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### *Nirgundi Oil: A Potential Therapeutic Agent For Managing Diabetic Wound.*

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#### ABSTRACT

**Background-** Today's increasing fast lifestyle poverty and imbalanced ecosystem, problem of wound contamination and infection increasing day by day. Person hardly get time to look after his personal health.

**Method-** The present study was designed to study role of *Nirgundi taila (Vitex negundo)* in *Pramehaja vrana* i.e diabetic wound. For this study 30 patients were randomly selected and the efficacy of the drugs were put into trial on these patients.

**Result-** On completion of trial the statistical analysis concludes the percentage of relief in parameters i.e Pain - 81.79%, discharge - 93.01%, burning sensation - 90.53%, granulation tissue - 86.69%, itching - 95.51%, numbness - 100%.

**Conclusion-** The research work finally conclude that *Nirgundi taila (Vitex negundo)* have a potent wound healing property in diabetic wound management and also showed an improved rate of wound contraction and reduction in healing time in patients treated with *Nirgundi taila* application.

**Keyword:** Diabetic wound, *Pramehajavrana*, *Nirgundi*.



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## INTRODUCTION:

Diabetes mellitus (DM) is a progressive and chronic endocrine disorder that primarily results in hyperglycemia. Diabetes is considered to be one of the major health problem worldwide with increasing prevalence. At present 250 million people globally are suffering from diabetes and this figure is predicted to increase upto 350 million by the end of 2030. The highest increment will occur in developing countries, where the prevalence will rise from 4.5% to 5.5%.<sup>[1]</sup> By the year 2030 it is estimated that there will be 45 million diabetic patients in India and China alone<sup>[2]</sup>. Diabetic wounds are unlike typical wounds in that they are slower to heal, making treatment with conventional topical medications an uphill process. In the management of diabetic wound, modern science is using newer and newer antibiotics which are becoming ineffective due to microbial resistance and have many adverse effects on system as well as money consuming also.

In the ancient *Ayurvedic* texts also diabetic wound have been mentioned as *Madhumehaja Vrana* (diabetic wound) that

includes clinical conditions involved in obesity, prediabetes, diabetes mellitus and metabolic syndrome. *Prameha* (diabetes mellitus) is a metabolic *kapha* type of disorder in which diminished functioning of *agni* lead to a tendency towards high blood sugar. If not treated properly this will leads to *madhumeha* (Hyperglycemia) <sup>[3]</sup> and further complications like *pidika's* (acne). *Pidika's* in due course will become *dushtavrana* (infected wound) if not treated.

*Acharya Sushrut* he pioneer who put forth the recorded evidence in the management of injury, in the treatise named "*Sushruta Samhita*" referring to this anomaly called *vrana(wound)* <sup>[4]</sup>.

*Vrana* is the condition associated with *dhatu nasha* and characterized by *vedana*(pain), *srava*, (discharge) and *vikruti*(deformity). *Vranachikitsa* is integral part of *Shalyatantra*, *Sushruta Samhita* mentions vivid and elaborate description of *vrnachikitsa*(wound treatment) . To combat this disease at its various stage sixty procedures have been described<sup>[5]</sup>.

The objective of this review is to illustrate how and why *Nirgundi tail* is considered as one of the best complementary and alternative medicine in diabetic wound management.

## AIMS & OBJECTIVES

To study the effect of *Nirgunditaila* on *Pramehajavrana* w.s.r to diabetic wound.

## MATERIALS AND METHODS:

The present study was performed on 30 patients suffering from mild to moderate diabetic wound i.e(*pramehajavrana*) selected randomly from

patients attending OPD of *Shalya* department of Jammu Institute of Ayurveda and Research and Shri Sain Charitable Hospital Urban Wing, Janipur

Jammu.

**CONSENT-** An informed written consent of all patients included in the study will be taken in the language best understood by them.

**TYPE OF STUDY –** Prospective open controlled study.

#### **DRUG AND DOSE –**

*Nirgundi tail* will be prepared according to *Bhaishajya Ratnavali* and will be applied locally on *pramehaja vrana* (diabetic wound) as required<sup>6</sup>.

