INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACY AND CHEMISTRY

Available online at www.ijrpc.com

Research Article

# EVALUATION OF INDIAN HERBS FOR HAEMOSTATIC ACTIVITY

**JH. Mehta[1], CG. Kularni[1], ST. Jadhav[1*], AM. Deshpande[2] and SB.Bhise[2]**

[1]Government College of Pharmacy, Vidyanagar, Karad 415124, Maharashtra, India.
[2]Sinhagad Institute of Pharmaceutical Sciences, Kusgaon (BK), Lonavala 410401, Pune, Maharashtra, India.

**ABSTRACT**

India is one of the important centres of mega diversity areas of the world. The rich cultural heritage of India is also associated with the use of surrounding flora and fauna as medicines. Plants have traditionally served as man's novel weapons against various ailments .To take ethno medicinal knowledge to global level a systematic study with modern approach is the need of an hour. An attempt has been made here to screen common Indian herbs which are used traditionally to heal the wounds and check haemorrhage from cuts and bruises for their haemostatic activity. As a guide to study the haemostatic activity of herbs, clotting times of blood in presence of various extracts of plant parts are determined in vitro. Of the ten plants evaluated, extracts of *Beta vulgaris* and *Acacia catechu* proved to have significant haemostatic activity at $P<0.05$ as judged by Chi Square goodness of fit test, whereas *Camellia sinensis, Calendula officinalis, Spinacia oleracea, Jatropha curcas* showed moderate haemostatic activity.

**Keywords**: Haemostatic, Indian herbs, Clotting time, Ehnomedicine.

## INTRODUCTION

In various developing countries a large proportion of population depends on and uses traditional medicines for healing[1]. It thus become crucial to study systematically and standardise procedure, dosage utilised, rationalisation of utility involved therein. In India various herbal preparations are sold by unauthorised people to treat a variety of pathological conditions. As a result many complications are witnessed during the treatment and thereafter. To take this ethno medicinal knowledge to global level a systematic study with modern approach and technology is the highest priority need.

Loss of blood is one of the main causes of mortality[2-6]. Though minor in every day cut and bruises, haemorrhage threatens life safety of patients and the wounded in trauma care and surgical procedures[7,8]. Immediate and early control of haemorrhage is therefore essential and most effective strategy. Under such circumstances identification of efficient haemostatics could improve the management of bleeding in all medical disciplines. Taking into consideration the rich medicinal flora of Indian forests, a huge number of traditionally used herbal medicines in country, a good number of ethno medicine sellers around, the research in this area is facilitated.

An attempt has been made here to screen Indian herbs used traditionally to heal the wounds, check haemorrhage from cut and bruises to evaluate their haemostatic activity. The present study aims to check *in vitro* haemostatic properties of some extracts of selected ten plants and applying statistical approach to ascertain the same.

## MATERIALS AND METHODS

### Collection and identification of Plants

Information regarding vernacular name, plant parts used, etc. was collected and authentic identification of plants was done with the help of different flora and monographs[9-23].

**Extraction Procedure**

Plant parts (Refer table 1) were air dried and reduced to fine powder in a pulveriser. Aqueous, Alcoholic and Petroleum ether extracts of respective plant parts were concentrated[24].

**Evaluation of haemostatic activity**

As a guide to study the haemostatic activity of various herbs and their parts ,clotting time of blood in presence of various extracts of respective plant was determined in-vitro using Lee White's Method as follows[25]:

Human venous blood was collected in a clean dry and corning glass tube. Clotting time determination in presence and absence of various extracts was determined and compared.

Hundred milligrams of concentrated solvent free extract was suspended in distilled water and final volume was made to 0.5ml. This extract preparation was used in experimental sets. One millilitre of freshly withdrawn human venous blood was taken in a clean, grease and detergent free corning glass tube of 1cm diameter containing 0.5ml of various extract preparations. Control determination was performed using 0.5ml of distilled water instead of extract preparation.

**Statistical Analysis**

Statistical significance of presented data was analysed by ''Chi Square goodness of fit test' at $P<0.05$[26, 27].

