



RESEARCH ARTICLE

PHARMACOLOGY

**WOUND HEALING ACTIVITY OF ALCOHOLIC EXTRACT OF “*GUAZUMA ULMIFOLIA*” LEAVES ON ALBINO WISTAR RATS****P.SENTHIL<sup>\*1</sup>, A. ASHOK KUMAR<sup>1</sup>, M. MANASA<sup>1</sup>, K. ANIL KUMAR<sup>1</sup>, K. SRAVANTHI<sup>1</sup> AND D.DEEPA<sup>2</sup>**<sup>1</sup>Department of Pharmacology, Jyothismathi College of Pharmacy, Turkapally, Hyderabad<sup>2</sup>SRM College of Pharmacy, SRM University, Kattankulathur, Tamilnadu**P.SENTHIL**Department of Pharmacology, Jyothismathi College of Pharmacy, Turkapally,  
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**ABSTRACT**

The alcoholic extract of *Guazuma ulmifolia* was evaluated for their wound healing activity in Albino Wistar rats using chemically induced wound model. The experimental animals were chemically burned by conc HCL (80%), and then divided into four groups, control, standard (Nitrofurazone 0.2% w/w), low dose (125 mg/kg) and high dose (250mg/kg). The re-epithelialization was evaluated by the reducing width of wounds for seven days. It was observed that the alcoholic extract showed re-epithelialization faster when compared with control. The extract also showed significant wound healing activity when compared with standard. The present results support that the use of alcoholic leaf extract of *Guazuma ulmifolia* in topical skin care and healing wounds.



## KEY WORDS

Wound healing, Epithelialization, *Guazuma ulmifolia*

## INTRODUCTION

*Guazuma ulmifolia* belongs to *Sterculiaceae* family. It is widely distributed in west India, Caribbean, Mexico, Central America, Colombia, Peru, Bolivia, Argentina, and Brazil. Leaves are used for prostate problems, uterine stimulant to aid in child birth, cleanse and detoxify blood, suppress the cough, promote hair growth, pneumonia, kidney disease, liver disease, wounds, sores, fever, skin eruption and irritation<sup>(1)</sup>. The plant contains various phytoconstituents like alkaloids, terpenoids, saponins, tannins, flavonoids and steroids. Several phytoconstituents like *triterpinoids*,<sup>(2)</sup> tannins, saponins<sup>(3)</sup>, alkaloids<sup>(4)</sup> and flavonoids<sup>(5)</sup> are known to promote wound healing process due to their antioxidant and antimicrobial activities. In addition triterpenoid reported to possess an ability to increase the collagen content, which is the [DELETE] one of the factors promoting wound healing<sup>(6)</sup>.

## MATERIALS AND METHODS

### PLACE OF STUDY

The present study was carried out in Department of Pharmacology, Jyothishmathi College of Pharmacy, Hyderabad. The study has been designed for the evaluation of wound healing activity of alcoholic extract of *Guazuma ulmifolia*. The leaves of *Guazuma ulmifolia* were collected and authenticated by Prof Dr. [DELETE] N.JAYASREE, Ph.D. [DELETE], Jyothishmathi College of pharmacy, Hyderabad.

### PREPARATION OF EXTRACT

The collected leaves were dried under shade, pulverized into coarse powder by mechanical

grinder to obtain coarse material. The extract was successfully obtained by cold maceration and hot soxhlet method with methanol for 72 hours. The yield was found to be 10%. The residue obtained was then utilized for evaluating wound healing activity, after suspending in 20% Tween 80.

### EXPERIMENTAL ANIMALS

Albino Wistar rats (120g-200g) were obtained from the animal house of Department of Pharmacology, Jyothishmathi College of Pharmacy, Hyderabad. The animals were housed in well ventilated, air conditional animal house at a constant temperature of  $23 \pm 2^{\circ}\text{C}$ , with the relative humidity of 55-60%. The animals were housed in spacious polypropylene cages with paddy husk as bedding material. The animals were maintaining on standard pellet diet and purified water. The animals were provided with food and water and libitum except during fasting.

Re-epithelisation time was observed for 1 to 7 days and measured wound healing diameter.

### WOUND HEALING ACTIVITY

#### Induction Method

The skin of rats were shaved mechanically and leaved for 24 hours, two or three drops of concentrated HCL (80%) were topically applied carefully on the shaved skin. Then the skin burned rats were housed separately under sterile conditions in isolated room cleaned with sterile solution.

#### Topical Application and Treatment

The two experimental groups (low dose-125mg/kg and high dose-250mg/kg) were

treated twice a daily by extract of *Guazuma ulmifolia*. One of these groups treated by 0.2%w/w Nitrofurazone USP (Standard), while the others are treated with vehicle (20% Tween 80) treated as Control.