#### **Drug contents**

- *Nirgundi* leaves and roots
- *Tila tail (sesame oil)*
- **Collection and method of drug preparation –**  
The roots and leaves of fresh *Nirgundi* plant (*Vitex Negundo*) collected from rural area of Nardani Jammu and is cleaned up with water and dried in natural sunlight after that they were sent in the *Rasshastra* and *Bhaishajya kalpana* Dept. of Jammu Institute of Ayurveda and Research college Jammu for *Nirgunditaila* preparation as per reference from *Bhaishajya Ratnavali* under the guidance of H.O.D. *Rasshastra* and *Bhaishajya kalpana* department.

The drug was prepared by *Snehapaka* method in Jammu institute of *Ayurveda* and research pharmacy.

- *Nirgundi kalka* -1 part
- *Nirgundi kwath* -16 part (*dravadravya-solid-liquid*)
- *Tila taila(sesame oil)* -4 parts

Firstly dry *Nirgundi* powder (*Vitex Negundo*) is taken and made into *kwath*, (decoction) then *moorchit tilataila* (processed sesame oil) is added and *paka* (transformation) is done. Later the *kalka*

(pastes) is mixed with the *sneha* (oil/ghee) and *paka* is done over *mriduagni*, till the total water content is evaporated and *samayaka snehapaka lakshana (processed)* are seen. *Nirgunditaila* is of *madhyamapaka (medium)* which is useful for external application.

#### **CLINICAL STUDY -**

**Source of data –** Patients attending OPD of Jammu Institute of Ayurveda and Research and Shri Sain Charitable hospital urban wing, Janipur Jammu.

**Intervention –** After proper cleaning of wound with *Triphala Kashaya*, *Nirgundi taila* is applied over wound and bandaging is done.

**Duration of treatment –** 6 weeks

**Follow Up –** patient were made to report to the hospital every week for a minimum period of 2 months for follow up study.

#### **INCLUSION CRITERIA –**

- Sex -either sex
- Age -no limits but preferably 10-80 years patients having controlled diabetes
- Wound /ulcer size -3 to 15 cm
- Established case of infected wound /ulcer

#### **EXCLUSION CRITERIA-**

- Patients suffering from major illness like cirrhosis liver, Ascitis, Tuberculosis, AIDS or HIV syndrome
- Patients with malignancy
- Bleeding disorder
- Multiple ulcers (more than three)
- T.A.O
- Varicose ulcer
- Syphilitic ulcer
- *Vrana(wound)* situated over *asthi,(bone)* *sandhi(joint)* , *koshta* (bowel) and *marma adhishtana*

### **ASSESSMENT CRITERIA AND METHOD OF ASSESSMENT OF TREATMENT**

The patients response was assessed based on subjective and objective criteria. The Subjective parameters of pain, discharge, itching, numbness, burning sensation, granulation tissue and Objective

parameters of size, healing time, recurrence were recorded on the basis of score adopted with grading (0,1,2,3,4). After completion of treatment, assessment of scar was done on the basis of

gradation (0,1,2,3,4).

The assessment of results were done by observing the severity of symptomology of the wound as well as laboratory investigation.

The severity of the symptoms of *vrana* (wound) is assessed weekly after 1<sup>st</sup> week, after 2<sup>nd</sup> week, after 3<sup>rd</sup> week and after 6<sup>th</sup> week. The *vrana* (*smell*), *varna*, *vedana*, (*pain*) *srava*, (*discharge*) *akriti* (*shape*), area of the *vrana* in sq cm and granulation tissue were recorded before and after the treatment.

The data of persons were individually analysed with unpaired 't'-test.

#### **MADHUMEHAJA VRANA GRADING:**

0 = Foot discoloration without breakdown

1 = Partial thickness wound

2 = Confined full thickness wound

3 = Full thickness wound with subcutaneous fat, muscle, bone involvement

4 = Local gangrene with or without osteomyelitis

#### **PROBABLE ACTION OF NIRGUNDI TAILA**

##### **Ayurveda View Point –**

The most important therapeutic property of this plant is its use in traditional medicines for wound healing.

*Vata* and *Kapha doshas* are playing major role in *vrana* (*infected wound*). *Nirgundi* (*vitex negundo*) and *Tilataila* (sesame oil) the contents of *Nirgundi* (*vitex negundo*) tail have *ushna* (*hot in potency*) properties therefore have *kaphavataghna doshaghata* property<sup>[7]</sup> ultimately leading to fast healing process of wound by inhibiting *doshadushti*.

