial
Leaves, Seeds Leaves	Alcoholic and Aqueous Methanol	*In vitro* *In vivo (Albino-Wister rat)*	Hepato-protective activity
Stem, Bark, Leaf	Petroleum ether Chloroform and ethanol	*In vitro*	Antifungal
Leaf	Aqueous	*In vivo (Swiss Albino mice)*	Immunostimulant
Whole plant	Aqueous	*In vivo (Mice)*	Anticholinesterase activity
Leaves and stem	Ethanolic	*In vitro*	Antioxidant
Leaves	Alcoholic	*In vivo (Guinea pig)*	Anti-allergy
Dried leaf, flower, fruit, seed	Ethyl acetate and chloroform	*In vitro*	Antibacterial
Flowers Leaves	Chloroform 50% Ethanol	*In vitro* *In vivo (Mouse)*	Antifilarial
Leaves	50% Ethanolic	*In vitro and* *In vivo (Swiss mice)*	Anti-trypanosonal
Seeds	Iridoid glucoside	*In vitro and* *In vivo (Hamsters)*	Anti-Leishmanial activity
Leaves, flowers, seeds, and bark	Ethanol	*In vitro*	CNS depressant
Dried plant parts	Hydro alcoholic	*In vitro*	Anti-anxiety
Leaves	Methanol and chloroform	*In vivo (Human trial)*	Anti-malarial
Leaves, flowers, bark, seeds	Ethanolic	*In vivo (Rat)*	Anti-anaemic
Leaves	Alcoholic	*In vivo (Guinea pig)*	Anti-histaminic Anti-tryptaminergic
Leaves	Ethanol	*In vivo (rat, Swiss albino mice)*	Antinociceptive and Anti-pyretic
Seeds	Ethanolic	*In vivo (Mice)*	Anti-viral
Leaves	Alcoholic	*In vivo (Albino rabbits)*	Tranquillizing, Anti-histemic, Purgative
Flowers	Aqueous	*In vivo (Male rats)*	Sedative effects
Bark	70% Methanol	*In vivo (Adult male albino rat)*	Anti-spermatogenic
Fruit	50% ethanolic	*In vivo (Adult albino rat)*	Anti-stress
Flower	Aqueous	*In vivo (Adult male mice)*	Hypoglycaemic and hypolipidemic activity

V. THERAPEUTIC APPLICATIONS IN DETAIL

A. Anticaner

The methanol extracts of leaf, stem and fruit of NAT were examined for *in vitro* anticancer activities. At 30 mg/ml con, with 71% inhibition of dried NAT leaf methanol extract exhibited moderate activity and 10mg/ml con. with 86% inhibition exhibited least inhibitory activity of breast cancer cells free of pathogens [54,55]

B. Anti Diabetic Activity

The chloroform extract of flowers, leaf and ethanolic extract of leaves remarkably rise superoxide dismutase and catalase volume and cause a remarkable depletion in liver lacto peroxidase, serum volume of SGPT, SGOT, alkaline phosphatase, cholesterol, and triglyceride levels in contrast to diabetic controls. Also, Ethanol extract of stem bark possess outstanding anti-diabetic activity when treated with streptozotocin nicotinamide induced diabetic rats [56, 57]

C. Analgesic Activity

It was established from percentage inhibition index that the ethanolic extract of NAT exhibited finer analgesic activity then aqueous extract when juxtaposed with standard drug Aspiring [53]. Petroleum ether and β-Sitosterol from NAT leaves could be accountable for analgesic activity [58, 59, 60].

D. Anti-Inflammatory Activity

The aqueous extract of entire plant, alcoholic extract of stem, seed and leaves of NAG were reported to have acute and subacute anti-inflammatory activity. The acute anti-inflammatory activity is evaluated in inflammatory models utilising different phlogistic agents that are Carrageenan, formalin, histamine and 5-hydroxitryptamine and hyaluronidase in hind paw of rats. In subacute models, *N-arbortristis* was found to check granulation tissue formation.

greatly in the granuloma pouch and cotton pellet test, NAT is also found to impede the inflammation produced by immunological methods that are Freund's adjuvant and purified tuberculin reaction.

