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A PHARMACEUTICO–ANALAYTICAL AND EXPERIMENTAL STUDY OF DATURA-YASHTIMADHU MALAHARA TO EVALUATE THE WOUND HEALING PROPERTY

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ABSTRACT

Datura-Yashtimadhu Ghrita is a folklore preparation used in treating wounds. But the scientific studies was not done yet. Hence this study aims at pharmaceuticoanalytical and experimental evaluation of *Datura-Yashtimadhu Malahara*. The formulation was changed from *Ghrita* to *Malahara* for the convenience of usage. Dermal toxicity study was carried out and found no dermal toxicity. The experimental study was done on incision wound model. 3 groups with 6 rats in each was made. Group I assigned as Control and treated with normal saline. Group II was Standard group, treated with *Jatyadi Ghrita* and Group III was Trial group which was treated with *Datura-Yashtimadhu Malahara*. 7 days application was done and observed till 14th day or complete epithelialization. The wound length is measured on daily basis and changes are noted. It is found that the Trial group showed faster wound healing that the Control group. However, it showed equivalent results with Standard group. Hence *Datura-Yashtimadhu Malahara* was effective in wound healing.

Keywords: Wound healing, *Datura-Yashtimadhu Malahara*, Rat, Incision wound, Experimental study.

INTRODUCTION

A wound is defined as a disruption of cellular, anatomical and functional continuity of a living tissue and may be caused by physical, chemical, thermal, microbial or immunological insults. In other words, a wound is a break in the epithelial integrity andmay be accompanied by disruption of the structure and function of underlying normal tissue. Even though healing of the wound is the natural process of the body, because ofcontamination with microorganisms there will be chances of development if unhealthy tissue and it shows delay in healing. To prevent this and for the early healing of the wound with minimal scar tissue it requires some interventions.

Research work on acute wounds in animal models showed the four phases of wound healing as Haemostasis, Inflammation, Proliferation or Granulation, Remodelling or Maturation.

Datura species are found commonly throughout India, especially in warmer regions. Even though it is a poisonous plant it has many medicinal uses. There are some references to the wound-healing properties of Datura in Ayurvedic classics. To support this, studies have shown the wound healing property in animal models[1,2]. *Yashtimadhu* (Glycyrrhiza glabra) is a tall perineal plant having *Vranaropana* property due to Madhura *Rasa*, and *Sheetha*veerya[3]. Lipids help in the easy absorption of drugs across cell membranes[4]. Hence *Ghrita* is prepared and converted to *Malahara* (ointment). The advantage of *Malahara* is its longer shelf life than Ghrita, which remains in contact with the wound for a longer time and is easily applied. Moreover, bees wax hastens the wound healing[5]. Hence this study has been planned to explore the action of *Datura Yashtimadhu Ghrita* in the form of *Malahara* on incision wounds.

OBJECTIVES:

- To prepare *Datura-Yashtimadhu Malahara*
- To perform an analytical study of *Datura-Yashtimadhu Malahara*
- To evaluate acute dermal toxicity of *Datura-Yashtimadhu Malahara*
- To evaluate experimentally wound healing activity of *Datura-Yashtimadhu Malahara* on the topical application on incision wounds made in albino rats.

METHODOLOGY:

Drug preparation:

Identification and collection of drugs

The drugs required for the preparation of *Datura-Yashtimadhu Malahara* were collected from its natural habitat of Dakshina Kannada, Bantwala district.

Ingredients required:

Datura – Leaves of Datura metal L

Yashtimadhu – Roots of Glycyrrhiza glabra

Sikta- Beeswax

Ghrita- Ghee

Pharmaceutical preparation :

The preparation of *Datura-Yashtimadhu malahara* was done under expert guidance at Rasa Shasthra and Bhaishajya Kalpana lab of Alva's Ayurveda Medical college, Moodabidire.

***Datura Patra Swarasa* :**

- Fresh leaves of datura obtained from authentic source was cleaned well.
- The leaves were then pounded in a mortar.
- The obtained *Swarasa* was strained by a strainer and collected in a vessel.
- This obtained *Swarasa* is called *Datura Patra Swarasa*.