*Kashaya rasa* of this drug have *shoshana* (*drying*) property therefore helps in *vrana ropana*. (*wound healing*)

*Tikta rasa* (*bitter*) of this drug have property of *sthireekarana* (*stabilized*) of *twak* (*skin*) and *mamsa* (*flesh*) therefore helping in increasing tensile strength of wound.

*Katu rasa* (*pungent*) of this drug have properties like *vrana* (*wound cleaning*) and *avasadana* (*depressing the raised wounds*)

The ingredients of this drug exhibit *Vedana* (*pain killer*) and *Shothhara* (*anti-inflammatory*) property thereby helps in reducing pain and inflammation.

*Tila taila* (sesame oil) has been used as a base in the preparation of *Nirgundi taila*. It possess *ushna* (*hot*), *teekshna* (*sharp*), *madhura* (*sweet*), *vataghna*, *vyavaayi* (*quick spreading*), *vikasi* (*looseness of joints*), *sookshma* (*Subtle*) properties which helps to reach drug till depth of wound<sup>[8]</sup>. It also nourishes the wound by its *snehna* (*oilation*) and *bhrihna* (*nourishment*) properties by granulation tissue formation.

##### **Modern View Point –**

#### ***Nirgundi Taila* (*Vitex negundo*) in Association with Diabetic Wounds –**

Although diabetic wounds are similar to wounds in normal patients, the healing process is different from that of other wounds. The most important thing in diabetic wound is that healing process is notoriously slow. In addition, slow wound recovery generally are not cost effective as it is wastage of both money and time. So to combat all these problems scientists have been searching for a cheaper, naturally sourced remedy for diabetic wounds that is efficacious.

The important therapeutic property of this plant is its use in traditional medicines for wound healing from the ethanolic and agnosies extract of the leaves of this plant<sup>[9]</sup>.

*Tilataila* (sesame oil) used in this drug has terpenoid as a chemical composition which has got anti-diabetic properties therefore helpful in reducing blood sugar<sup>[10]</sup>.

#### ***Nirgundi Taila* in Association with Antibacterial property -**

The important chemical composition of this plant is Essential oil which have six main ingredients. Out of which two main compounds found in essential oil are Caryophyllene and epiglobulol which may be responsible for the antibacterial activity on diabetic wound. Moreover juice of leaves said to have property of removing worms from ulcers<sup>[11]</sup>.

Terpenoid, tannin, saponin and methanolic seed extract of *tila* has got strong antimicrobial

properties as they are anti-bacterial, antiviral, and astringent [12].

#### **Acetylcholine esterase (AChE) inhibition activity of *Vitex negundo* –**

The essential oil in this plant exhibits a strong AChE inhibition activity.

#### **Analgesic activity of *Nirgundi Taila*–**

Petroleum ether extract of *Vitex negundo* leaves has shown significant analgesic activity [13].

Alkaloids present in *Tilataila* are good sources of pain relievers [14].

#### **Anti-inflammatory activity of *Nirgundi taila*(*Vitex negundo*) –**

Leaves of this plant are useful in dispersing swelling and useful as an anti-allergic [15].

#### **Managing Wound Debridement –**

Debridement is a very crucial process that facilitates the diabetic wound healing process. During debridement, old dead cells or tissues are removed

by mechanical, chemical, surgical, or autolytic means. There are several mechanisms through which *Nirgundi* (*Vitex negundo*) and *Tilataila* (*Sesame oil*) facilitates the rapid debridement of diabetic wounds and aids in healing.

#### ***Vranakarma* (Wound Dressing)**

The cleaning of wound has been carried with the *Triphala kashaya* or distilled water.

Devitalized tissue debridement carried out in some cases as per the indication without using anaesthesia and special procedures. The *Nirgundi taila* is applied locally considering the site and size of wound. *Vranakarma* (wound care) is practiced daily for 7 days and later on alternate days up to 6 weeks till complete healing of wound.

