

## The Wound Healing Ability of the Prepared Ointment Incorporating Herbal Extracts

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### ABSTRACT

Physical injuries or wounds are the physical damage to the skin. The human body naturally possesses the wound healing ability to heal physical damages. The wound healing was initiated in the human body in various mechanisms, and it occurs in three phases. The plants like Musa and Tridax have been evaluated for the wound healing activity, and the extracts were seen toxic to the body too. So in this research, the ointment formulation was prepared using the extracts of the two plants that are extracted with water as the solvent. The polyherbal ointment was prepared using the herbal extracts that were extracted from the parts of Tridax and Musa using the distilled water as a solvent. The prepared ointments showed a better activity compared to the crude extracts and the standard drug too.



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### INTRODUCTION

Physical injuries or wounds are the physical damage to the skin. The human body naturally possesses the wound healing ability to heal physical damages. The wound healing was initiated in the human body

in the various mechanism, and it occurs in three phases.

1. Inflammatory phase: in this phase, the inflammatory mediators like prostaglandins, cytokinin and the interleukins were generated, and they initiate the next process of the healing cycle.

2. Proliferation stage: in this stage, the inflammatory mediators that are generated will initiate the collagen fibres in the skin and initiate the process of healing. This stage also enhances the generation and repair of the blood vessels, and the epithelial tissue is formed it the wound bed to start the closure of the wound.

3. Epithelialization and remodelling: in this stage, the granulation tissue was all cover with the epithelial tissue, and the close of the wound was done. The eschar formation was also seen in this stage [1].

Since there are no synthetic drugs to treat eh wounds in the body, the focus has been shifted towards the herbal drugs to enhance the healing ability of the wounds. The herbs have been used in the medicine and the history to heal the wounds quickly and have been investigated as a lot for the proving of the property. There were a lot of publication works on the wound healing ability of the herbal extracts [2, 3]. The herbs with the anti-inflammatory profile and the antioxidant activities have already been proven for the wound healing activity [4-6].

The plants like Musa and Tridax have been evaluated for the wound healing activity [7, 8], and the extracts were seen toxic to the body too. So in this research, the ointment formulation was prepared using the extracts of the two plants that are extracted with water as the solvent and then investigated for the wound healing activity by comparing the extracts separately and the ointment which incorporated both the extracts.

#### Formulation of the ointment

The plant parts of Musa and tridax were brought from the farm in the locality and were, and herbarium was prepared, and the same is stored in the library. The plant parts were then dried under a shaded roof area which had received a lot of natural ventilation, and the area had an even temperature of about 35<sup>0</sup>c. The relative humidity is according to the temperature outside. The drying was performed for about four days, and the moisture content in the dried parts was about 6.5%. Now the parts are pulverization, and the resultant fine powder was extracted with water using the maceration technique. 5g of the powder was soaked in a beaker with 100ml of distilled water, and the shaking of the bottle was done in regular intervals for making the water mix with the drug powder well. Then the macerated solvent was filtered using a filter paper press, and the filtrate was collected. This was let to evaporate to drying under pressure and the crude extract as weighed to calculate the percentage yield. This was stored and used to prepared the ointment. 10gm of the ointment base was prepared by mixing the liquid paraffin and the beeswax and then heating for about 90<sup>0</sup>c for about 5mins to melt the wax. This was then incorporated with extracts to make the final concentration of the extract as 200mg/g of the ointment. Flavouring and colouring were added, and the agents used were of natural origin. The resultant ointment that was generated was of thick consistency and was easily applicable to the human skin. Skin irritation study was performed to make sure there was no irritation or inflammation on the

skin.

#### Animal section

30 Healthy albino rats were of both the male and female to investigate the activity. The rats weighed about 190-200gms overall. They were kept in the laboratory conditions and gave free food and water at the will of the animal. The treatment of the animals was done as per following the guidelines of the animal ethics committee that was constituted in the laboratory.

#### Wounding process

The rats were given the anaesthesia by injecting the ether in the peritoneal route, and the skin on the dorsal side was shaved off to about 5 cm in length and width. The rats were then rested and let to go into anaesthesia. Then excision wounds were made on the dorsal side where the skin was shaved off [9]. The wounds were made after sterilization of the area so that to avoid the infection and microorganism contamination. The injuries were made to a measurement of 400mm<sup>2</sup> [10]. The 30 animals were separated into five groups. These groups had rats of both sexes and the six animals. The grouping and administration were done as per the procedure. The excision wound model was adopted for the investigation.

Group 1 was administered with the normal saline which was topically poured on the wound; Group 2 was administered with the standard drug, Beta-dine ointment with 5%w/w ointment; Group 3 was administered with the extract of the tridax and Group 4 was administered with the extract of Musa. Group 5 animals were administered with the topical application of the ointment that is prepared, which covers the wound totally [11]. The investigation was continued to 15 days, and the wound was measured in the days of 1,3,6,9,12 and 15 days interval. The percentage protection was calculated, and the day of the dropping of the eschar was counted as the end day of the wound.

#### RESULTS AND DISCUSSION

The wounds that were caused due to the surgery took almost 20 days to heal with the administration of the saline solution. The eschar loosened out and fell off on the 20<sup>th</sup> day. The wound healing process usually takes in the three steps, as discussed above. 1. Inflammatory stage 2. Proliferative stage and the 3. Remodelling stage. There are few variations in the healing time of the wounds in the rats that are in the group 1 are due to the variations in the body response in the healing process in those stages [7]. The extracts showed a complete wound healing of

**Table 1: Wound healing Comparison of the Poly herbal ointment**

Grouping	Wound surface area (mm <sup>2</sup> )						Percentage protection
	1stDay	3rd Day	6th Day	9thDay	12thDay	15thDay	
Topical Saline	402±0.63	383.3±0.94	376.4±0.75	312.1±0.67	224.0±0.82	160.82±0.19	67.38
Betadine	403±0.719	370±0.81*	282.1±0.13*	236.8±0.16*	96.9±0.63*	10.5±0.7**	98.25
Tridax Extract	402±0.578	354.4±0.9*a	254.12±0.7*a	205.19±0.81*	154.8±0.14*	17.93±0.11**	97.38
Musa Extract	403±0.823	353.7±0.6*a	253.2±0.5*a	204.2±0.72*	153.5±0.16*	16.44±0.43**	98.18
Prepared ointment	403±0.935	354.11±0.7*a	255.8±0.4*a	205.3±0.84*	154.3±0.37*	18.16±0.64**	96.74

the wounds in 15 days. Both the extracts showed similar activity in the closure of the wounds. The ointment showed a better activity compared to both extracts. The wound healing of the ointment was complete within 12 days. The activity was comparably similar and significant to the activity of the betadine. The epithelialization of the wound was performed, and the debris was also eliminated. The closure of the wound was successful, and the antioxidant and the anti-inflammatory activity was responsible for the activity [8].(Table 1 )

## CONCLUSION

The polyherbal ointment was prepared using the herbal extracts that were extracted from the parts of Tridax and Musa using the distilled water as a solvent. The prepared ointments showed a better activity compared to the crude extracts and the standard drug too.

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## Conflict of Interest

Authors declared no conflict of interest.

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