**Observation of Burns**

The areas of the burns were recorded daily to show the contracting ability of wounds and to determine the closure time. The granulations of tissues or rebuilt layers were observed. The reepithelialisation time was recorded.

**STATISTICAL ANALYSIS**

Results were analysed by one way ANOVA followed by Dunnet multiple comparisons tests. P values <0.05 were considered as significant.

**RESULTS**

**PHYTOCHEMICAL STUDY**

The ethanolic extract of leaves of *Guazuma ulmifolia* showed the presence of various phytoconstituents like alkaloids, terpenoids, saponins, tannins, flavonids and steroids.

**CHEMICALLY INDUCED WOUND MODEL**

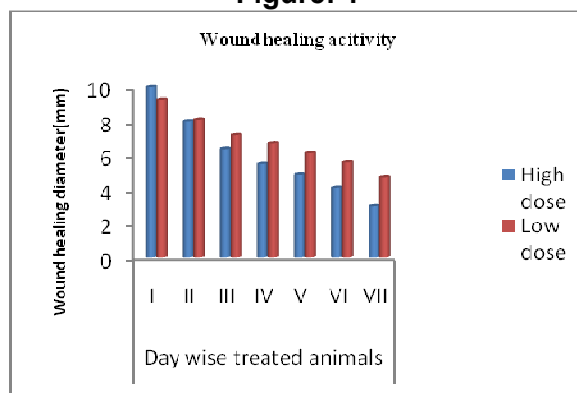
The table 1 shows the Mean±SE values of wound diameter of four groups. There was a statistically significant (p<0.01) reduction in the mean wound diameter, when comparing *Guazuma ulmifolia* 125mg/kg and 250mg/kg with Nitrofurazone 0.2% w/w. The figure 1 indicates that the extract showed significant wound healing activity at the dose of 250mg than 125mg.

**Table: 1**

Groups	Mean value of Wound Diameter (mm)						
	I	II	III	IV	V	VI	VII
Control	10±0.36	9.83±0.015 4	9.4±0.173	9.1±0.0155	8.8±0.1254	8.4±0.0155**	7.9±0.01**
High dose	10±0.65 <sup>ns</sup>	8±0.0154**	6.4±0.7883**	5.5 ±0.2887**	4.9±0.29**	4.166±0.2867	3±0.16**
Low dose	9.33±0.54 <sup>n</sup>	8.18±0.623*	7.2±0.358**	6.73±0.67**	6.13±0.886**	5.6±0.3741**	4.7±0.24**
Standard dose	10±0.36 <sup>ns</sup>	7.93±0.765*	6.73±0.427**	5.5±0.8205*	5.5±0.450**	4.8±0.5715**	4.033±0.28*

ns p>0.05, \*p<0.05, \*\* p<0.01 – one way ANOVA followed by Dunnet multiple comparisons tests

**Figure: 1**



## DISCUSSION

In the present study the wound healing activity of alcoholic extract of *Guazuma ulmifolia* was evaluated by chemically induced wound model in Albino Wistar rats. There are many plants with reported wound healing property in folklore and traditional medicines like *Allamanda cathartica*,<sup>(7)</sup> *aloe vera*,<sup>(8)</sup> *Nigella sativa*,<sup>(9)</sup> *Calotropis gigantea*,<sup>(10)</sup> *Sida cordata*<sup>(11)</sup> survey shows *Guazuma ulmifolia*<sup>(12)</sup> were extremely used for their wound healing property in traditional medicine. Several phytoconstituents like triterpenoid, tannins, saponins, alkaloids and flavonoids are known to promote wound healing process due to their antioxidant and antimicrobial activities. In addition triterpenoid reported to possess an ability to increase the collagen content, which is one of the factors promoting wound healing.

The presence of various phytoconstituents viz., alkaloids, terpenoids, saponins, tannins, flavonoids and steroids in the extracts of *Guazuma ulmifolia* was confirmed.

Wound healing involves different phases such as contraction, epithelialization, granulation and collagenation<sup>(13)</sup>. The decreased wound diameter significantly contributes to better and effective wound healing property. During the initiation of study

from "0" there was not much different in healing of wounds in all the four groups. At the end of the study (7<sup>th</sup> day) - low dose and high dose showing significant wound healing effect. When the results were interpreted in high dose, showed high significant wound healing activity as compare to low dose. High dose showed better and faster wound healing activity as compare to low dose.

The induction wound study after treatment with alcoholic extract of *Guazuma ulmifolia* on 7<sup>th</sup> day, regenerated tissue shows increase in tensile strength as compared to untreated group. Standard and extract of *Guazuma ulmifolia* treatment increase the tensile strength and significant wound healing activity.

## CONCLUSION

Our study has shown that the alcoholic extract of *Guazuma ulmifolia* exhibited dose depend wound healing activity.

## ACKNOWLEDGEMENT

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