The Biobrio ISSN : 2393-9508 e-ISSN: 2582-4902
An International Quarterly Journal of Life Sciences
Website: www.thebiobrio.in SJIF 2024:8.259
12(1&2): 1320-1323, 2025

Clinical aspects of some plants used in the treatment of snakebite among folk-lore

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Received : 02nd June, 2025 ; Accepted : 28th June, 2025
DOI:- https://doi.org/10.5281/zenodo.16750389

ABSTRACT

Snakebite is still a serious health problem in many rural and tribal areas, especially where hospitals and antivenom treatments are not easily available. In such places, local people often depend on traditional knowledge and plant-based remedies passed down through generations. This study looks into the clinical effects of certain plants used by these communities to treat snakebites. Several plants, such as *Mucuna pruriens, Andrographis paniculata, Eclipta prostrata* and *Hemidesmus indicus* have demonstrated neutralizing effects against snake venom toxins. These plants exhibit anti-inflammatory, antioxidant, and antivenom properties, which help mitigate local tissue damage, coagulation disorders and neurotoxic effects induced by snake venom.

Key Words - Snakebite, Medicinal plants, Antivenom, Traditional medicine, Envenomation

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INTRODUCTION

From the very time immemorial man has been duly dependent on nature for its survival. This dependency led the aboriginal people living in harmony with nature to evolve a unique system of knowledge about plant wealth by applying trial and error methods. Traditionally, this treasure of knowledge has been passed on orally from generation to generation without any proved written document (Samy and Ignacimuthu, 2000).

Indigenous communities practice herbal medicine to cure snakebites (Siddiqui and Hussain, 1990; Maitz, 1992; Honghton and Osibogun, 1993).

Snakebite is a very serious medical, social and economic problem in different parts of world population. Envenomation's due to snakebites are commonly treated by parenteral administration of horse or sheep-derived polyclonal antivenoms aimed at neutralization of toxins. Traditional herbal medicine is also readily available in rural areas (=folk-lore) for immediate treatment of snakebite. Application of leaf infusion onto the snakebite area or chewing leaves or taking leaf extracts orally are some procedures intended to counteract snake venom activity (Kirtikar and Basu, 1975).

Actually, phytochemical constituents of plants like flavonoids inhibit snake venom phospholipase A_2 (Alkaraz and Houlth, 1985). Flavonoid glycoside rutin is also effective in increasing survival of rats injected with cobra venom (Gujral and Dhawan, 1956). Several other substances have also been isolated from many other plants and tested against venom. (Mors *et al.,* 1989; Pereira *et al.*, 1994; Chopra *et al.,* 1956; Kirtikar and Basu, 1975; Nadukarni, 1976; Lewis and Elvin-Lewis 1977; Alam

et. al., 2003). However, in most cases, the efficacy of these traditional treatment regimen is unknown/ unproven. Thus, the study of herbal antidotes against snake venom is of great importance in the management of snakebite. (Harsha *et al.,* 2002; Mahishi *et al.,* 2005). Hence, the present study is focused on the preliminary survey of plants under test for their therapeutic application against snakebite.

MATERIALS & METHODS

Materials

- Leaves of *Vitex negundo* (Verbenaceae), *Achyranthes aspera* (Amaranthaceae), *Veronica anagallis-aquatica* (Scrophulariaceae), and *Leonurus sibiricus* (Lamiaceae)
- Digital balance
- Distilled water
- Conical funnel
- Conical flash
- Muslin cloth
- Cobra venom
- Methanol
- Centrifuge
- Silica gel column
- Petroleum ether
- Chloroform
- Hot plate

***Vitex negundo* (Verbenaceae)**

***Veronica anagallis-aquatica* (Scrophulariaceae)**

***Leonurus sibiricus* (Lamiaceae)**

***Achyranthes aspera* (Amaranthaceae)**

Methods

The leaves of plant under test were collected from our area. About 200 gms of each shade-dried leaves

were dissolved in 800 ml distilled water at room temperature. The extracts were filtered by sterile muslin cloth and get concentrated by using lyophilization to obtain aqueous residue. The extract was kept in stoppered bottle, and then stored at 4°C for *in vivo* testing of antidote in animal model (Brantner and Grein, 1994).

The aqueous extract of leaves under test was subjected to phytochemical screening for the identification of secondary metabolites (Harborne, 1976). Different chemical constituents like alkaloids, gallic acids, aglycones, triterpenes were evaluated. 5 gm of used antisnake venom plant extracts were dissolved in methanol and then centrifuged for 25 minutes. The residue was placed on top of silica gel column and then chloroform in the ratio of 8:2; 3:1; 2:1. Again Chloroform/ methanol in the ratio of 85:15; 80:20; 90:10 respectively. The fractions were evaporated to dryness and tested for venom neutralization in experimental animals.

RESULTS & DISCUSSION

The bitter taste of the leaves of test plant are used for prognostic purposes. If the leaves of test plant taste bitter, the patient suffering from snakebite is judged free from danger, but if the leaves are sweet to taste, the patient needs urgent medical attention. Doses are repeated until the taste returns to normal. Sometimes especially when a patient cannot open his/her mouth, the juice of the leaves is administered through nostrils or eyes or applied liberally to the head (Anandan and Veluchamy, 1986; Anuradha *et al.,* 1986). A strict and complete dietary schedule for nausea, swelling, pain and other effects during and after recovery is followed to promote a thorough care. (Whitaker, 1978).

Neutralizing effect of venom by crude extracts of test plants

The prepared extracts were independently administered orally to experimental mice after Snake Cobra Venom injection (2.5 µg). The prepared extracts were found to neutralize the venom.

The present investigation proved that extract prepared from the leaves of test plant possess snake venom neutralizing potential which may be due to their phytochemical constituents. Several chemical constituents like alkaloids, flavonoids, glucosides, phenolics, pentacyclic triterpenes (i.e. aleanolic acid, tannins, ursolic, $\propto$ and β – amyrin are found to be present in varied proportions. All these classes of chemicals compounds are capable of interacting with macromolecular targets (= enzymes) and can effectively inhibit the toxic effect of snake venom *in vitro* rather than *in vivo* (Borges *et al.,* 2005). The above observations confirmed that the leaves extract of test plant possess potent snake venom neutralizing potential among folk-lore.

CONCLUSION

This study concludes that these experimental plants might be used for effective neutralization of snake bite in future. It requires more biochemical study for identification and structural characterization of specific biomolecules present in these plants for their proper and effective application in snake bite treatment.

CONFLICT OF INTEREST

There is no conflict of interest regarding the publication.

ACKNOWLEDGEMENTS

The authors would like to extend their gratitude to Department of Botany (Jai Prakash Mahila College) and research scholars of the department for their laboratory facilities and support throughout the study process.

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