

STUDIES ON WOUND HEALING ACTIVITY OF *Heliotropium indicum* Linn. (BORAGINACEAE) LEAVES AMONG FOLKLORE

Sudha Kumari
Nalanda Open University Patna.

ABSTRACT

The petroleum ether, chloroform, methanol and aqueous extracts of *Heliotropium indicum* (BORAGINACEAE) leaf were separately evaluated for their wound healing activity in rats. The results revealed significant promotion of wound healing with both methanol and aqueous extracts with more promising activity. The present work substantiates its validity among folklore.

Keywords : *Heliotropium indicum* Linn., wound healing, leaf extract.

INTRODUCTION

Wound healing is the process of repair that follows injury to the skin and other soft tissues. It involves a complex series of interactions between different cell types, cytokine mediators and the extracellular matrix. Each phase of normal wound healing, namely hemostasis, inflammation, proliferation and remodeling is distinct although the wound healing process is continuous with each phase overlapping the next. Several medicinal

plants have been used since time immemorial for the treatment of cuts, wounds, and burn and showed promising effects. (B. Kumar *et al.* 2007).

Heliotropium indicum is a foetid herb, 30-50 cm tall, with tap - root stock. The plant is reported to be highly valued among folklore medicine and is believed to be useful in treating fever, abdominal pain, dermatitis, venereal diseases, insect bites, menstrual disorder and sore throat (C. Muthu *et al.* 2006; A togola *et al.*; G. F. Asprey *et al.*, 1995; L.M. Giron *et al.* 1991 and S. Duttagupta *et al.* 1977). The leaf paste is applied externally to cure rheumatism and skin infections. (N. Nagaraju *et al.* 1990; B. Barrett *et al.* 1994; M. Misawa *et al.* 1983).

MATERIALS AND METHODS

The leaves of *Heliotropium indicum* were collected from different parts of our area. The leaves were washed, shade dried and pulverized to coarse powder. The powdered leaves (500 gm) was extracted with petroleum ether, chloroform, methanol and water for 48 hours in a soxhlet extractor. Following extraction, the liquid extracts were concentrated under vacuum to yield dry extracts. Standard methods (J. B. Harborne, 1984; H. Wagner *et al.*, 1926) were used for preliminary phytochemical screening of the different extracts.

The selected extracts of *Heliotropium indicum* leaf were separately evaluated for their wound healing activity in rats using excision (= infected), incision and dead space wound models.

RESULTS AND DISCUSSIONS

The preliminary phytochemical screening of its leaf extracts showed the presence of steroids and sterols, triterpenoids, alkaloids, flavonoids, saponins, tannins and phenolic substances gums and mucilages, carbohydrates and proteins respectively.

The results of wound healing effect showed significant promotion of wound healing activity with both aqueous and methanol extracts in the excision and incision wound models. In excision wound model, the mean percentage closure of wound area was calculated on 4, 6, 8, 11, 14 and 16 post-wounding days (Table - 2). The methanol extract - treated rats showed faster epithelialisation of wound than the animal treated with aqueous leaf extract.

In incision wound model (Table-3), the methanol and aqueous extract treated rats showed significant increase in breaking strength, when compared to the control. The mean breaking strength was also significant in rats treated with standard drug nitrofurazone whereas the other extracts failed to produce significant effects.

The results of the excision and incision wound models revealed that the methanol extracts of *Heliotropium indicum* possess better wound healing activity compared to other test extract. The wound healing effects of the chloroform, methanol and aqueous extracts may be attributed to the presence of phytoconstituents like alkaloid, triterpenoids, tannins and flavonoids in the extracts which are known to promote the wound healing process mainly due to their antimicrobial property. Flavonoids and triterpenoids are also known to promote the wound healing process mainly due to their astringent and antimicrobial property which seems to be responsible for wound contraction and increased rate of epithelialisation (C. Ya *et al.* 1988; H. Tsuchiya *et al.* 1996; M. Scortichini *et al.* 1991; S. Levine, 1970; H. S. Mohammad *et al.* 2005).

