A COMPREHENSIVE REVIEW ON THE WOUND HEALING PROPERTY OF NEUROCALYX CALCINUS EXTRACT

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ABSTRACT: Traditional medical practises like Siddha, Ayurveda, and Unani, among others, have used herbal remedies for thousands of years. The allopathic medical system made considerable use of medicinal plants to create novel compounds for the treatment for challenging illnesses. However the increased cost of medication and associated side effects have led to usage of plant sources, The Plant *Neurocalynx Calcinus is* commonly known as Paccha chedi widely used by the tribal people of Kerala is reviewed for the wound healing activity

For it's wound healing and antioxidant qualities, phytochemistry and pharmacology have been under study in recent times. This review goes into great length on all of the most recent evidence regarding it's properties, phytochemistry, and pharmacology. The phytochemical makeup of the plant was analysed, and it was found to include phenolic compounds, tannin, alkaloids, triterpenes, flavonoids, saponins. This drug has undergone thorough Traditional medical systems and has been used as herbal remedies in treatment by the ayurveda for quite few years. The anti-oxidant and wound healing effects of this drug have been thoroughly tested. Along with Anti-microbial activity, the study of the plant has largely been used to identify natural substances that are important for the creation of medicaments for the same. The majority of pharmaceuticals on the market today are made from plants, with simple synthetic modifications employed to produce novel chemicals.

Keywords: *Neurocalynx Calcinus,* Phytochemical, Alkaloids, Antimicrobial activity .Antifungal activity, Wound healing activity

INTRODUCTION: India has a wide variety of vegetation, which contributes to the abundance of medicinal plants there. They are employed to treat many ailments in both herbal and conventional medicine. They support the restoration of good health, something that pharmaceutical treatments are unable to do, in addition to helping to treat illnesses. The number of publications on the chemistry, pharmacology, and clinical research of medicinal

plants has expanded in recent years as a result of this increased interest from scientists.With this plant wound healing, anti-microbial, anti-inflammatory, and antiviral effects have all been noted. This plant yields crude extract, with a pleasant aroma that Siddha practitioners frequently used to ,treat a range of illnesses. Extract is derived using a conventional extraction method. This review concentrates on a number of the plant's therapeutic properties, that have been verified scientifically and offers strong justification for the traditional application of the plant.

The substantial therapeutic potential of *Neurocalynx Calcinus* is a result of it's biochemical characteristics, which are frequently found in conventional treatments. The current review, which aims to address these concerns, concentrates on *Neurocalynx Calcinus* phytochemical and pharmacological qualities .It is a low understory shrub with numerous spreading branches with terete growth patterns. It is a member of the Rubiaceae family.Traditionally, it has been used to treat a variety of skin problems and wound healing in South India and Sri Lanka

Plant profile

Taxonomy

Synonym:Paccha chedi
Kingdom : Plantae
FAMILY : Rubiaceae
Genus : Neurocalynx
SPECIES :N. Calcinus [1].

BOTANICAL DESCRIPTION: It is a herb that grows vertically. Some are tiny trees that can reach heights of 5–6 m (16–20 ft).

When the stem is young, it is dark brown, then turns greyish white and branches out to a width between 0.7 cm and 1.5 cm. The roots are woody and dark in colour, with lateral roots that are between 0.5 and 3.0 cm wide. The leaf is packed on the young branches, trifoliate, pale green, obanceolate, digitate, sessile, and has tiny stipules. The white, little blossom is tiny.

One leaflet has the lamina vertically while the other has the lamina laterally deflexed. Leaflets are folded adaxially. Adaxially folded leaflets are distinct from ordinary leaflets by having broad, circular canals in the midrib and leaf margins. The canals are 50 millimetres in diameter. The lamina has a bifacial look that is obvious. It is made up of large, thin epidermal cells with 15-20 mm wide walls that are square or rectangular in shape. The mesophyll is further separated into three zones: the adaxial zone of palisade cells, the median level of circular cells, and the adaxial zone of spongy parenchyma cells. The palisade cells are thin and cylindrical in shape, packed closely together, and arranged in two rows. It is composed of three layers of loosely packed, lobed, spongy parenchyma cells. The lamina has a thickness of 250 mm.

