



**PHARMACOLOGICAL STUDY OF NAGAKESARA WITH RESPECT TO ITS  
STONITASTHAPANA KARMA WITH SPECIAL REFERENCE TO ITS HAEMOSTATIC  
ANaD WOUND HEALING PROPERTIES**

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**ABSTRACT**

*Nagkesara* was named on the most effective useful part of the tree i.e. stamen of the tree flowers. It is found at the eastern and southern parts of India. It has many good properties, amongst which the *Raktasthapana* is very important. Because of this property, it is frequently used in *Raktapitta* and *Rakta-arsha* like conditions. Modern day researches have revealed its antiseptic, purgative, blood purifier, worm control, Antioxidant, hepatoprotective, Analgesic, Antispasmodic, Anti-venom, Immunomodulatory, Anti-neoplastic, Anti-convulsant, Anti-inflammatory, Anti-ulcer, Anti-arthritic, Anti-microbial etc. activities. In traditional medicine, it is used to treat fever, cold, asthma and as carminative, expectorant, cardiogenic, diuretic and antipyretic agent. Here, the wound healing and haemostatic properties will be studied in detail.

**KEY WORDS:** *Nagkesar*, *Mesua ferea*, Haemostatic, *Rakta Skandan*, *Sthambhan*.

**INTRODUCTION**

*Nagkesara* is the drug that is utilized since centuries in Ayurvedic preparations. In the ancient times, there were more chances of injuries and thus the drugs with haemostatic capabilities were thought to be very essential ones. Such herbs were taken internally as well as applied externally. *Nagkesara* has several karma, among which *Shonitasthapana* is an important one.<sup>[1]</sup> Classical references can be found in *Brihat-trayi* as well as later texts.

**VERNACULAR NAME**

**Sanskrit** : *Kesara*, *Nagapushpa*, *Naga*, *Gajakesara*,  
**Bengali** : *Nageshvara*, *Nagesar*, **English** : *Cobras*  
**Saffron**, **Gujrati** : *Nagkesara*, *Sachunagkeshara*,  
*Nagchampa*, *Pilunagkesar*, **Hindi** : *Nagkesara*, *Pila*  
*Nagkesara*, **Kannada** : *Nagsampige*, *Nagakesari*,  
**Malayalam** : *Nangaa*, *Nauga*, *Peri*, *Veluthapala*,  
*Nagppu*, *Nagappovu*, **Marathi** : *Nagkesara*, **Punjabi** :  
*Nageswar*, **Tamil** : *Naugu*, *Naugaliral*, *Nagachampakam*,  
*Sirunagappu*, **Telugu** : *Nagachampakamu*.<sup>[2]</sup>

**MORPHOLOGY**

**NAGAKESARA (Stamen)**

*Nagakesara* consists of dried stamens of *Mesua ferrea* Linn. (Fam. Guttiferae); an evergreen tree, about 15-18 m high with short trunk, often buttressed at the base.<sup>[3]</sup>

**TAXONOMY**

Kingdom: Plantae  
Clade: Angiosperms  
Clade: Eudicots  
Clade: Rosids  
Order: Malpighiales  
Family: Calophyllaceae  
Genus: *Mesua*  
Species: *M. ferrea*<sup>[4]</sup>

**DISTRIBUTION:** It is found in the Himalayas from Nepal eastwards, Bengal, Assam, evergreen rain forests of North Kanara, Konkan, forests of Western Ghats and Andhra Pradesh.<sup>[5]</sup>

**DISCRIPTION**

a) Macroscopic: Stamen consists of anther, connective and filament; coppery or golden brown; filament united at base forming a fleshy ring; each stamen 0.9-1.9 cm long; anther about 0.5 cm long, linear, basifixed, containing pollen grains; filament 0.8 - 1.0 cm long; slender, filiform, more or less twisted, soft to touch, quite brittle; connective not visible with naked eye; odour, fragrant; taste, astringent.

b) Microscopic: Androecium - Anther shows golden-brown, longitudinally dehiscent anther wall, consisting of thin-walled, parenchymatous cells, pollen grains numerous in groups or in single, yellowish and thin-

walled, many pollen grains having 1-3-minute, distinct protuberances on walls, thick-walled, exine and intine distinct. Powder - Brown; shows elongated cells of filament, connective and numerous golden yellow pollen grains having 1-3 protuberances.<sup>[6]</sup>

#### PROPERTIES: PROPERTIES AND ACTION

*Rasa: Kashaya, Tikta,*

*Guna: Laghu, Ruksha*

*Virya: Ushna {Ishat}*

*Vipaka: Katu*

*Karma: Urdhajatrugatarogahara, Kaphahara, Varnya, Vastivatamayghna, Shonitasthapana.<sup>[7]</sup>*

**CHEMICAL COMPOSITION:** Two bioflavanones designated as mesuaferrone-A and mesuaferrone-B have been reported from stamens.<sup>[8]</sup>