E. Anti-Microbial Activity

Leaves, bark, and seeds oil have massive range of antibacterial movement contradictory to gram poor and gram sublime minute organic entities including streptomyces lines. The aqueous and methanal concentrates of the developed leaves of NAT have been investigated for bactericidal games against Escherichia coli, and Staphylococcus aureus, Bacillus subtilis and Pseudomonas aeruginosa. The two extracts had been vivaciously contradictory to the microscopic organisms apart from *P. aerugionosa* that got impermeable to the fluid extract

F. Hepatoprotective Activity

The leaves and seeds of NAT aqueous extracts were found to have anti-hepatotoxic activity against Carbon tetrachloride Induced hepatotoxicity. Additionally, it was confirmed that alcoholic and aqueous extract exhibited crucial hepatoprotective activity by decreasing the volumes of serum glutamic pyruvic transaminase (SGPT), serum glutamic oxaloacetic transaminase (SGOT) and serum bilirubin. The results were established by histopathological studies of liver samples which showed regeneration of hepatocytes by the extracts.

G. Antifungal Activity

Ethanol, chloroform, and petroleum ether extracts of stem bark is found to have prospective antifungal activity against Aspergillus Niger and Candida albicans. Leaf extracts are efficacious in decreasing radial growth of three fungal pathogens of rice, *Rhizotonia solani, Pyricularia oryzae* and *Cochliobolus miyabeanus*.

H. Immuno-Stimulang Activity

Aqueous leaf extract of NAT had been found as a formidable immunostimulant as exhibited by both humoral and cell mediated responses [10]. Flowers exhibited immunomodulator activity by activating cell mediated immune system [27]. Also, the ethanolic extracts of root and seed displayed immunostimulant activity against systemic candidiasis in mice.

I. Anticholt Nestepase Activity

The aqueous extract of NAT stimulated the activity of acetylcholinesterase in mice and estranged the inhibition of this enzyme by malathion. Elevated effects were perceived in serum than in brain. Low anti-muscarinic activity against acetylcholine induced contractions of isolated rabbit ileum was already reported.

J. Antioxidant Activity

Leaves and stem of NAT play crucial role in furnishing herbal antioxidants. Phytochemical screening of ethanolic extract of stem and leaves of NAT disclosed the presence of flavonoids, tannins, saponins, glycosides, alkaloids, steroids, and phenolic compounds. Phenolic compounds were spotted as antioxidant agents, that acts as abstract radical terminators and were known to display medicinal hobby and show physiological functions. The inspiring sequel of NAT with varied invitro antioxidant test proved the plant as reducing agent and dynamic as scavenger of hydrogen peroxide and free radicals. The comprehensive antioxidant hobby of NAT could be credited its polyphenolic content and other phytochemical constituents.

K. Anti-Allergic Activity

The pre-treatment of guinea pigs exposed to histamine aerosol with a water-soluble section of alcoholic extract NAT leaves furnished outstanding protection against development of asphyxia. Arbortristoside A and Arbortristoside C present in NAT were reported to be Anti-allergic.

L. Antibacterial Activity

NAT antibacterial potential was gauged for gram positive bacteria Staphylococcus aureus and gram negatives bacteria's - *Escherichia coli, Klebsiella pneumonia* and *Pseudomonas aeruginosa*. The dried leaf, flower fruit and seed extracts prepared in ethyl acetate and chloroform had been utilised to evaluate their anti-bacterial activity with regard to zone of inhibition of bacterial growth. These activities of plant parts were due to the existence of diverse plant secondary metabolites viz.

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glycosides and phenolics. The ethanolic and hydroalcoholic extracts of leaves were also exposed for its antibacterial performance against both antibiotic resistant and non-resistant strains of Staphylococcus aureus. A benzo-furanone, 3, 3a, 7, 7a, tetrahydro-3ahydroxy-6(2H) benzo-furanone was remoted from flowers. The compound exhibited remarkable antibacterial activity against both gram positive and gram negative bacteria.