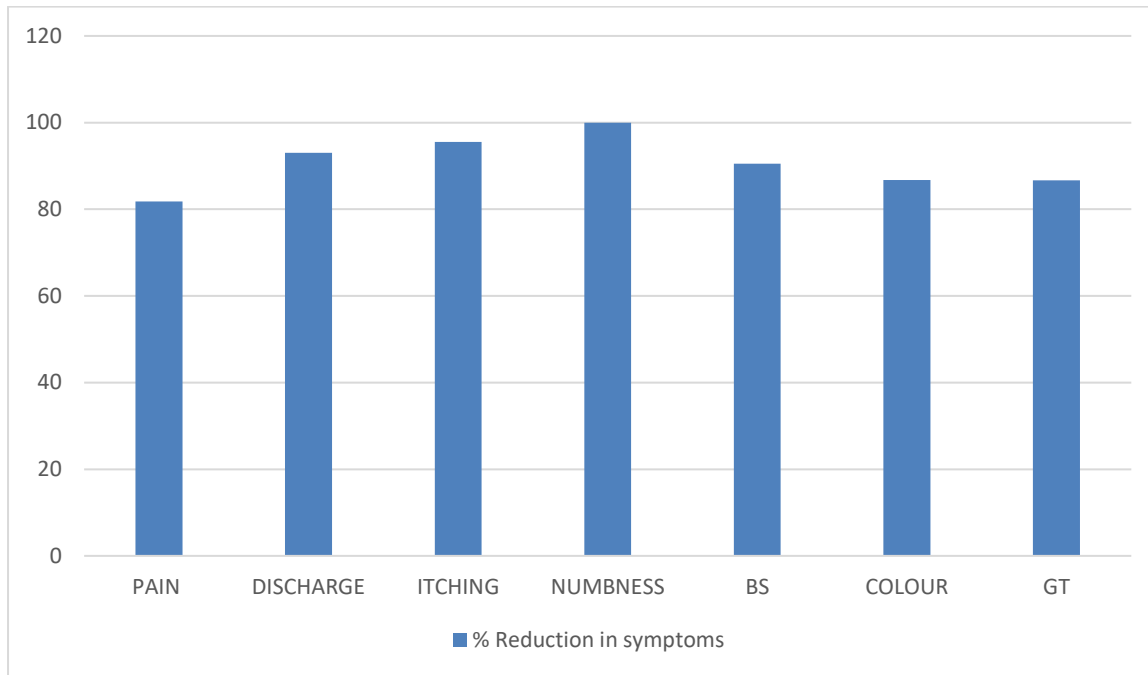
Parameters were noted during every follow up. Complete assessment was done after 6 weeks.

## 5 RESULTS –

The present study revealed the overall result after treatment in patient by *Nirgundi taila*.

SYMPTOMS	%AGE
Pain	81.79
Discharge	93.01
Itching	95.51
Numbness	100
Burning sensation	90.53
Colour	86.72
Granulation tissue	86.69

