



A REVIEW ON VITEX NEGUNDO NANOGEL FOR WOUND HEALING ACTIVITY AS A NOVEL APPROCHES

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ABSTRACT:

Injury needs special attention for quick recovery because it is a panic scenario that can be minor or significant. The aim of this study is to evaluate the wound healing ability of Vitex negundo leaf extracts (both ethanolic and aqueous solutions). Injury needs special attention to recover quickly because it is a panic scenario that can be minor or significant. The aim of this study is to evaluate the wound healing ability of Vitex negundo leaf extracts (both ethanolic and aqueous solutions). When both extracts were applied to circular incision and linear incision wound models in Wistar rats, rapid healing of damaged skin was observed.

KEYWORD:-

vitex negundo ,Nanogel, Wound healing

INTRODUCTION:

Wound healing is an important biological process involving tissue regeneration and repair. A wound is defined as a "disruption of tissue continuity resulting from violence or trauma" and is considered healed when the injured or inflamed tissue returns to its pre-injury state. Depending on the composition of the repaired wounds and There are three different types of wound healing: First Intentional Healing, Second Intentional Healing, and Third Intentional Healing. Wound healing occurs in three stages: regeneration, proliferation and inflammation. Angiogenesis, collagen deposition, granulation tissue development, epithelialization and wound contraction are hallmarks of the proliferative phase. Angiogenesis is the process by which endothelial cells produce new blood vessels. For granulation and fibroplasia.

The plant Vitex negundo (family Verbenaceae) is known as niggundi. It is a fragrant large shrub or small tree that grows up to 3 meters tall with square branches. It is almost everywhere in India and can reach up to 1500 meters in the outer Himalayas. It is also commonly found in waste places, roadsides, stream banks or moist places near deciduous forests. Although almost every component of V. When using negundo, the most important elements for medicinal purposes are the leaves and the bark. A decoction of the leaves is given with long pepper in the treatment of catarrhal fever, and is believed to be tonic and narcotic. An infusion of the twigs is said to promote vitality and is said to be a useful treatment for migraines, vertigo, spasms, coughs and mental disorders.

A polymer-based submicron cross-linked hydrogel particle is called a nanogel. In the field of drug delivery, these complex polymer networks offer a unique opportunity in the context of hydrogel production and nanoparticles. Nanogels are highly tunable in terms of size, shape, surface functionality and degradation mechanisms. They can be synthetic, natural or a combination of both. Thanks to these intrinsic properties, as well as their biocompatibility and ability to encapsulate small drugs and molecules, nanogels are a promising approach to the treatment of diseases and dysfunctions, as they can act as delivery systems that can successfully overcome the difficult physiological barriers found in the body. Not to be confused with nanocomposite hydrogels (NC gels), which are lightweight thermal insulators, or nanogel-aerogel.

(Nayak S, Nalabothu P, Sandiford S, Bhogadi V, Adogwa A. Evaluation of wound healing activity of negundo extracts on rats. BMC Complementary and Alternative Medicine 2006;125-126)¹

MATERIAL AND METHOD PLANT

MATERIAL:

Vitex negundo leaves were collected from Ambijalgaon village and Ahmednagar district of Maharashtra. After being crushed into a coarse powder and dried in the shade, the leaves were kept in an airtight container until needed again.

EXTRACT PREPARATION:

To defat the drug, 500 GM of powdered drug was packed in a Soxhlet apparatus and extracted with petroleum ether (60-800). Ethanol was used to remove the dried powdered drug. After separating the ethanol extract, the press residue was extracted again with distilled water. Distillation was used to remove the solvent and low pressure was used to remove the remaining solvent.

(Nayak B.S., Anderson M., Pereira L.M.P. Evaluation of wound-healing potential of vitex negundo leaf extract in rats. . 2007; 78: 540-544.)³

DRUG PREPARATION :

Pharmaceutical composition: gel was prepared from ethanol and water extracts. 200 mg of ethanol extract and water extract were combined with 100 g of Carbopol 940 separately to obtain a 0.2% (wt.) gel. Animal wounds were treated topically .