#### PHARMACOLOGICAL & BIOLOGICAL ACTIVITIES

##### Wound healing activity

Tannins isolated from the ethanol extract of aerial parts of *M. ferrea* have been shown to have promising wound healing activity in excision and incision wound healing rat models when applied in the form of an ointment. Increased epithelialization and wound contraction were proposed to be the possible mechanisms responsible for the wound healing activity of aerial parts.<sup>[9]</sup>

##### Anti-hemorrhoid activities

A polyhedral formulation containing *M. ferrea* was evaluated for its efficacy to treat bleeding piles in a preliminary clinical study using 22 subjects. Finding of the study revealed that out of 22 subjects, 16 patients had improvement in terms of reduced bleeding with no noticeable adverse effects. Another recent study also highlights the efficacy of standardized herbal preparation containing *M. ferrea* in terms of improvement of anorectal conditions in Grade I and II patients. Both preparations reduced the bleeding and pain in the hemorrhoid patients.<sup>[10]</sup>

##### Wound healing activity

The wound healing studies were carried out using ether anaesthetized rats in two different wound model at two different concentrations (5% and 10% w/w):-

a. Incision wound - In incision wound model four groups (The group I was considered as control, the group II served as the reference standard and treated with 0.2% w/w Nitrofurazone ointment. The group III animals were treated with the 5% w/w ethanolic extract and the group IV animals were treated with 10% w/w ethanolic extract of *Mesua ferrea* of animals containing six in each group. Paravertebral incision of 6 cm. long was made on either side of the vertebral column of the rat. Care was taken to see that incision was at least 1cm. lateral to vertebral column. The wounds were closed with interrupted sutures of 1cm. apart. The animals were caged individually. The sutures were removed on 8th post

wounding day. The tensile strength of the wound was measured on 10th post wounding day.<sup>[11]</sup>

b. Excision wound-In excision wound four groups (The group I was considered as control, the group II served as the reference standard and treated with 0.2% w/w Nitrofurazone ointment. The group III animals were treated with the 5% w/w ethanolic extract and the group IV animals were treated with 10% w/w ethanolic extract of *Mesua ferrea*) of animals containing six in each group. A circular piece of full thickness (approx. 500 mm<sup>2</sup>) was cut off from a pre-determined area on the back of the rat wounds were traced on 1mm<sup>2</sup> graph paper on the day of wounding and subsequently on alternate days until healing was complete. Changes in wound area were calculated, giving an indication of the rate of wound contraction. Number of days required for falling of the eschar without any residual raw wound gave the period of epithelialization. The ointment of the fruit extract, standard drug and simple ointment was applied to the wound twice daily, until recovery to the respective groups of animals. Statistical analysis-The results are expressed as mean  $\pm$ SE of six animals in each group. The data were evaluated by students t-test were considered statistically significant.<sup>[12]</sup>

c. RESULTS: It was observed that the wound healing contracting ability of the extract ointment in different concentrations was significantly greater than that of the control (i.e. simple ointment treated group). The 10% (w/w) extract ointment treated groups showed significant wound healing from the fourth day onwards, which was comparable to that of the standard drug, i.e. nitrofurazone ointment treated group of animals. The wound closure time was lesser, as well as the percentage of wound contraction was much more with the 10% w/w extract ointment treated group (18 $\pm$ 1 days for 100% contraction which was almost similar to that of the nitrofurazone treated group). The 5% (w/w) extract ointment treated group of animals showed significant wound contraction from the eighth day onwards and achieved 100% with the wound closure time of 20  $\pm$ 2 days. The tensile strength of the 10% extract treated group and the nitrofurazone ointment treated group were comparable to each other. The 5% extract ointment treated group showed a lesser but significant increase in the tensile strength compared to the control group. Thus, both concentrations of the extract as well as the standard drug showed a significant increase in tensile strength in the 10 days old wound. The results of the present study revealed that both concentration (5% and 10% w/w) of ethanolic extract of *Mesua ferrea* flower have significant wound healing activity in both incision as well as excision wound models.<sup>[13]</sup>

##### Anti-ulcer activity

Xanthenes from *M. ferrea* were screened for antiulcer activity by pyloric ligation method in albino rats. The ulcer scoring for the gum acacia treated rats was found to be 3.50  $\pm$  0.27 which was significantly lesser than that of

standards. The control animals showed extensive ulceration, haemorrhage and perforation, while the xanthones pre-treated animals exhibited only scattered areas of hyperemia and occasional haemorrhagic spots.<sup>[14]</sup>

**THERAPEUTIC USES** - Raktapitta, Vatarakta, Shopharoga, Vastiroga.<sup>[15]</sup>

**CLASSICAL PREPARATIONS:** *Candana-balalashadi Taila, Kumaryasava, Nagakesaradi Churan.*<sup>[16]</sup>

### CONCLUSION

The properties as told in Ayurvedic texts indicate the rakta sthapana karma and the same is indicated by the given evidences of the present day researches. Thus, the drug Nagkesar can be considered for its haemostatic and wound healing capabilities.

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