



**PHARMACOLOGICAL PREPARATION OF WOUND HEALING ACTIVITY OF  
NAGARMOTHA PASTE ON WISTER RATS**

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Article Received on 02/10/2023

Article Revised on 23/10/2023

Article Accepted on 13/11/2023

**ABSTRACT**

Growing herbal remedies for general health is an old tradition. A need for ayurvedic medicines has grown significantly in the last decade. It is because herbal drugs have significant impacts on living organisms. The perennial grass *Cyperus rotundus*, sometimes called nagarmotha, The Cyperaceae family includes nutgrass, sometimes known as purple nutsedge. It is a global plant species which may be obtained in almost any tropical, subtropical, or cold region. This is a plant that's also commonly used in traditional systems of medicine, including Ayurvedic as popular mechanisms around in the country, for its excellent healing skills in dyspepsia, defecation, constipation, abdominal discomfort, indigestion, dermatitis illnesses, hyperglycemia, and other conditions Furuncle infections,bruises with wounds, fever, stomach pain, and the like. It possesses excellent healing potential such as antioxidant potential, pro-government interaction, usually pro, blood, plasmodium, generally pro, anti-allergic, anti-tumor, painkiller effects, and neurological effects. This systematic study aims to inform on phytochemistry, conventional Treatments for furuncle illnesses in Ayurveda and traditional medicine, fractures in wounds, heat or gastrointestinal pain, and so on. It possesses exceptional healing potential including such antimicrobial properties, anti-diabetic activity, anti-inflammatory activity, anticoagulant activity, antihypertensive, anti-diarrheal, anti-allergic, anti-tumor, painkiller action, and anticarcinogenic activity. A aim of this paper is provide information on *Cyperus rotundus*' phytochemical compounds, classical use in Ayurvedic medicine and folk medicinal processes, and therapeutic properties.

**KEYWORD:** Nagarmotha, Wound Healing, Excision, Incision.

**INTRODUCTION OF WOUND**

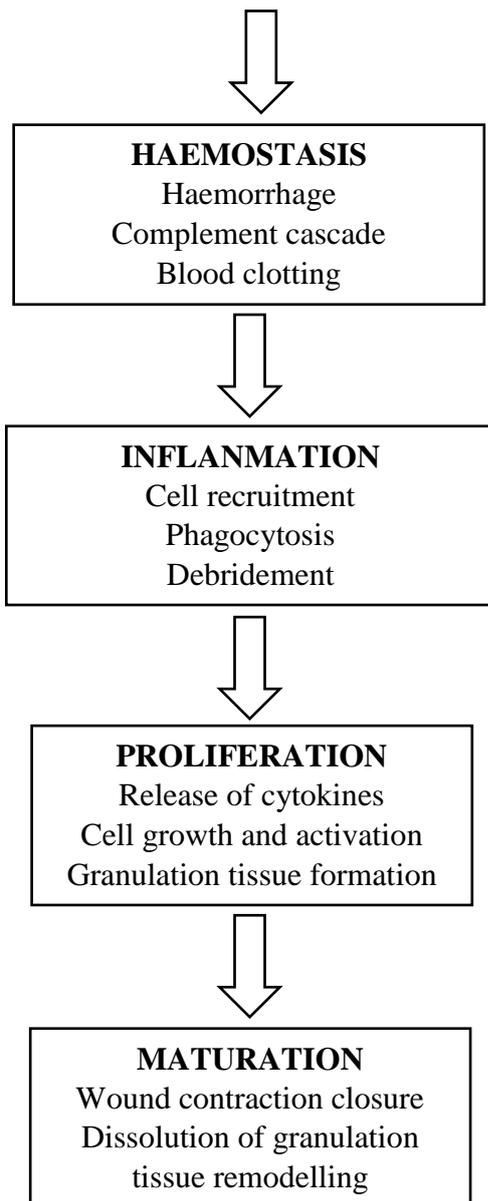
The complicated, dynamic process of a wound healing involves interactions between many cells and substances. The process of a live creature replacing damaged tissue with newly formed tissue is known as wound healing. In a clear chronology of the physical characteristics that make up the process of mending traumatic damage, wound healing is shown.<sup>[1]</sup>