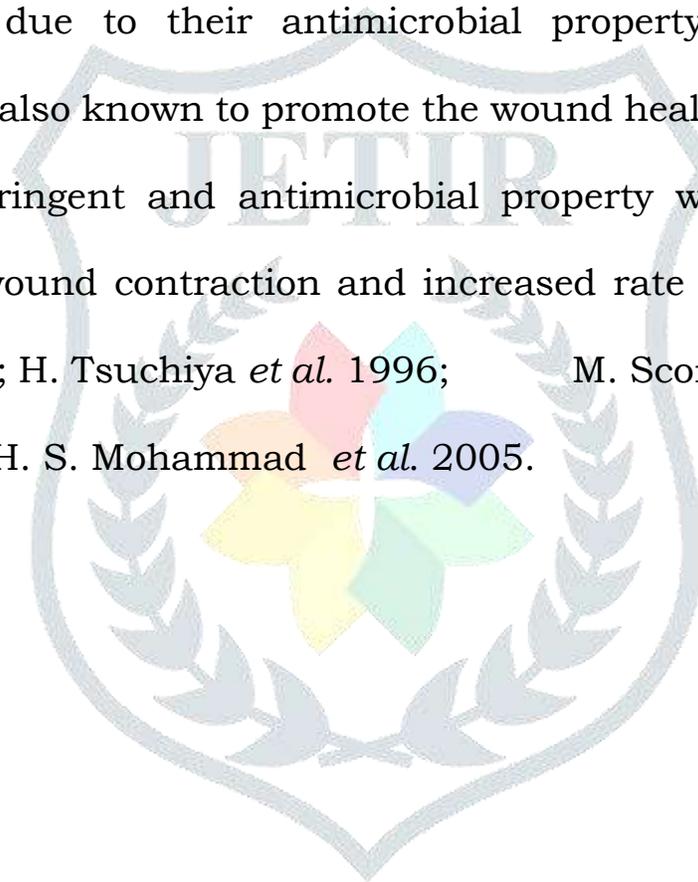
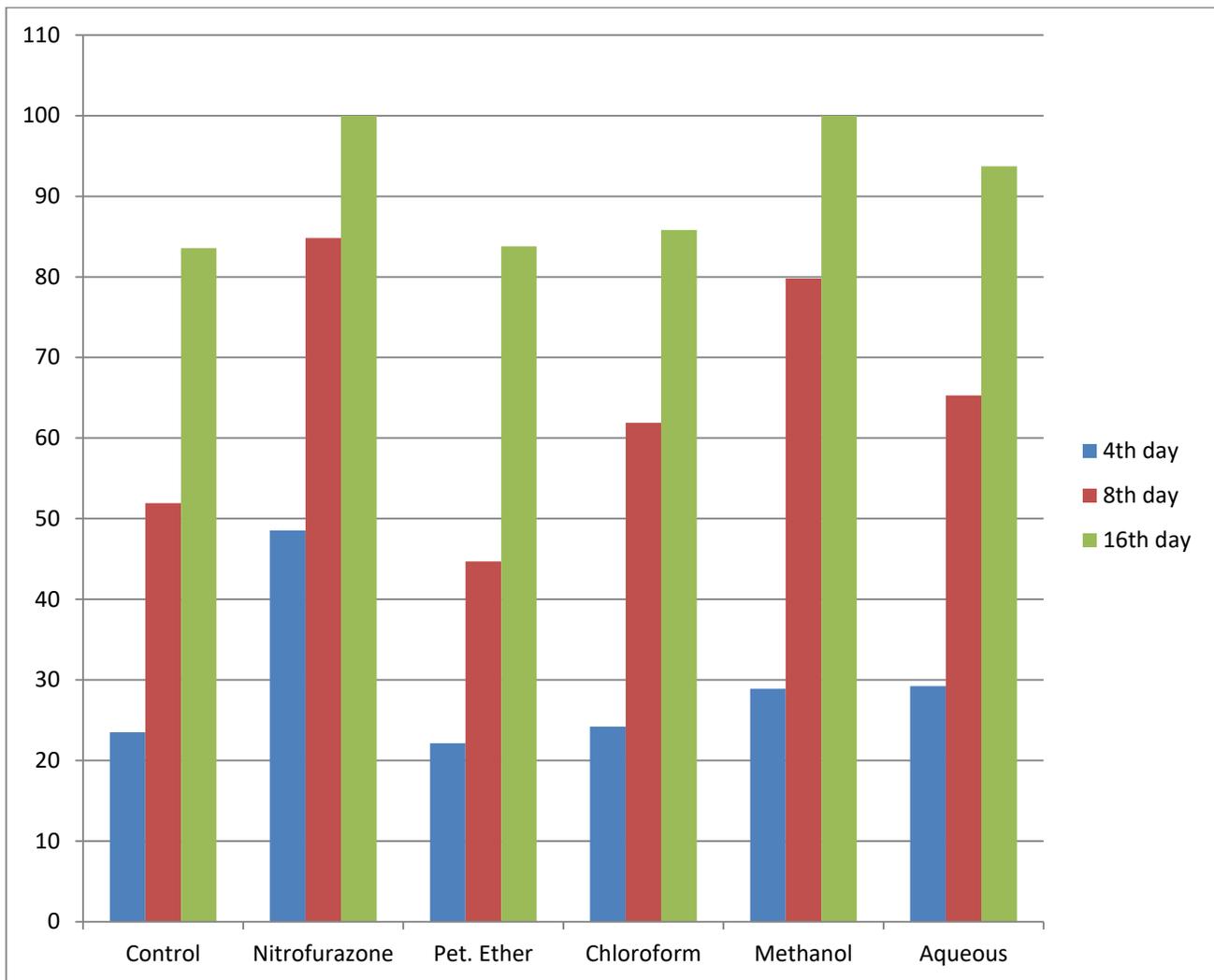