NANO GEL PREPARATION:

manufacturing Nanogel is provided in the application. The method includes at least the following steps:

- Mix the monomer, water, initiator and crosslinker until uniform to create the aqueous phase.
- To create an oil phase, add an emulsifier to the oil solvent and stir continuously.
- Create a homogeneous emulsion by combining the oil and water phases, then gradually adding a catalyst to start the polymerization reaction to form a nanogel. A nonionic surfactant acts as an emulsifier. The nanogel produced by this production method has a uniform distribution, controlled diameter and good stability.

(M, Azizah AZ, Roheeyati AM, Fatimah AB, Jahanshiri F, Pak-Dek MS. Bioactive compounds and antioxidant activity of different extracts from Vitex negundo leaf. Journal of Medicinal Plants Research 2011; 5(12): 2525-2532.)³

(Esimonz CO, Ibezim, EC, Chah KF. The wound healing effect of herbal nanogel journal of Asian 2013 :255-256.)²

ANIMALS:

Animal species: Healthy albino Wistar rats, weighing 180-230 g, of both sexes and approximately the same age, were used in the study. They were housed in clean polypropylene cages, fed a standard diet, and continuously supplied with tap water. Each animal got its own house. The Animal Ethics Committee approved

the project proposal (1349/ac/10/CPCSEA).

ANIMAL STUDY

WOUND MODEL SURGICAL:

Wound healing activity: The wound healing activity was studied using a surgical wound model. Before and during injury, animals were sedated with 1 ml of intravenous ketamine hydrochloride (10 mg/kg body weight). The animals were left unrestrained because this type of anaesthesia prevents them from moving for at least two hours after the administration of the anesthetic solution. Each rat was shaved to remove hair from the neck. Before creating a wound, 70% ethanol was applied topically to the shaved area.

According to the marks, a circular incision with a diameter of 400 mm and a depth of 2 mm was made with serrated forceps, a scalpel and steel scissors. No systemic or topical antimicrobial agents were used and the wound was left exposed to the elements. Each mouse was kept in its own cage and the rats were randomly assigned to groups. Six Wistar rats, each weighing 250-300 mg, were divided into four groups. The control group was the one that received no treatment. Neomycin ointment was applied to group II, which received conventional treatment. Ethanol and water extracts were assigned to group III and IV, respectively.

The extract was administered once daily starting from rat skin incisions and continued until the skin was completely epithelialized. Drawing the wound on millimeter scale paper made it possible to measure the area of the wound. For the final analysis of the results, the percentage of wound healing was calculated using the initial wound size (400 mm²) for each animal in each group on the predetermined days, i.e., the fourth, eighth, twelfth and first day after wounding. The endpoint of complete re-epithelialization was defined as scar separation that did not leave a gross wound, and the number of days required to achieve this was determined.

(Mukherjee M.K., Verpoorte R., Suresh V. Evaluation of in-vivo wound healing activity of vitex negundo leaf extract on different wound model in rats. Journal of Ethnopharmacology. 2000; 70:315–321)⁶

The biochemical parameters are as follows:

At the end of the study, a circular wound area was removed. The therapeutic properties of Vitex negundo water and ethanol extracts were evaluated by biochemical parameters such as collagen, hydroxyproline 16 and hexosamine 17. The levels of hexosamine, collagen and hydroxyproline were increased in both test extracts per gram of dried tissue.

(Zargar M, Azizah AZ, Roheeyati AM, Fatimah AB, Jahanshiri F, Pak-Dek MS. Bioactive compounds and antioxidant activity of different extracts from Vitex negundo leaf. Journal of Medicinal Plants Research 2011; 5(12): 2525-2532.)³

CONCLUSION :

Ayurvedic medicine describes Vrana, also known as ulcers or ulcers, as a tear in the mucous membrane that heals and leaves a permanent scar. Exogenous injuries include traumas such as torn Kshata, pierced Bhinna, pierced Viddha, cut Chinna, bruised Picchita and abrasion Dhrista 19

was evaluated for wound healing in Wistar rats, which have a strong propensity for wound healing. In a surgical wound model, it was found that animals treated with Vitex negundo aqueous extract had a greater rate of wound contraction than animals treated with ethanol extract. The experimental group showed faster scarring and healing in addition to a reduction in wound size. The breaking strength, determined experimentally by measuring the force necessary to break it, is one of the most important parameters of the cutting model.