A barrier of defence against the outside environment is formed by the inner and outer layers of the skin, or epidermis and dermis. Different stages of hemostasis, inflammation, proliferation, and remodelling are all part of normal wound healing.<sup>[1]</sup>

The replacement of amorphous form and excessively appropriate for clotting occurs during the early stage of wound healing in order to establish haemostasis of damaged platelets of the blood being to stick wounded site. When injured and dead cells, together with bacteria and other pathogens or debris, are being

removed, they produce chemicals that encourage clotting and inflammation.

When new tissue, new blood vessels, and matrix contraction are produced to make up for a shortage, this is called proliferation. The new tissue's tensile strength is increasing throughout this maturation period, which also improves the blood flow to the injured region. The stage of angiogenesis known as proliferation involves the deposition of collagen and granulation tissue. It is a vascular endothelial cell from angiogenesis, which produces new blood vessels.<sup>[2]</sup>



Wound that can be caused by very different problems. Diabetic is the being one or more regions of wounds that are not healing. The chronic wound may be useful in

medical terms of a wound persistent. Diabetes wound problem has not progressed through the stages different is the wound healing. These wounds are fall in oxygen the ability to heal fight injection of affected to white blood cells which fight infection required oxygen demand to the kill of bacteria.<sup>[4]</sup>

The term action of HBO are surrounding of a chronic wound have been high terms level of oxygen. That are many different of the oxygen demand encourages growth of the small blood vessels of the wound. This term reduce oxygen demand in help of body own in physiological action to fight disorder to the death of tissue.

This person has been H.B.O to help of wound problem is usually of 20-40 H.B.O year once of per day 6 days per weeks something difference will be first two weeks of treatment. The 5000 species all world. It is long genus is carex with 2000 species nagarmotha is the 550 species of a prenil weed the dark green galbrous the plant releases tubers called rhizomes. underneath, fibrous roots and basal bulbs scopes is the umbels upper the ground.<sup>[5]</sup>

#### Plant Profile

Nagarmotha is a type of grass that is usually referred to as "Nut grass". It has a distinctive scent and is commonly used in culinary spices, fragrances, and incense sticks.

Nagarmotha's deepan and pachan qualities, according to Ayurveda, aid digestion when taken in the right quantity. Because of its antispasmodic and carminative characteristics; nagarmotha oil is a useful home treatment for gastrointestinal ailments.

Because of its anti-oxidant properties, Nagarmotha oil aids in the management of diabetes. It protects the body from certain diseases and inhibits cell damage caused by free radicals. It also has anti-diarrheal properties, as the presence of flavonoids reduces the production of watery stool.<sup>[6]</sup>

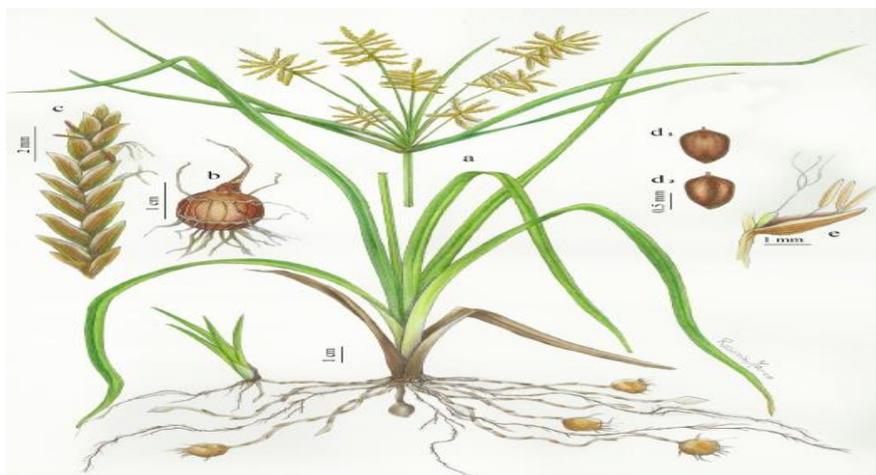
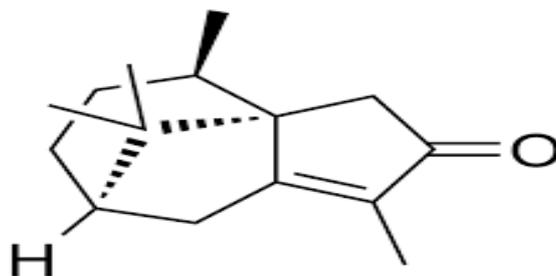