***Datura – Yashtimadhu Malahara* Preparation:**

- *Yashtimadhu* root obtained from an authentic source was cleaned and dried well.
- Then it was rubbed on a stone to get *Yashtimadhu Kalka*.
- In a clean stainless-steel vessel kept on a heat source, *Yashtimadhu Kalka*, *Datura Patra Swarasa*, and *Ghrita* was added in the ratio 1:20:20.
- *Datura-Yashtimadhu Ghrita* was obtained as per standard *Ghrita Paaka* method[6].
- 4 parts of *Sikta* were dissolved in obtained *Ghrita Paaka* and filtered using a clean cloth.
- It was filled into clean air-tight containers to get to get *Datura-Yashtimadhu Malahara*.

Experimental study

Different animal experiments are used to understand the physiological and pathological mechanisms in the

field of medical science. The effects of drugs on organisms and individual tissues are studied by designing a specific animal model and gaining insight into where and how the drug works.

The prepared formulation i.e., *Datura-Yashtimadhu Malahara* is a new dosage form that is not mentioned in ayurvedic literature. Hence the experimental study had two components;

- Dermal toxicity study-to understand the safety of the formulation which was followed by
- Efficacy study-excision wound model.

Both studies followed the following criteria for inclusion and exclusion.

Inclusion criteria :

a)Healthy rats of either sex

b)weighing about 200-300g

Exclusion criteria:

a) Infected, pregnant, and diseased rats.

b) Rats that are under trail for other experiments.

Method: The rats will be randomly selected and grouped as follows:

Table 1. Showing The Groups And Number Of Rats For Dermal Toxicity Test.

Dermal Toxicity Group	Drug	Number of Rats	Duration
Self-Assessment Group	*Datura-Yashtimadhu Malahara*	3	10 Days

Table 2. Showing The Groups, Drugs, And Number Of Rats For Efficacy Study.

Efficacy Study Groups	Group Name	Drug	Number Of Rats	Duration Of Application
Group 1	Control Group(CG)	Water Wash	6	7 Days
Group 2	Standard Group(SG)	Jatyadi Ghritha	6	7 Days
Group 3	Trial Group(TG)	Datura Yashtimadhu Malahara	6	7 Days

The procedure followed for the dermal toxicity study:

- Fur of animals was removed in the paravertebral region.
- *Datura-Yashtimadhu Malahara* - 1g was applied once a day.

The procedure followed for the incision wound model in the efficacy study:

- Animals in each group were anesthetized using diethyl ether.
- The fur is removed from the paravertebral region and is cleaned.
- A paravertebral long incision of 3cm was made using a surgical blade using aseptic measures.
- All the groups were treated as per their group details mentioned above once daily.

ASSESSMENT CRITERIA:

Dermal toxicity study- any visible changes on the skin, eyes, behaviour, and food intake was noted.

No visible changes were observed on the skin surface. There was no irregularity in the food intake and activities of the animals.

Efficacy study: The length of the wound was measured every day till the complete epithelialization.

RESULT AND DISCUSSION :

Analytical study of *Datura-Yashtimadhu Malahara*:

Table 3. Showing the results of the analytical study

PARAMETERS	RESULTS
LOSS ON DRYING(%)	28.36
pH	10.62
Rancidity (acid value)	9.812
TOTAL FAT(%)	87
SPREADBILITY (CM)	2

The analytical study helps in the standardization of the formulation.

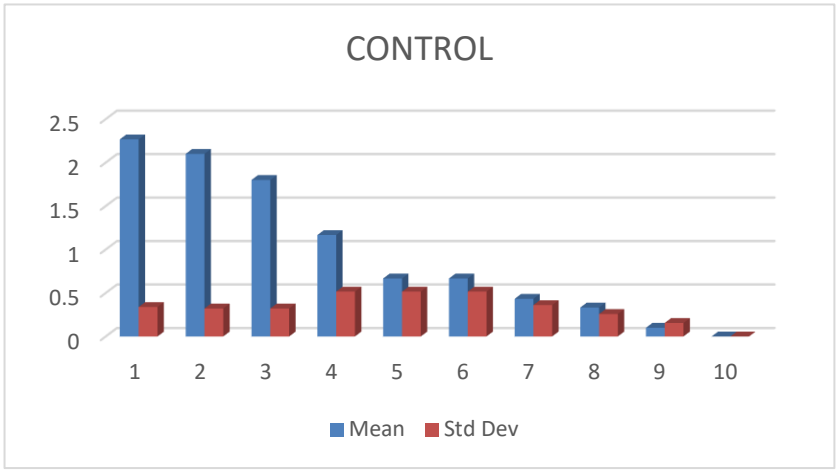
Experimental Study:

The dermal toxicity test on rats did not show any allergic reaction and the rats are healthy throughout the observation period. This suggests that the Trial drug does not contain dermal toxins. The wound healing process may be enhanced through antimicrobial, anti-inflammatory, antioxidant, cell proliferation, and angiogenic effects[7]. There are many formulations available to treat infections that may or may not possess wound-healing properties[8]. Plant extracts play an important role as they can be used to treat wounds at any stage and are mostly non-toxic[9].

1. Day-wise graphical representation of healing of the control group.

There was not much significant change observed in the healing. Studies had suggested that the normal duration of healing of cutaneous wounds takes 12-16 days[10]. Since this model has a 3cm incision wound, it took 10 days for complete healing.

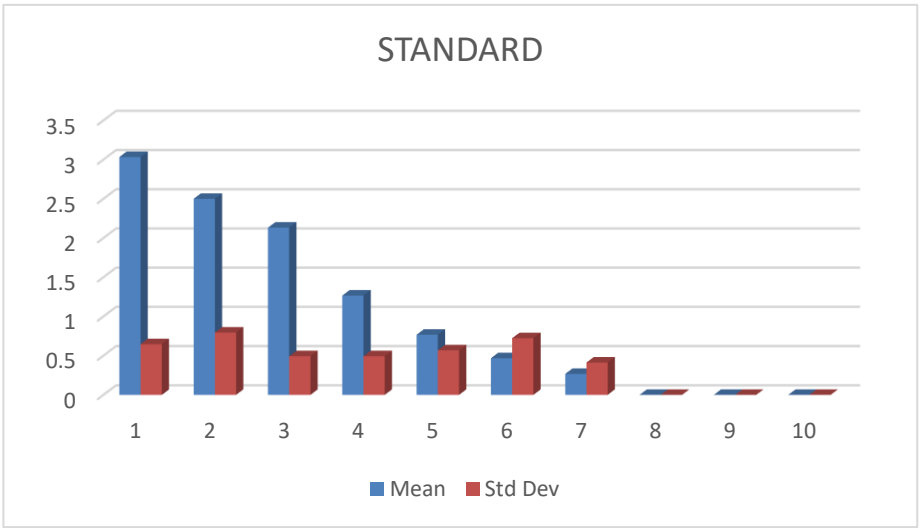
Graph 1. Showing the mean and standard deviation of the control group.



2. Day-wise graphical representation of healing of standard group.

There were significant changes in wound healing, since the standard drug i.e., *Jatyadi Ghrita* is a potent wound-healing drug[11]. Complete healing was observed on the 8th day.

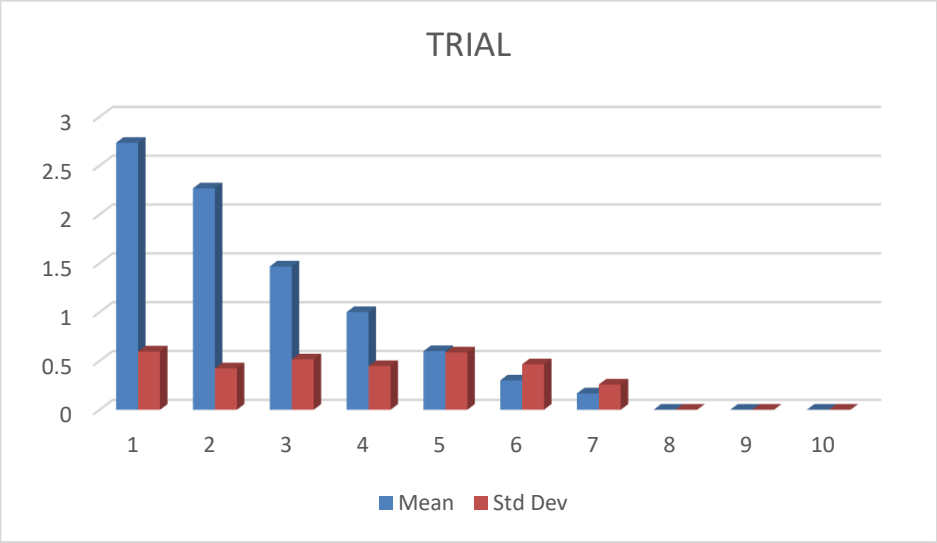
Graph 2. Showing the mean and standard deviation of the standard group.