The little circular collateral circulatory bundle that is present in the centre of the rib and distinguishes the midrib. The midrib does not have a canal. The three or four shoots, parallel xylem component lines, and a few phloem components that make up the vascular bundle are all linked by capillaries. The presence of prominent papillae cells in the abaxial epidermis

serves as a defining characteristic. Broad and asymmetrically shaped vein islets have well-defined, simple or forked vein terminations at the lamina. The tracheids in the vein terminations are arranged in a globular cluster. They have pitted thickenings on the walls of their chambers and are short and cylindrical in shape.

The tracheids are large. the little, circular collateral circulation bundle that marks the midrib and is located in the middle of the rib. There is no canal in the midrib. The vascular bundle is made up of three or four shoots, parallel xylem component lines, and a few phloem components that are all connected by capillaries. A distinguishing feature is the presence of prominent papillae cells in the abaxial epidermis. Vascular islets with broad and uneven shapes terminate at the lamina in well-defined simple or forked veins. In the vein terminations, the tracheids are organised in a globular cluster. They are short and cylindrical in shape, with pitted thickenings on the walls of their chambers. Large tracheids are present 800 mm thick are the roots. It is made up of wide shallow fissures and periderm that is rather broad and superficial. After the periderm, there are parenchymatous & dense continuous sclerenchyma cells. The distribution of the secondary phloem is extensive and continuous.

A substantial, spherical, thick-walled diffuse mass of vessels and sclerenchymous ground tissue is compressed into a limited area by secondary xylem, which is dense and compact.The majority of secondary xylem is made up of xylem. The thickest part of the root is 2 to 5 mm.The radial segments of fibres that connect to the cortical region are discontinuous, and the periderm is bigger and deeply fissured. There are around nine fan-shaped radial bands of arteries and fibres that make up this 1.5 mm thick cylinder. that are linked by a common vein. There is a long, thick-walled radial chain of big, round vessels that runs down the length of each xylem band [2]. Dilated rays further divide the radial level xylems into smaller parts

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Fig 1 Flowers of *NEUROCALYNX CALCINUS*

Fig 2 Leaves of *NEUROCALYNX CALCINUS*

Fig 3 Flowering buds of *NEUROCALYNX CALCINUS*

Family : RUBIACEAE
(Madder Or Coffee Family)

- Synonym(s): Neurocalyx wightii Arn.
- Species Name (as per The Plant List): Neurocalyx calycinus (R.Br. ex Benn.) Robins.
- Habit: Herb
- Key identification features: An erect herb; stem woody, short. Leaves opposite, crowded toward the apices of branches. Flowers 1-2 cm across. Fruit dry, dehiscing irregularly. Seeds many, globose
- Flower, Fruit : March-July

Distribution: Karnataka : Udupi district, Dakshina Kannada district, Chikkamagaluru district, Shivamogga district, Hassan district, Kodagu (Coorg) district, Uttara Kannada district and Kerala : Kannur district, Wayanad district, Malappuram district, Palakkad

PHYTOCHEMISTRY: The plant includes triterpenes, alkaloids, phenolic groups, flavones, tannin, sugars, amino acids, and reducing sugar, according to the phytochemical study [3].The total amount of phenols and tannins in the leaves and stems of *Neurocalynx Calcinus* were quantified using spectrophotometric methods. It is advantageous that the plant contains more phenols than tannins [4]. The hitherto unidentified chemicals were isolated from methanolic extracts of *Neurocalynx Calcinus* [5] .The GC-MS analysis of the methanolic extract of *Neurocalynx Calcinus* revealed ten major peaks, each of which related to a phytoconstituent present in the plant. IR and NMR analysis was used to determine the structure of the molecules. [6] Three of these are dodecanoic acid, tetra decanoic acid, and n-Hexadecenoic acid. compounds that exhibit antioxidant and antibacterial properties,

TRADITIONAL USES: The leaves, flowers, and tender shoots have well-known cooling and demulcent effects. The leaves are used to cure abscesses, skin ailments, and Among other things, oozing wounds [7]. This plant has one of the main ingredients phenolic compounds and flavonoids which is probably the wound healing agent in case of chronic wounds .Along with other herbs, the leaves are crushed and the dark green juice is directly applied on the wounded area directly too.