Goutha Mchandra et al. (2010) argue that little breaking force is required in the early stages of injury because the thrombus holds the edges together and grows rapidly with collagen deposition and collagen fiber cross-linking. Animals treated in this study and#039; tensile strength was significantly higher than in untreated animals. It turned out that the increase in tensile strength of the treated wound was a sign of wound healing, possibly as a result of increased collagen content and fiber stabilization. One biomarker of the wound healing process is hydroxyproline, which is always associated with collagen synthesis. .

In this study, the tissue hydroxyproline content in the untreated control group was 41.83 µg/g tissue and 67.9 µg/g tissue in the standard drug-treated group. It is interesting to note that animals treated with excess CT had a tumor of 94.48 µg/g, while tissue treated with the ethanol extract had 83.56 µg/g. Wounds are physical injuries that result in an opening or break in the skin. .

Both aqueous and ethanol extracts of *Vitex negundo* were evaluated for wound healing in Wistar rats, which showed a strong promotion of wound healing. In the surgical model, the Ayurvedic physician describes Vranas, also known as wounds or ulcers, as a tear in the mucous membrane that heals and leaves a permanent scar. Exogenous injuries include traumas like torn Kshata, pierced Bhinna, pierced Viddha, cut Chinna, contusion of Picchita and abrasion of Dhrista.

(Biswas TK, Maity LN, Mukherjee B. Wound healing potential of vitex negundo A pharmacological evaluation. International Journal of Low Extreme Wounds 2004; 3: 143–rat. Journal of Ethnopharmacology 2010; 127(3):614-619.)¹⁰

(Shivhare Y, Singour PK, Patil UK, Pawar RS Wound healing potential of ethanolic extract in rat. Journal of Ethnopharmacology 2010; 127(3):614-619.)

It was observed that the rate of contraction of the wound area was higher in animals treated with aqueous extract than in animals treated with *Vitex negundo* ethanol extract. The experimental group not only showed a reduction in wound size, but also showed a faster rate of healing and scar formation. One of the essential parameters of the notch model is the breaking strength, which was determined experimentally by measuring the force required to break it. Goutha Mchandra et al.(2010) argue that little breaking force is required in the early stages of injury because the thrombus holds the edges together and grows rapidly with collagen deposition and collagen fiber cross-linking.

Animals treated in this study and tensile strength was significantly higher than in untreated animals. An increase in the tensile strength of the treated wound was observed as a sign of wound healing, presumably as a result of increased collagen content and fiber stabilization. One biomarker of the wound healing process that is always associated with collagen synthesis is hydroxyproline.

(Rashed A.N., Afifi F.U., Disi A.M. Simple evaluation of the wound healing activity of a crude extract of JVI-1, Journal of Ethnopharmacology. 2003; 88: 131–136.)⁵

According to the present wound study, the tissue amount of hydroxyproline was 41.83 µg/g tissue in the untreated control group and 67.9 µg/g tissue in the conventionally treated group. It is interesting to note that animals treated with excess CT had 94.48 µg/g of tumor, while tissues treated with the ethanol extract had 83.56 µg/g. are physical traumas that cause the skin to crack or open. Ayurvedic theory states that Vrana, also known as ulcers or ulcers, is caused by a tear in the mucous membrane that heals and leaves a permanent scar.

Injuries like cut, puncture wound, lacerated wound, Viddha or Picchita can be considered as exogenous wounds (abrasion wound) and Ghrista (fissured edge). Wistar rats were used to test the effect of aqueous and ethanolic extracts of *Vitex negundo* on wound healing. The results showed that the animals treated with the aqueous extract had a higher contraction than the animals treated with the ethanol extract. In addition to reducing wound size, the experimental group had a fasterrate of healing and scarring.