Image: Herbal Plant of *Cyperus Rotundus*.



**Chemical Structure of Nagarmotha (Cyperus rotundus)**

Nagarmotha may be beneficial in the treatment of skin infections. Because of its Astringent nature, using a paste of Nagarmotha powder and coconut oil reduces swelling and stops bleeding. On the skin, Nagarmotha oil or powder is usually used with coconut oil or rose water.<sup>[7]</sup>

It flourishes best in gardens, lawns, fields, and waste areas of southern Asia, southern and central Europe, and Africa, where it loves moist or well-irrigated, light sandy and medium loamy soils with an acidic, Neutral, or alkaline nature.

Nagarmotha is a colonial plant with fibrous roots that reaches a height of 7 to 40 cm. Tubers, basal bulbs, basal bulbs, rhizomes, and fibrous roots are the means by which they reproduce. These rhizomes begin as white, meaty, and scaly, with wiry, fibrous, and dark brown leaves.

There is no specific growth orientation for these rhizomes. Tuberous bulbs, also known as basal bulbs or maize, are huge structures that grow vertically and reach the soil, eventually giving rise to roots, shoots, and other rhizomes, and are 2-25mm in diameter. Those sprout horizontally or downwardly from a chain of tubers or a single tuber, on the other hand.<sup>[8]</sup>

The leaves that emerge from the plant's base are typically dark green, glossy, and thin, with tubular and membraneous leaf sheaths. The inflorescence is supported by the tall, smooth, and triangular stem. Flowers are bisexual, they are formed in compound

umbels with three to eight spikelets and have a pistil with three stigmas and three stamens.

Fruits are produced all year, but especially during the monsoon season, and contain seeds in the form of trigonous nuts. The leaves that emerge from the plant's base are typically dark green, glossy, and thin, with tubular and membraneous leaf sheaths. The inflorescence is supported by the tall, smooth, and triangular stem. Flowers are bisexual, They are formed in compound umbels with three to eight spikelets, each with three stamens and a pistil with three stigmas. Fruits are produced all year, but especially during the monsoon season, and contain seeds in the form of trigonous nut.<sup>[9]</sup>

#### Classification of Nagarmotha (Cyperus Rotundus)

Genus	Genus
Species	C.rotundus
Kingdom	Plantae
Unranked	Angiosperms
Unranked	Monocots
Unranked	Commelidins
Order	Poales
Family	Cyperaceae

#### Generated and Allocation

Cyperus rotundus is the well-known intrusive weed with either a global global spread both temperate and tropical climates. That has been called "the worst weed in the world."<sup>[10]</sup>

#### Nagarmotha (Cyperus Rotundus) of Indian Names.

Sanskrit	Bhadramusta, Granthi, Kachhda, Mustako, Sugandhi-granthila
Tamil	Korai
Telugu	Tungagaddi
Gujarati	Motha
Hindi	Motha, Mutha
Canarese	Koranarigadde, Tungegaddo, Tungehullu
Marathi	Bimbal, Nagarmotha, Motha