ANTIMICROBIAL PROPERTIES

Several *Neurocalynx Calcinus* leaf and root extracts were examined using the disc agar method against 13 microbiological species, including 8 bacteria and 5 moulds find out how antibacterial they are. While this plant's leaf and root extracts in petroleum ether, chloroform, and acetone were discovered to have antibacterial activity against B. cereus, E. aerogenes, S. typhi, P. vulgaris, and S. aureus, *Neurocalynx Calcinus* methanol extract was discovered to have both antibacterial and antifungal activity against S. aureus and B. cereus. On the other hand, P. vulgaris was most effectively inhibited by the methanol root extract (22mm). Root extract have been found to have stronger antibacterial and antifungal effects [11]. Through the usage of agar, the antibacterial characteristics of naturally obtained extract from *Neurocalynx Calcinus* were compared to those of a commercially available product of other medicament using the agar gel diffusion technique [12].

Anti-inflammatory-reduction capacity

The ability of *Neurocalynx Calcinus* methanolic extract to inhibit cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2) was investigated as an antioxidant capacity .The compound strongly suppressed COX-1, and it was shown that it’s anti-inflammatory activity in vivo was comparable to that of the over-the-counter drug ibuprofen. Through the use of molecular docking assays, the binding orientations of gallic acod in the functional regions of COX-1 and COX-2 were identified.Recent research article demonstrated the anti-inflammatory effects of an alcoholic extract of *Neurocalynx Calcinus* in rats, and also described the anti-inflammatory effects of a dried stem of *Neurocalynx Calcinus* in rats [20]

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Antioxidant function

The ability of two leaf fractions from *Neurocalynx Calcinus* to scavenge free radicals was investigated. The DPPH radical, ABTS radical, nitric oxide radical, and hydroxyl radical scavenging assays were used as four in vitro models to evaluate activity. Both fractions had considerable antioxidant activity when compared to typical antioxidants. The fact that the chloroform fraction exhibits more radical scavenging activity than the ethanol fraction despite having less polyphenolic compounds suggests that the structural makeup of polyphenolic compounds influences their antioxidant capacity. [25]

Liver-protective behaviour

An alcohol extract from the stem of *Neurocalynx Calcinus* was investigated for it's ability to protect rats liver from CCl4-induced liver damage. Histopathological and biochemical markers were employed to evaluate the action. A liver sample's histological changes were contrasted with those in a control group. It was discovered that the extract had a sizable hepatoprotective effect [27].

The hepatoprotective properties of methanol extracts of *Neurocalynx Calcinus* against the liver-damaging paracetamol were studied. The near-normal levels of biochemical markers like SGOT, SGPT, ALP, and GGPT that are affected by paracetamol-induced hepatotoxicity show the hepatoprotective activity of these extracts.

Alcoholic extracts of *Neurocalynx Calcinus* was found to exhibit antioxidant effects against free radicals, LPO, SOD, catalase, and DPPH when compared to control group mice.

Alcoholic extracts of the plant *Neurocalynx Calcinus* was found to have antioxidant effects against free radicals, LPO, SOD, catalase, and GPx generated during paracetamol-induced hepatotoxicity when compared to mice in the control group. Histopathological examinations of liver sections after treatment with alcohol extracts of *Neurocalynx Calcinus* demonstrated regenerative changes in hepatocytes. A dose-dependent hepatoprotective effect is produced by the alcohol extracts of *Neurocalynx Calcinus* [28].

Kidney-protective activity

The methanol extract of *Neurocalynx Calcinus* was evaluated for it's ability to protect wistar male albino rats against gentamicin-induced nephrotoxicity. Blood urea, serum creatinine, serum uric acid, serum electrolytes, and antioxidant indices such Renal SOD, Catalase, LPO, and GPx were all examined by the researchers. The findings showed that kidney SOD catalyse levels had significantly increased while high serum marker levels had significantly decreased. The dose level of 500mg/kg was revealed to have a protective effect by a histological study, but the dose level of 250mg/kg had only marginal protection [29].

Wound healing activity

Using an excision wound model, the ability of *Neurocalynx Calcinu*s methanol extract to promote wound healing was evaluated. The effects of two different *Neurocalynx Calcinus* extract dosage levels were investigated. The wound treated with plant medicine demonstrated a faster rate of wound closure, elevated levels of Hydroxyproline, Hexosamine, SOD, and Ascorbic acid, and decreased levels of Lipid peroxides as compared to the control rats. Studies on the histopathology of the tissue also demonstrated a decrease in macrophages and increasing collagenation [30].

Conclusion: The wealth of information available on this plant, which shows that *Neurocalynx Calcinus* has considerable anti-microbial and antioxidant activities, attests to its medicinal importance. As a result, the conventional medical system provides substances with physiological activity and aids in the development of new pharmaceuticals.

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