M. Antifilarial Activity

The chloroform extract of the flowers and a pure compound isolated from NAT plant displayed larvicidal activity against *Culex quinquefasciatus*, a habitual filarial vector.

N. Anti-Trypanosomal Activiy

A crude 50% ethanolic extract of NAT leaves were assessed *Invitro* and *in vivo* for Anti-Tripanosomal activity. The extract evidenced trypanocidal activity at the giant concentration (1000 $\mu g/ml^{-1}$) tested

O. Anti-Leishmanial Activity

The Anti-Leishmanial activity of NAT has been credited to iridoid glucosides, Arbortristosides A, B, and C and 6-b-hydroxyloganin. The Arbortristoside and 6-b-hydroxyloganin evidenced both invitro & in vivo anti Leishmanial activity against amastigotes in macrophage culture and hamster test systems.

P. Cms Depressant Activity

It was recorded that the leaves, flowers, seeds, and bark of NAT displayed noteworthy concentration dependent extension of onset and duration of sleep and found to cause decrease in dopamine and increase in serotonin level from which it can be set on that CNS depressant activity of ethanol extract of seeds, leaves and flowers could be due to decrease in dopamine and increase in serotonin level.

Q. Anti-Anxiety Activity

NAT hydroalcoholic extracts have anxiolytic potential. Utilising hydro-alcoholic blend, dried plant parts of NAT was extracted, concentrated by distilling off the solvent and then evaporated to dryness on water bath and then stored in airtight container in refrigerator till used.

R. Antimalarial Activity

Clinical study was undertaken on 120 patients of Malaria. Fresh paste of medium sized 5 leaves of NAT was administered thrice a day for 7 to10 days which cured the decease in 92 (76.7%) patients within 7 days. Another 20 patients were cured by 10 days while remaining 8 patients did not respond to treatment. The paste was well tolerated, and no reverse side effects were recorded. Screening of methanol and Chloroform extract of leaves for mosquito larvicidal actively against three major mosquito vectors. Aedes aegypti, Culex quinquefasciatus and Anopheles stephensi has found the two extracts to kill larvae of A. stephensi with LC50 value of 244.4 and 747.7ppm respectively.

S. Anti- Anemic Activity

Research was executed as a haematological study on ethanolic extracts of the flowers, barks, seeds and leaves of the plant and observed the concentration dependent rise in haemoglobin content and red blood cells count in rats. The extracts also protect the decline of hemogram profile in anaemic rats.

T. Anti-Histaminte and Anti Tryptaminergic Activity

The aqueous soluble of alcoholic extract of NAT leaves (4.0 and 8.0 g/Kg) significantly protect against histamine aerosol-induced asphyxia (2% @ 300mm Hg) in guinea pigs. Arbortristoside A and Arbortristoside C present in NAT was reported to be anti-allergic.

U. Anti-Nociceptive and Antipyretic Activity

Antipyretic sequel against brewer's yeast-induced proxies in rats was indicated. When dispensed orally for six consecutive days in rats, it generated dose dependent gastric ulcers. The water-soluble fraction of ethanolic extract of the leaves manifested crucial aspirin-like anti nociceptive activity which was exhibited by inhibition of acetic acid induced squirming in albino mice but deteriorates to evoke morphine like analgesia which was proved via tail flick and mouse tail-clip method.

V. Anti-Viral Activity

The ethanolic extract, n-butanol portions and two pure compounds, Arbortristoside C, remoted from NAT acquire distinct inhibitory activity against Encephalomyocarditis virus (EMCV) and Semliki Forest Virus (SFV). The in vivo ethanolic extract and n-butanol fraction at day-to-day doses of 125 mg/Kg weight guarded EMCV infected mice against SFV by 40% and 60% respectively.