#### Macroscopic Character

It is a stoloniferous, rhizomatous, halophytic perennial sedge. Rhizome is numerous and slim;

planting material and as growing, it is juicy; as grown, it becomes rigid and black; xylem the coming out of a rhizome. Glabrous, deep green vibrant community

upward, A leaf is darker green and either a webbing in reddish brown and is clustered to base of the root  
Inflorescence 3-9 spreading beams with few, large

spikelet tassels; spikelet 20-40 flowered, red brown to almost black.<sup>[11]</sup>



### Nagarmotha Root

#### Chemical Constituents

Despite Cyperus' diverse chemical makeup, sesquiterpenes seem to have the most biological activity. These compounds have strong aromas and flavours. one of the most widespread sesquiterpenes discovered in Cyperus rhizomes. Some of the more popular Cyperone, -selinene, -cyperene, -cyperotundone, patchoulone, -sugeonol, -kobusone, and -isokobusone are a few examples. Pinene, a monoterpene that is a common plant constituent, and various sesquiterpene derivatives including cyperol, isocyperol, and cyperon are among the other terpenes discovered in Cyperus.<sup>[12]</sup>

#### Pharmacological Uses

Traditional uses for Cyperus rotundus rhizomes include the treatment of amenorrhea, dysmenorrhea, renal and vesicular calculi, ocular impairment, blood diseases, and general debility. The rhizomes are analgesic, anti-inflammatory, and antipyretic, according to pharmacological study. The excellent performance of its DPPH radical scavenging capacity in vitro demonstrates that its antidiabetic effect is caused by its antioxidant activity. The antibacterial effects of cyperus oil were tested on a variety of microorganisms, including Proteus vulgaris, Klebsiella pneumoniae, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, and Streptococcus pyogenes.<sup>[13]</sup>

#### AIM AND OBJECTIVE

- To investigate the potential use of plants with appropriate chemical and pharmacological properties in traditional medicine.
- To carry out a chemical analysis of the plant Nagarmootha.
- Nagarmootha's ointment was tested in experimental settings for its ability to heal wounds.

However, the current research was developed and carried out in the procedures that are roughly described as follows in order to appropriately and more precisely analyse and correlate the data gathered.

#### 3.1. Phytochemical investigation

- Collection and authentication of nagarmootha
- Phytochemical screening analysis of nagarmootha paste
- Characterisation of phytoconstituents of nagarmootha paste
- Formulation of ointment

#### 3.1.2. Pharmacological screening

1. Acute Dermal Toxicity:
2. Wound Healing Models:
  - a) Excision Wound Healing Test
  - b) Incision Wound Healing Test
  - c) Histopathological Study
  - d) Statistical Analysis

### MATERIALS AND METHODOLOGY

#### Collection of the plant materials

In the month of August 2021, fresh roots of *Cyperus rotundus* (Nagarmotha) were harvested from a nearby nursery garden in Kanpur (Kishan garden). Under the sun, the newly harvested plant material (Root) was dried. Dried plant material (root) was powdered using mechanical grinder and passed through sieve No.60 to get the powdered of desired coarseness powder material was preserved in air light container.<sup>[14]</sup>

#### PLANT MATERIAL

The model animals for excision and incision wounds were separated into six groups, each consisting of four animals, as shown below.

**Groups:-1** (Control Group) The animal of left untreated and considered as control.

**Groups:-2**(StandardGroup) animal of this group received 5% Povidone Iodine Ointment.

**Group:-3**(Test Group) Animal of this group on Herbal Paste (Nagarmotha 5% w/w).

**Group:-4**(Test Group) Animal of this group on Herbal Paste (Nagarmotha 10% w/w).<sup>[15]</sup>

### INCISION WOUND MODEL

According to the procedure presented, an incision wound model was produced.

Animals were treated in groups and using models for excision wounds. Ketamine hydrochloride (50 mg/kg ointment) was used to put all of the animals to death.