Table - 1 Showing phytochemical screening.

Extr.	Alkaloid	Carbohydrate	Glycosides	Prot.	Steroid & Sterol	Triter Period
Pet. ether	+	—	—	—	+	+
Chloroform	+	—	—	—	+	+
Methanol	+	—	—	+	—	—

Table - 2 Effect of various extract on wound.

Treatment	4th day	8th day	16th day
Control	23.52	51.92	83.56
Nitrofurazone	48.53	84.80	100.00
Pet. Ether	22.15	44.70	83.80
Chloroform	24.19	61.88	85.80
Methanol	28.88	79.78	100.00
Aqueous	29.23	65.28	93.70



REFERENCES

- B. Kumar, M. Vijayakumar, R. Govindarajan, and P. Pushpangadan, 2007. Ethnopharmacological approaches to wound - healing - exploring medicinal plants in India. Journ. Ethnopharm. 114 (2) : 103 - 13.
- Y. R. Chadha, 1985. The Wealth of India, CSIR, New Delhi.
- K. R. Kirtikar and B.D. Basu, 1994. Indian Medicinal Plants : Bishen Singh, Mahendrapal Singh, Klewer, Dehradun, India.
- R. Stewart, 1997. Herbalism : most common form of medicine available. The ' Eastern Pharmacist vol. 475.
- C. Muthu; M. Ayyanar; N. Raja and S. Ignacimuthu, 2006. Medicinal plants used by traditional healers in Tamil Nadu, India. Journ. Ethnobiol. and Ethnomed. Vol. 2 : 43.
- G F Asprey and P. Thornton, 1955, Medicinal plants of Jamaica. The West Indian Med. Journ. Vol. 4 (2) : 69 – 82.
- LM Giron; V. Freire; A. Alanzo and A. Caceres, 1991. Ethnobotanical Survey of the medicinal flora used by the Caribs of Guatemala. Journ. Ethnopharm. Vol. 34 (2-3) : 173 -187.
- S. Duttagupta and P. C. Dutta, 1977. Pharmacognostic study of the leaf of *H. indicum*. Journ. Crude Drug Res. Vol. 15 : 141-151.

- N. Nagaraju and K N Rao, 1990. A survey of the crude drugs of Andhra Pradesh Journ. Ethnopharm. Vol. 29 (2) : 137-158.
- B. Barrett, 1994. Medicinal plants of Nicaragua's Atlantic Coast Econ. Bot. Vol. 48 (1) : 8 – 20.
- M. Misawa, M. Hayashi and S. Takayama, 1983. Production of antineoplastic agents by plant tissue culture. Planta Medica 49 (2) : 115-119.
- J B Harborne, 1994. Phytochemical Methods. A Guide to Modern Techniques of Plant Analysis. Chapman and Hall, New York, USA.
- H. Wagner and S. Bladt, 1996. Plant Drug Analysis. Springer, Berlin, Germany.
- C. Ya, S.H. Gaffney, T.H. Lilley and E. Haslam, 1988. Chemistry and significance of condensed Tannins, Plenum Press, New York.
- H . Tsuchiya, M. Sato, T. Miyazaki, 1996. Comparative study on the antibacterial activity of phytochemical flavanones against methicillin resistant Staphylococcus aureus. Journs. Ethnopharm. Vol. 50 (1) 27 – 34.
- H.S. Muhammad and S. Muhammad, 2005. The use of *Lawsonia inermis* in the management of burn wound infections. Afr. Journ. Biot. 4 (9) : 934-937.