W. Tranquilizing Antistaminic & Purgative Activity

Comprehensive research was undertaken with water soluble portion of alcoholic extract of leaves of NAT for certain CNS activities (namely hypnotic, tranquilizing, local anaesthetic, hypothermic, anticonvulsant), antihistaminic and purgative activities. The results were found in consonance with vital typical tranquilisers and thus bolstered the utilization of the plant by Ayurvedic physicians in prior mentioned conditions.

X. Sedative Effect

The sedative potentiality of a hot Infusion of the blossoms were assessed in rats. Male rats exposed a concentration dependent responsive sedative activity, while females persisted unaffected. At these doses, muscle strength and cardio Nyctanthes arbortristision were not affected, nor was blood glucose levels affected even at the excessive dose. However, glucose absorption from small intestine was notably diminished, the sedation was credited, in part, to the antioxidant and membrane stabilizing property of the extract.

Y. Antistress Activity

Antistress potential was examined in fruit of NAT. water soluble fraction of 50% ethanolic extract of fruit was administered to adult albino rats. It reversed the stress-induced biochemical changes.

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Z. Antispermatogenic Effect

Bark of NAT was utilized for testing antispermatogenic effect. 70% methanol extract of bark was administered to adult male albino rats in vivo. It exhibited suppression of spermatogenesis.

AA. Hypoglycemic and Hypolipidemic Activity

Aqueous extracts of NAT flowers were used to assess hypoglycaemic and hypolipidemic properties. The aqueous extracts of the flower were given orally to adult male mice *in vivo* in dose dependent manner. It proved to be safe for oral consumption which evokes promising hypoglycaemic and hypolipidemic activity. The active principle requires the future investigation.

VI. SOME OTHER ACTIVITIES

Acetone extract of seeds evinced ovicidal effect on the eggs of the rice moth, Corcyra cephalonica. The inhibition of egg hatching increased with increase in dose of plant extracts in contact toxicity test. 80.73% Ovicidal activity was observed at 100% concentration of the extract. Petroleum ether extract of NAT also evinced insecticidal activity against Bagrada cruciferarum. The ethanolic extract of whole plant has been reported to initiate hair growth.

A. Toxictty

The ethanolic extract of NAT leaves exhibited toxic effect. The median fatal dose 16 g/Kg was noticed in rats. At 2.0 g/kg, no mortality was observed, while at 32g/kg dose 70% mortality was noticed. When ethanol extract of leaves 1, 2 and 4 gm/Kg/day was orally administered for six consecutive days, it generated gastric ulcers in rats. Also, this extract exhibited irritant effects as it, concentration dependently, the formation of unformed semi fluid collagenous pasty stools in albino mice due to a purgative effect. Rabbit developed conjunctival congestion with oedema when the extract was infused into its eye. At the same time the person who grinded the dried leaves developed vesicles on both palms.

B. Commercial Applications

The corolla tubes, used for dyeing silks and cotton. The blossoms are gathered for religious offerings and to make garlands The essential oil in aromatic blossoms is used as perfume. The bark could be utilized as polishing as a toning material and leaves were used for polishing word and ivory.

VII. CONCLUSION

NAT is perhaps a “Treasure house” of the therapeutic components! which efficiently cures wide range of diseases in astonishing way. This review gives information concerning significance of Parijata – A Devine tree in Hindu Mythology. Morphological features, Phyto constituents from different parts of the tree. Toxicity of the extracts should also be considered in human study for safety purposes. The extracts must be administered in dose dependent manner. The review specially focuses on the Therapeutic applications it possesses. NAT stands as one of the leading alternative potential medicinal plants in treatment of various diseases. It possesses Commercial application along with the Therapeutic applications as described. But it is disappointing that NAT is at present listed under critically endangered species according to IUCN Red data book. Hence, it is very crucial to safeguard this amazing shrub that possesses diverse applications. Researchers of distinct branches of life sciences should work hand in hand in extensive micropropagation of NAT and exploitation of the most essential bioactive components present in NAT by utilising advanced technologies. This research work in fact, helps the society in various ways in development of medical field and also economic development.

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