With the use of a sharp scalpel, On either side of the rats' vertical Colum, The top layer of the shaved skin was cut through by making a 4 cm incision.

The wound was repaired with interrupted sutures after full hemostasis stitches every day for 10 days using black silk surgical thread. After the 10 days, all of the rats had been anaesthetized, and the stitches were removed. Then, a tensiometer was used to measure the healed wound's tensile strength.<sup>[16]</sup>

### EXCISION WOUND MODEL

The Excision wound model was produce such as method report 6 group of animal groups each contain 4 rat was shaved on the dorsum portion used as a ointment paste animal anaesthetized used as a ketamine hydrochloride (40mg/kg) body weight.<sup>[17]</sup>

As a region were composed on save dorsal impression and field of he wound to be produce were marked.

The total softness excision wound with a circular area is a 314mm<sup>2</sup>

The animal was through a treatment employing footed forceps, a surgical blade, and pointed scissors along the marking before being released into a natural setting.

It is a straightforward paste that is applied once daily starting on the day of the procedure and continuing until the wound is fully healed.

In this model wound contraction to incision period was evaluation.

It is the stop of study.

All the animal was Anaesthetized and form the healed wounds.

The animal sumples tissue was collected from each other animal leaving 95mm margin of simple skin around of the head wound.<sup>[18]</sup>

### WOUND HEALING EVALUATION PARAMETER

Measurements of the excision wound model's wound contraction and incision time were made for all groups on days 0, 3, 6, and 9 by tracing the wound on a clear sheet and using a milimeter-based graph.<sup>[19]</sup>

Up to full wound healing, wound contraction was measured every four days and reported as a percentage of the healed wound area.

Using a formula, the percentage of wound contraction was estimated using the miliad size of the wound as the base.<sup>[20]</sup>

The number of days needed to heal the residual wound was divided by the incision wound.

$$\% \text{wound contraction} = \frac{\text{initial wound area} - \text{specific day wound area}}{\text{initial wound area}} * 100$$

Details Group Tittle	Group 1 Normal Wounds	Group 2 <sup>nd</sup> Standard Group	Group 3 <sup>rd</sup> Test Group Wound Healing activity	Group 4 <sup>th</sup> Test Group Wound Healing activity
Number of Animal	6	6	12	12
	Excision incision	5%Povidone Iodine Ointment	Nagarmotha Paste 5% w/w Ethanol & Water	Nagarmotha Paste 10% w/w Ethanol & Water

### MEASURMENT OF TENSILE STRENGTH

The repairing skin's tensile strength The word "wound" describes how well a wound has healed.<sup>[21]</sup>

It may be used to evaluate the quality of healed tissue on the tenth day and represents how much the restored tissue resists breaking under force. To put the animals to sleep, ketamine hydrochloride was injected into each one at a rate of 50 mg/kg body weight.

All animals had their sutures taken out and the healed tissue removed.

Using a tensiometer, the tensile strength of the tissue that was removed was assessed.<sup>[22]</sup>

### Preliminary phytochemical screening

The preliminary phytochemical investigation was carried out with Ethanol and Water of Cyperus

Rotundus Linn for quantitative identification of photochemical constituents. Photochemical tests were carried out by standard methods.<sup>[23]</sup>

