

Local Anesthetic Activity of *Jatropha gossypifolia* L. on Frogs

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ABSTRACT

The plant *Jatropha gossypifolia* (Euphorbiaceae) is known as belly ache bush. The plant originated from Brazil and it is now cultivated in Tropical countries throughout the world. The roots, stems, leaves, seeds and fruits of the plant have been widely used in traditional folk medicine in many parts of West Africa. The young stem of the plant is used as tooth brush as well as to clean tongue, in the treatment of thrush. The tuber of the plant grinded into a paste is also locally used in the treatment of haemorrhoids. The literature survey claims that there was no local anaesthetic activity was reported. Hence this study was under taken to evaluate the local anesthetic activity of the aqueous extract and methanolic extract of *Jatropha gossypifolia* by plexus anaesthesia in frogs. The mean onset of anaesthesia were found with the test drugs were 9.33 ± 0.33 and 5.33 ± 0.33 mins compared to 2.75 ± 0.33 min for the standard drug in plexus anaesthesia model. The results revealed the significant local anesthetic activity with the control group.

Key words: *Jatropha gossypifolia*, Methanol Extract, Aqueous Extract, Plexus anaesthesia.

INTRODUCTION

Jatropha gossypifolia L. belongs to the family Euphorbiaceae. The common name for *J.gossypifolia* L. is pignut or fignut, and in Yoruba land it is commonly known as "Lapalapa"¹. The leaf decoction of *J.gossypifolia* L. is used for bathing wounds². It was reported that the leaf bark used for sores, sprains, rash and bewitchment in Latin America and the Caribbean; the poultices are used for sores and pain in Trinidad^{3,4}. The stem sap stops bleeding and itching of cuts and scratches. In Southern Nigeria, the extract from fresh leaf applied with crushed leaf is routinely used by herbalists and local people to stop bleeding from the skin and nose⁵. The coagulant activity of the leaf extract of *J.gossypifolia* was detected while trying to examine its coagulant properties⁶. This study was under taken

to evaluate the local anaesthetic activity of the aqueous extract and methanolic extract of *J. gossypifolia* by plexus anaesthesia in frogs.

MATERIALS AND METHOD

Preparation of the Extract

Fresh leaf parts are collected, identified and authenticated by Dr.Raghu Ram, professor, Department of Botany and Microbiology, Acharya Nagarjuna University, Nagarjuna nagar, Guntur and the specimen was deposited in the department for future reference. They were cleaned, dried under shade, and powdered by mechanical grinder. Leaves are extracted with polar to non-polar solvents. Aqueous and methanolic extracts were collected. The yield was calculated as 0.05 and 0.16 g.

Phytochemical Studies

Freshly prepared *J.gossypifolia* extract was subjected to phytochemical screening test by using standard protocol.

Animal

Frogs were procured from the central animal house of the Vignan pharmacy college. The animals were grouped into three, containing three animals in each (i.e., n=3) and they were housed at controlled room temperature. The experimental study was approved by the Institutional animal ethics committee. (IAEC).

Drugs

Xylocaine, sodium chloride, Hydrochloric acid were purchased from (S.D.fine chemicals, Mumbai) and are of analytical grade.

Acute Oral Toxicity Studies

The acute oral toxicity study was performed as per OECD 420 guidelines⁷.

Local Anaesthetic Activity Plexus anaesthesia in frogs

The frogs were divided into three groups. They were decerebrated and upper parts of their spinal cord were destroyed using pithing needle. The abdominal viscera were excised and removed

through a transverse incision made just below the sternum there by forming a pouch. The lumbar plexus was exposed carefully without damaging it. The frogs were pinned to vertical with their legs hanging down. The drugs were administered into the abdominal pouch in sufficient volumes to submerge the lumbar plexus. The left and right limbs of the frogs were immersed every minute for maximum period of 10 sec in beaker containing 0.1 N HCL and normal saline (0.9%NaCl) respectively. Afterwards the feet were rinsed in water. The time taken by the animals falling to withdraw their feet was recorded as the "onset of local anesthetic action"^{8,9}.

Statistical Analysis

The results were analyzed for statistical significance by one-way ANOVA followed by Dunnett's 't' test 'P' value of < 0.001 was considered significant.