3. Day-wise graphical representation of healing of trial group.

Complete healing of the wound was found on the 8th day. This shows that the *Datura* and *Yasthimadhu* are having wound healing action.

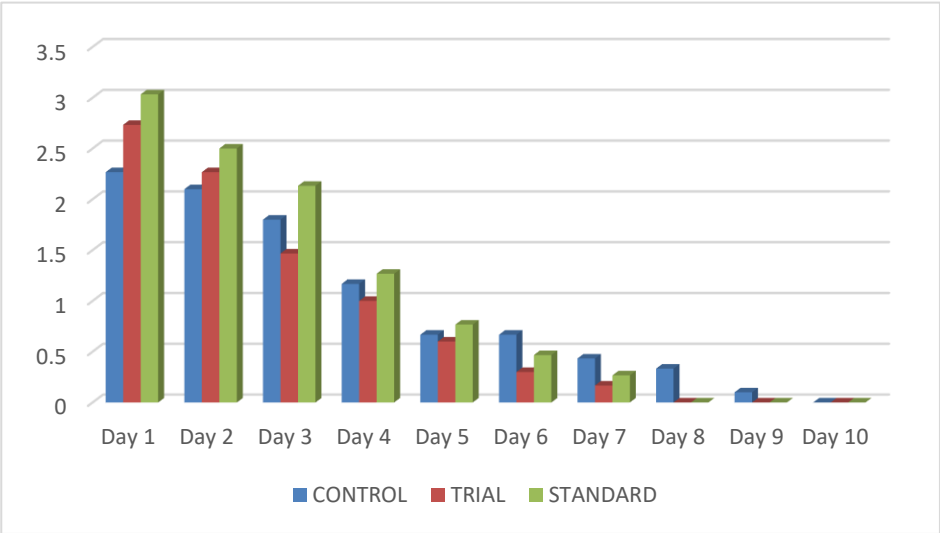
Graph 3. Showing the mean and standard deviation of the trial group.



4. The following graph shows the healing of wounds between the groups.

The graphical representation shows that wound healing was better in the TG and SG when compared to the CG. However, there was not much significant difference between SG and TG groups. Both TG and SG group rats showed complete healing by the 8th day. Whereas, in CG complete wound healing occurred on the 10th day. Studies have shown evidence of herbal extract with ghee in wound healing[12].

Graph 4. Showing the comparison of healing in control, trial, and standard groups.



CONCLUSION

In this study, *Datura-Yashtimadhu Ghrita* was used in the form of *Malahara* which can be easily applied, have longer shelf than *Ghrita* and thus remains in contact with wound for longer period. The dermal toxicity study showed that this *Malahara* is not having any allergic reaction and can be used safely. In this study, trial group showed better result than the control group and the actionis almost equal to standard group. Hence on the above study *Datura-Yashtimadhu Malahara* is effective in wound healing.

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Table 4. Showing the images of the preparatiion of *Datura-Yashtimadhu Malahara*

Fig.01 *Datura*leaves

Fig.02 *Yashtimadhu*root

Fig.03 *DaturaPatraSwarasa*

Fig.04 Ghee

Fig.05 Preparation of medicated*Ghrita*

Fig.06 *Datura-YashtimadhuGhrita*

Fig.07 Preparation of *Malahara*

Fig.08 *Datura-YashtimadhuMalahara*

Table 5. Showing the images of wound healing in rats of different groups			
	CONTROL	**TRIAL**	**STANDARD**
DAY1			
DAY 4			

DAY 8			
DAY 10