**GRAPH – REDUCTION IN SYMPTOM**

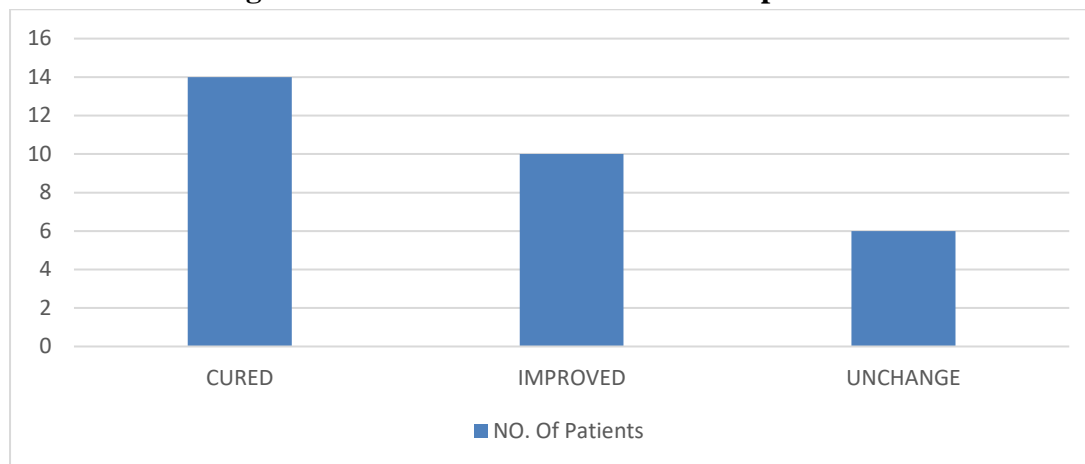


**T-Test in the sample:**

S.NO.	Signs and symptoms	Mean score		% of improvement	SD ±	SE ±	“Z”	“p”
		BT	AT					
1	Pain	2.43	0.20	81.79	0.32	0.11	3.05	<0.01
2	Discharge	1.86	0.13	93.01	0.67	0.15	4.01	<0.01
3	Itching	2.23	0.10	95.51	0.81	0.18	3.97	<0.01
4	Numbness	2.26	0.00	100	0.48	0.10	1.34	<0.01
5	Burning sensation	2.43	0.23	90.53	0.91	0.20	3.87	<0.01
6	Colour	2.26	0.3	86.72	0.53	0.09	2.25	<0.01
7	Granulation tissue	2.23	0.3	86.69	0.47	0.42	4.12	<0.01

**Showing the overall result after treatment in patients:**

RESULT	NO. OF PATIENT
Cured	14
Improved	10
Un change	6

**GRAPH- Showing the overall result after treatment in patients:****DISCUSSION**

Diabetic ulcers are found to be very difficult to treat because of spreading in nature. Usually they are well controlled by systemic treatment for control of hyperglycemia. *Ayurvedic* classics has advocated

many *kashayas*(decoction) , *tailas*,(oils) *ghritas*(ghee), *lepas*(packs) etc for encouraging wound debridement and healing agent. Amongst such medicaments *Nirgunditaila* (*vitex negundo*) is well accepted as *vranashodhana*(wound cleaner)) and *ropaka* (wound healer) .This *taila*(oil) is mainly prepared with *Nirgundi* (*vitex negundo*) which has been claimed to several therapeutic properties, as they are most important in wound healing with strong antimicrobial and anti-inflammatory activities. *Nirgundi*(*vitex negundo*) has been considered as ‘*Sarvaroganivarini*’- the remedy for all diseases, as it has been said that - a man cannot die of disease in an area where *Vitex*

*negundo*, *Adhatoda vasica*, and *Acorus calamus* are found. Second important drug used in this *taila* (oil) preparation is *Tila*,(sesame oil) which has antibacterial, anti-diabetic, antioxidant, immunity booster, antiviral, astringent therapeutic potentials based on their chemical composition. Therefore these two important drugs which are also easily available has been used in the preparation of *Nirgundi taila* ,(sesame oil) for treating diabetic wound. Hence *Nirgundi taila* ,(sesame oil) is selected for the study purpose which has shown marvelous and satisfying results. *Nirgunditaila*, (sesame oil) was applied externally over the wound of the selected patients and wound was daily dressed as explained till complete healing is achieved. It has been evaluated that 14 patients were cured completely and 10 patients shows improvement. Our studies showed an improved rate of wound contraction and reduction in healing time in patient treated with *Nirgunditaila* ,(sesame oil) application.

**CONCLUSION:**

A close perusal of the observation and interference that can be drawn leads to the following conclusions

- The result of this clinical trial proved that *Nirgundi taila* ,(sesame oil) has significant results in diabetic wound management i.e in various parameters like size, slough,

discharge, granulation appearance of margins and tenderness as well also in subjective parameters like pain.

- Granulation process and desloughing process are faster in patients treated with this *taila*.

- This drug cures diabetic wound in 2-3month duration completely, if it is not complicated by affecting muscles and bones.
- Patient with chronic history of *madhumeha* (hyperglycemia) are prone to get *madhumehaja vrana*(diabetic wound) .
- In the treatment of *madhumehajavrana* (diabetic wound) both medical and surgical intervention is necessary.
- *Madhumehajavrana* (diabetic wound) if not treated properly patient may lose his limb.
- Regular observations, dressing and blood sugar control is very important in the treatment of *madhumehajavrana*. (diabetic wound)

- *Nirgunditaila* (sesame oil) is a cost effective and is a safe natural agent with increased wound healing capacity and is considered to be a suitable therapy with promising results that promotes wound healing.

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**Conflict of interest:- Nil**





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