RESULTS

The phytochemical studies reveals that the presence of alkaloids, steroids, tannins and vitamin c. The oral acute toxicity study paves, there was no lethal effect up to 2000mg/b.wt. The mean onset of anaesthesia with the test drug were observed as 5.33 ± 0.33 and 9.33 ± 0.33min compared to 2.75 ±

**Table 1: Local anesthetic activity of
J.gossypifolia L. leaves on plexus anaesthesia in frog**

Group	Drug	Onset of local anesthetic action (Mean ± SEM) in min
A (control)	0.9 % saline	10.67 ± 0.33
B (test)	20 % methanolic extract	9.33 ± 0.33*
C (test)	20 % aqueous extract	5.33± 0.33*
D (standard)	2 % xylocaine	2.75 ± 0.33

* P < 0.001 when compared to control;
n =3 in each group

0.33min for the standard drug xylocaine (2%). The onset of local anaesthetic activity in the test and standard groups was significantly different from the control group (Table 1). The anaesthetic action of the standard and test drugs continued till 30min of our observation period.

DISCUSSION

The local anaesthetic activity of *J.gossypifolia* L. was studied by the method plexus anaesthesia in frogs¹⁰. In the present study, 2% xylocaine was used as the standard drug. The wheal

model is suitable for estimating the degree of anaesthesia and its duration simultaneously, where as the plexus anaesthesia determines the onset of anaesthesia¹¹. The mean onset of local anaesthetic action with *J.gossypifolia* L. in concentration of 20% were 9.33 ± 0.33 and 5.33 ± 0.33 min ($p < 0.001$) the anaesthetic action till 30 min of the observation period. The finding suggests that *J.gossypifolia* L. possess significant local anaesthetic property. The local anesthetic property of *J.gossypifolia* L. observed in the study could be attributed with the presence of alkaloids, tannins and resins.

CONCLUSION

The present study concluded that the local anesthetic activity of selected species of

J.gossypifolia L. leaves were showing significant comparable activity with the standard and control which was used in the study. Further this study suggests isolating the responsible biomarker for the activity.

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Abbreviations

IAEC; Institutional Animal Ethics Committee.
OECD; Organisation of Economical Cooperation and Development

REFERENCES

- Odebiyi O, Sofowora EA. Phytochemical screening of Nigerian Medicinal plants II, *Lloyd*. **41**(3): 234-236 (1998).
- Morton JF.A survey of medicinal plants of Curacao. *Econ. Bot.* **22**: 87-102 (1968).
- Morton JF. Atlas of medicinal plants of middle America: Bahamas to Yucatan. Charles C. Thomas, Springfield, USA. 1420 (1981).
- Omoregbe RE, Ikuebe OM, Ihimire IG. Antimicrobial activity of Some medicinal plants extracts on *Eschericia coli*, *Salmonella.paratyphi* and *Shigella dysentriae*. *Afr. J. Med Sci.* **25**: 373 –375 (1996).
- Chakraborty A, Devi BRK, Sanjebam R, Khumbong S, Thokcham I.S. Preliminary studies on local anesthetic and anti-pyretic activities of *Spilanthes acmella* Murr. in experimental animal model. *Indian j pharmacol.* **42**(5): 277-279 (2010).
- Lahon LC, Khanikor HN, Ahmed N.. Preliminary study of local anaesthetic activity of *Euphorbia nerifolia* Linn. *Indian j pharmacol.* **11**: 239-240 (1979).
- Karala NA, Bhatt NV, Trivedi JJ, Goyal RK. Local anaesthetic activity of some amide compounds. *Indian J Pharmacol.* **25**: 30-33 (1993).
- Boruah RN, Leclercq PA. Charecterisaton of the essential oil from flower heads of *Spilanthes acmella*. *J Essential Oil Res.* **5**: 693-695 (1993).
- Liu SS, Michel AA, Linda JR. The management of pain, Churchill living stone inc, USA 447-48 (1998).
- Burn JH, Finney DJ, Goodwin LG. Local anesthetics. Biological standardization 2 nd ed. London: *Geofefrey cumberlege*. 325-331 (1952).
- Agshikar NV, Abraham G J. Pharmacology and acute toxicity of essential oil extracted from *Zanthoxylum budrunga*. *Indian j med Res.* **60**: 757-761 (1972).