**Wound Healing Properties of Methanolic Extract of Seeds of *Mucuna Pruriens***

*1Gunde M.C., 1Meshram S.S., 1Dangre P.V., 2Amnerkar N.D.*

1*Kamla Nehru College of Pharmacy, Butibori, Nagpur (M.S.)-India*

2*Sharad Pawar College of Pharmacy, Wanadongri, Nagpur (M.S.)-India.*

**ABSTRACT**
Plants and their extracts have immense potential for the management and treatment of wounds. Wound healing is a complicated process that involves four phases viz. (i) Coagulation begins immediately after injury (ii) Inflammation which begins with in hours (iii) Proliferation which begins with in days (iv) Remodeling up to period of weeks, months, years. *Mucuna pruriens* seeds are being used traditionally as anti-inflammatory, antimicrobial agents in various disorders. This study was aimed to investigate the wound healing efficiency of methanolic extract of seeds formulated as 1% and 2% hydrogels of carbopol 974 NF. Carbopol is a pH sensitive polymer and widely used as a base for various topical gel preparations. Wound were induced in Swiss albino mice divided into five groups as follows: Group-I (negative control) received no treatment. Group-II was treated with carbopol empty gel. Group-III and IV was treated with carbopol gel containing 1% and 2% of methanolic seeds extract, Group-V (positive control) received the standard drug (Framycetin cream). The efficacy of treatment was evaluated based on the wound contraction, hydroxyproline content and tensile strength of skin.

**Keywords:** Wound healing, hydrogel, hydroxyproline content and wound contraction.

**INTRODUCTION**
Wound is defined as a loss or breaking of cellular and anatomical or functional continuity of living tissue (1). Healing of wound is a biological process that is initiated by trauma and often terminated by scar formation (2). The process of wound healing occurs in different phases such as coagulation, epithelization, granulation, collagenation and tissue remodeling (3, 4). In India, there has been interest in knowing the potential of natural products obtained plants and animal for development of drug for various diseases. The wound healing properties of plants was taught in popular form of Indian medicine known as Ayurveda (5).

*Mucuna pruriens* Baker (Fabaceae) is a herbaceous twining annual found almost all over India from Himalayan foothills to the plains of Punjab to south India among hedges and bushes. It has been cultivated in certain region for its levodopa content (6). Seed of *M. pruriens* have been shown to possess antispasmodic, anti-inflammatory, antipyretic (7), antivenin property (8), aphrodisiac activity (9), anabolic and fertility property (10). It has also shown to possess CNS depressant activity. Seeds are used in general weakness as a tonic.

Animal and grouping: Swiss albino mice weighing 20-25 gm were used. They are allowed to acclimatize to laboratory conditions for not less than 10 days. Wounds were induced in mice by dividing them into following groups: Group-I (negative control) received no treatment. Group-II was treated with carbopol empty gel. Group-III and IV was treated with carbopol gel containing 1% and 2% of methanolic seeds extract, Group-V (positive control) received the standard drug (Framycetin cream).

Preparation of extract: The weighed quantity of coarsely powdered seeds of *M. pruriens* was passed through sieve no.40 and subjected to hot solvent extraction in a soxhlet apparatus using methanol, at a temperature range of 40-80°C, before and after every extraction the marc was completely dried and weighed. The filtrate was evaporated to dryness at 40°C under reduced pressure in a rotary vacuum evaporator. A brownish black waxy residue was obtained. The percentage yield of methanolic extract was 18.7% w/w. The extract was further used for the evaluation of wound healing activity.

Experimental Methods: Wound healing activity was studied using two models viz. excision wound model and incision wound model. Excision wound model: It was made on the dorsal thoracic region 1 cm away from vertebral column and 5 cm away from ear using round seal of 1.5 cm diameter on the anaesthetized mice. The skin of wound area was excised to the full thickness to obtain a wound area of about 300 sq.mm. A contraction, which contributes for wound closure in first 2 weeks, was studied by tracing the raw wound. Wound area was measured by retracing the

**MATERIAL AND METHODS**
Plant Material: The fresh seeds of *M. pruriens* were collected from the rural area of Nagpur district (M.S.) India and authenticated by macroscopic and microscopic evaluation. The seeds were dried in shade and pulverized to get coarse powder.
wound on a millimeter scale graph paper. The degree of wound healing was calculated using formula:
1-(wound area on corresponding day/wound area on zero day) x 100. The number of days for complete epithelization was noted.11

Estimation of Hydroxyproline: The hydroxyproline content was determined by extracting hydroxyproline from scab using conc. HCL followed by reaction between amino group of hydroxyproline with p-aminobenzaldehyde to develop red colour. The red colour thus measured on spectrophotometer at 558nm.12

Incision wound model: One Para-vertebral straight incision of 6 cm length each was made through the entire thickness of the skin, on either side of the vertebral column with the help of a sharp scalpel. After complete homeostasis the wound were closed by means of interrupted sutures placed at equidistance points about 1 cm apart and wound healing was noted. When wounds were cured thoroughly, the sutures were removed and the tensile strength of the skin that is the weight in grams required to break open the wound skin was measured by tensiometer.13

### RESULTS AND DISCUSSIONS
The basic principle of optimal wound healing is to minimize tissue damage and provide an adequate tissue...
perfusion and oxygenation, proper nutrition and moist wound healing environment to restore the anatomical continuity and function of the affected part. The results of excision wound model indicate that in the first 4 days there is no significant increase in the wound contraction in all the groups as compared to the control group. The results of the 8th day indicate that there is significant increase in the percentage wound contraction in the group treated with standard drug, 1% and 2% methanolic extract revealing that the extract has ability to induce cellular proliferation. (Table-1 and Graph-1)

Hydroxyproline is one of the biomarker which increase level indicate the wound healing process. The increase hydroxyproline content in scab of the animal treated with 1 and 2% methanolic extracts support the wound healing process. Out of these two extracts 2%methanolic extracts is found to be the most effective. (Table-2)

The increase in tensile strength of wounded skin in incision wound model indicates the promotion of collagen fibers. Highest tensile strength of the wound skin observed in the animal treated with 2% methanolic extracts. The increase tensile strength reveals that the disrupted surfaces are firmly knit by the collagen (Table 3)

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<thead>
<tr>
<th>Groups</th>
<th>Tensile strength in gram (mean±SEM)</th>
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<tr>
<td>I (Control)</td>
<td>328.83 ± 3.64</td>
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<tr>
<td>II (Empty Carbopol)</td>
<td>513.00 ± 2.63</td>
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<tr>
<td>III (1% M.E.in Carbopol)</td>
<td>739.67 ± 3.29</td>
</tr>
<tr>
<td>IV(2% M.E.in Carbopol)</td>
<td>861.83 ± 3.19</td>
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<tr>
<td>V (Standard Drug)</td>
<td>643.00 ± 4.91</td>
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REFERENCES