**RESULT AND DISCUSSION**

The use of herbal medicines in traditional folk therapies has prompted the scientists to assess their properties and evaluate them systematically to obtain a rational, evolved and useful drug constituent. Among aqueous, ethanolic and petroleum ether extracts of 10 herbs, namely *Calendula officinalis,Beta vulgaris, Camellia sinensis, Spinacia oleracea, Piper nigram, Jatropha curcas, Butea monosperma, Cinnamoum zeylanica, Acacia catechu, and Aloe vera* petroleum ether extract of root of *Beta vulgaris* showed the highest haemostatic activity showing 24.7% reduction in clotting time compared to control. Aqueous extract of fruits of *Acacia catechu proved* to be the next best, showing 22.26 % activity difference (Refer table 2, figure 1). In the alcoholic extract group *Beta vulgaris* and *Jatropha curcas* were the only two showing increase in haemostatic activity with the % activity difference of 21.41 and 4.03 respectively(Refer table 2, figure 2). Petroleum ether extracts of various plants also showed considerable haemostatic potential. Similar extracts of *Calendula officinalis, Camellia sinensis, Spinacia oleracea, and Jatropha curcas* had shown substantial decrease in clotting time with % activity difference ranging from 4 to 10 % (Refer table 2, figure 3).

'Chi Square goodness of fit test' was applied to check statistical significance of screened herbs for their haemostatic activity[26, 27]. Statistical analysis revealed that aqueous, alcoholic and petroleum ether extracts of *Beta vulgaris* & aqueous extract of *Acacia catechu* are found to be significant at $P<0.05$.

**CONCLUSION**

Traditional herbal medicines deserve special appreciation with the outcome coming from several studies that were performed on ethno medicinal plants all over the world[28-32]. This results in the production of improvised drugs. The current study undertaken certainly revealed the haemostatic ability of *Beta vulgaris* and *Acacia catechu* thus justifying their perspective candidature for further molecular level studies to come up with future generation haemostatic medicine.

**ACKNOWLEDGEMENTS**

Authors are thankful to all who helped us for this study directly or indirectly.

**Table 1: Indian herbs and their parts under current study**

| S. No. | Plant Names | Vernacular name | Part used |
|---|---|---|---|
| 1 | *Calendula officialis* | Zendu | Bracts |
| 2 | *Beta vulgaris* | Beet | Root |
| 3 | *Camellia sinensis* | Tea | Leaves |
| 4 | *Spinacia oleracea* | Palak | Leaves |
| 5 | *Piper nigram* | Kali miri | Seeds |
| 6 | *Jatropha curcas* | Jamalgota | Fruit |
| 7 | *Butea monosperma* | Palas | Leaves |
| 8 | *Cinnamomum zeylanica* | Daalchini | Bark |
| 9 | *Acacia catechu* | Khair | Bark |
| 10 | *Aloe vera* | Korphad | Leaves |

**Table 2: Clotting time determination in presence of various extracts of Indian medicinal herbs**

| Sr.No | Plant names | Clotting time (In Seconds) | | | |
|---|---|---|---|---|---|
| | | Control* | Aqueous extract | Alcoholic extract | Petroleum ether extract |
| 1 | *Calendula officinalis* | 345 ± 3 | 345 ± 1 | 345 < | 330 ± 0.58 |
| 2 | *Beta vulgaris* | 425 ± 0.57 | 345 ± 0.50 | 334 ± 0.19 | 320 ± 0 |
| 3 | *Camellia sinensis* | 310 ± 0.57 | 310 | 310< | 281 ± 0.58 |
| 4 | *Spinacia oleracea* | 296 ± 1.52 | 295 ± 1.53 | 296 < | 276 ± 1.53 |
| 5 | *Piper nigram* | 320 ± 1 | 320 < | 320 < | 320 < |
| 6 | *Jatropha curcas* | 322 ± 2 | 315 ± 0.58 | 309 ± 0.58 | 296 ± 0.58 |
| 7 | *Butea monosperma* | 266 ± 0.57 | 266 < | 266 < | 266 < |
| 8 | *Cinnamomum zeylanica* | 234 ± 0.57 | 234 < | 234 < | 234< |
| 9 | *Acacia catechu* | 247 ± 0.58 | 192 ± 0.58 | 247 < | 247 < |
| 10 | *Aloe vera* | 235 ± 0.42 | 235 < | 235 < | 235 < |

Control*: Control tube contained 0.5ml distilled water instead of extract preparation.
All readings are expressed as Mean clotting time (Seconds) ± S.D.