(Bhat RS, Shankrappa J, Shivakumar HG. Formulation and evaluation of polyherbal wound treatments. Asian Journal of Pharmaceutical Sciences 2007; 2(1): 11-17.)⁷

Fracture resistance of the cut pattern is a crucial parameter that was measured experimentally. At the beginning of the wound, a small breaking force is necessary because the clot holds the edges together. However, as the accumulation of collagen increases and cross-links form between the collagen fibers, the breaking strength increases rapidly. The pulling force used in the present studies was significantly greater in treated animals than in untreated animals.

It was observed that an increase in the treated wound and tensile strength was a sign of wound healing, which can be due to an increase in collagen content and stabilization of one biomarker of the wound healing process, which is always related to collagen synthesis. is hydroxyproline. In the present study, tissue hydroxyproline content was found to be 41.83 µg/g tissue in the untreated control group and 67.9 µg/g tissue in the conventional drug-treated group. In particular, animals treated with excess CT had 94.48 µg/g tissue, while ethanol extract treated tissues had 83.56 µg/g.

(Biswas TK, Maity LN, Mukherjee B. Wound healing potential of vitex negundo A pharmacological evaluation. International Journal of Low Extreme Wounds 2004; 3: 143)¹⁰

(Vishwanathan AS and Basavaraju R A Review on Vitex negundo L. - A Medicinally Important Plant. European Journal of Biological Sciences 2010; 3(1): 30-42.)⁸

REFERENCES:

1. Nayak S, Nalabothu P, Sandiford S, Bhogadi V, Adogwa A. Evaluation of wound healing activity of negundo extracts on rats. BMC Complementary and Alternative Medicine 2006;125-126
2. Esimonz CO, Ibezim, EC, Chah KF. The wound healing effect of herbal nanogel journal of Asian 2013 :255-256.
3. Zargar M, Azizah AZ, Roheeyati AM, Fatimah AB, Jahanshiri F, Pak-Dek MS. Bioactive compounds and antioxidant activity of different extracts from Vitex negundo leaf. Journal of Medicinal Plants Research 2011; 5(12): 2525-2532. formulated Journal of Pharmaceutical and Allied Sciences 2005; 3(1): 294 -299
4. Rashed A.N., Afifi F.U., Disi A.M. Simple evaluation of the wound healing activity of a crude extract of JVI-1, Journal of Ethnopharmacology. 2003; 88: 131–136.
5. Nayak B.S., Anderson M., Pereira L.M.P. Evaluation of wound-healing potential of vitex negundo leaf extract in rats. . 2007; 78: 540–544.
6. Mukherjee M.K., Verpoorte R., Suresh V. Evaluation of in-vivo wound healing activity of vitex negundo leaf extract on different wound model in rats. Journal of Ethnopharmacology. 2000; 70:315–321
7. Bhat RS, Shankrappa J, Shivakumar HG. Formulation and evaluation of polyherbal woundtreatments. Asian Journal of Pharmaceutical Sciences 2007; 2(1): 11-17.
8. Vishwanathan AS and Basavaraju R A Review on Vitex negundo L. - A Medicinally ImportantPlant. European Journal of Biological Sciences 2010; 3(1): 30-42.
9. . Shivhare Y, Singour PK, Patil UK, Pawar RS Wound healing potential of ethanolic extract in rat. Journal of Ethnopharmacology 2010; 127(3):614-619.
- 10.. Biswas TK, Maity LN, Mukherjee B. Wound healing potential of vitex negundo A pharmacological evaluation. International Journal of Low Extreme Wounds 2004; 3: 143–rat. Journal of Ethnopharmacology 2010; 127(3):614-619.
11. 9. Tandon VR & Gupta RK Vitex negundo Linn (VN) leaf extract as an adjuvant therapy to standard anti-inflammatory drugs. Indian J Med Res 2006; 124: 447-450.
12. Tandon VR Medicinal uses and biological activities of Vitex negundo -Review article. Natural Product Radiance 2005; 4(3):162-165.