**Preliminary phytochemical screening of paste of *Cyperus Rotundus*.**

Plant constituents Test/ Reagent used	Root			
	5%Ethanol	5%Water	10%Ethanol	10%Water
Alkaloids	po+	po+	po+	po+
• Hager's reagent	Ne-	po+	Ne-	po+
• Mayer's reagent	po+	po+	po+	po+
• Dragendorff's reagent	po+	po+	po+	po+
• Wagner's reagent	po+	po+	po+	po+
Phenolic compounds and tannins	po+	Ne-	po+	Ne-
• Ferric Chloride solution	po+	Ne-	po+	Ne-
Flavonoids	po+	Ne-	po+	po+
• Lead acetate test	po+	Ne-	po+	Ne-
• Sodium hydroxide test	po+	po+	po+	po+
• Ferric chloride	po+	Ne-	po+	po+
• Shinoda test	po+	po+	po+	Ne-
Carbohydrates	Ne-	Ne-	po+	po+
• Molish's test	po+	Ne-	Ne-	po+
Glycosides	Ne-	po+	po+	Ne-
• Legal's test	po+	Ne-	Ne-	po+
• Raymonds test	po+	po+	po+	po+
Sterols	po+	Ne-	Ne-	po+
• Test +conc <sup>n</sup> H <sub>2</sub> SO <sub>4</sub>	po+	Ne-	Ne-	po+
• Salkowski test	Ne-	po+	po+	Ne-

**CONCLUSION**

The laceration is described as a disruption with in structure and function continuity of body tissue. This can be produced by mechanical, pharmacological, radiative, bacterial, and other methods. Immunological damage has occurred to the tissue. Healing process is one of the most important areas. Clinical medications are explained in many herbal medicine and folklore systems.

When it comes to pain care and management, plants have a lot of potential. Tribal communities all throughout the world use plants to treat open wounds. These natural substances promote regeneration of damaged muscle through a variety of processes. Those medicinal herbs are not always affordable and freely accessible, but they are also safe. Because plants contain a diverse variety of soul ingredients, including wound healing molecules, I chose to analyse the wound healing capability of a common species present in Indian cultivation and lead to the improvement of a genuine, sustainable and environment wound healer.

Herbs have such a lot of promise whenever it comes to injuries relief or control. Herbs are used to heal puncture wounds by tribal tribes all over the world. Those natural chemicals enhance muscle regeneration through a variety of mechanisms. Those medicinal herbs are not always cheap or easily available, and they're also safe. Because plant contain a broad range of soul elements, containing tissue repair molecules, I decided to investigate the wound healing capabilities of a typical species found in Indian cultivation, which

would lead to the development of a true, ecological, and ecologically friendly wound healer.

**DISCUSSION**

Herbs have been used to cure a variety of diseases, including wounds, since ancient times. Despite the numerous obstacles experienced in the discovery of therapeutic plant-based drugs, natural compounds extracted in trees is still an issue importanta part on the hunt for additional drugs. Bioprospecting with contemporary analytical techniques and researchers can undoubtedly aid in the discovery of novel lead compounds and therapeutics from plants if these resources and tools are properly utilised. Selected sections of the plant *Cyperus Rotundus* were purchased from local nursery garden from Kanpur (Kishan garden) during the month of August 2021 gathered from the herbal garden of healthy plants were chosen with care. Flora of the Madras Presidency was used to validate the plant specimen's identity (Gamble, 1997) and verified using a herbarium specimen housed at the Royal Botanic Garden, Kew ([www.kew.org](http://www.kew.org)) (Voucher specimen number K000373089).

*Cyperus Rotundus* is the chosen plant. The Brazilian bachelor button (Nagarmotha) is a perennial bushy plant with a height of 45-60cm that belongs to the genus *Cyperus Rotundus*. It bears purple flower heads and a well-branched root with refreshingly fragrant foliage. In medicine, it's used to treat pain from snake bites, inflammation, sore throats, urethritis, traumatic injuries, bleeding, and ulcers. Many herbal medications include flower essences in their formulation.

Proper identification and validation of the plant medication is critical for ensuring the reproducible quality of herbal goods (Lalithrani et al., 2011). The most important aspect of any pharmacognostical investigation is plant identification and authentication. As a result, after adequate botanical identify a recognition medicine of phytochemical constituents or quantitative tests analyses in the current dissertation. The data from the acquired results were given and discussed in this paper sequel. Botanical, phytochemical, and pharmacological screening for wound healing, analgesic, anti-inflammatory, and antibacterial activity were performed on ethanol and water root of the selected plant material.

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