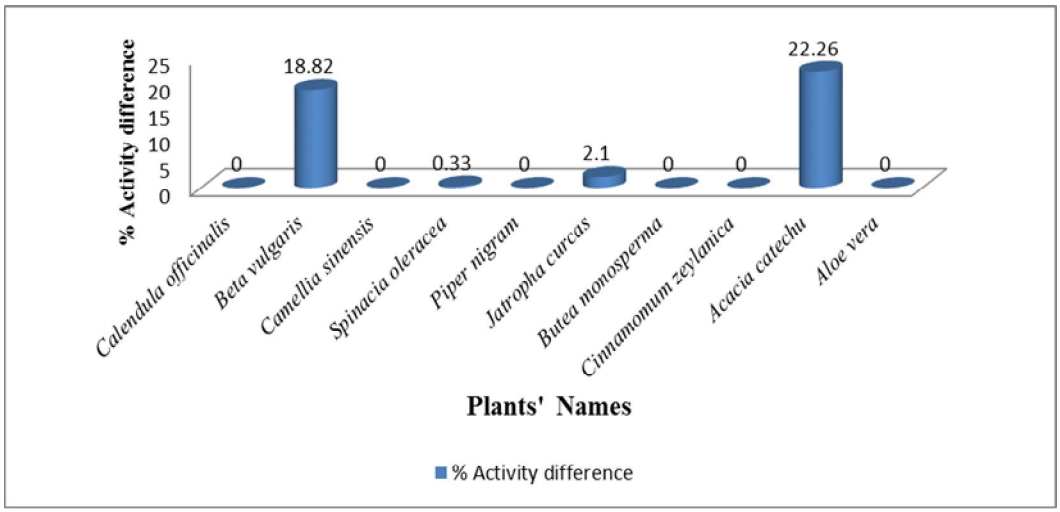


**Fig. 1: Graph showing % haemostatic activity differences in presence of aqueous extract preparations compared to control set**

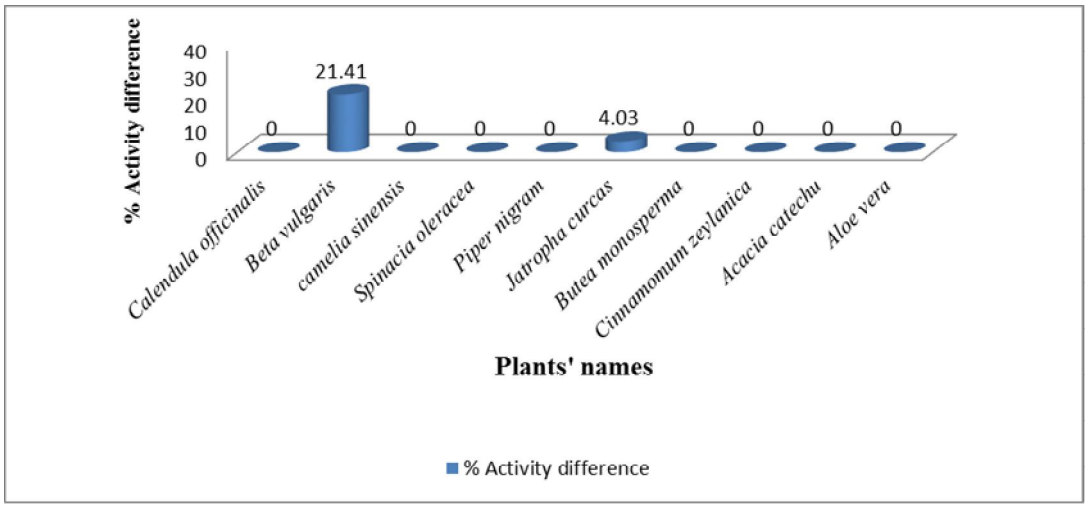


**Fig. 2: Graph showing % haemostatic activity differences in presence of alcoholic extract preparations compared to control set**

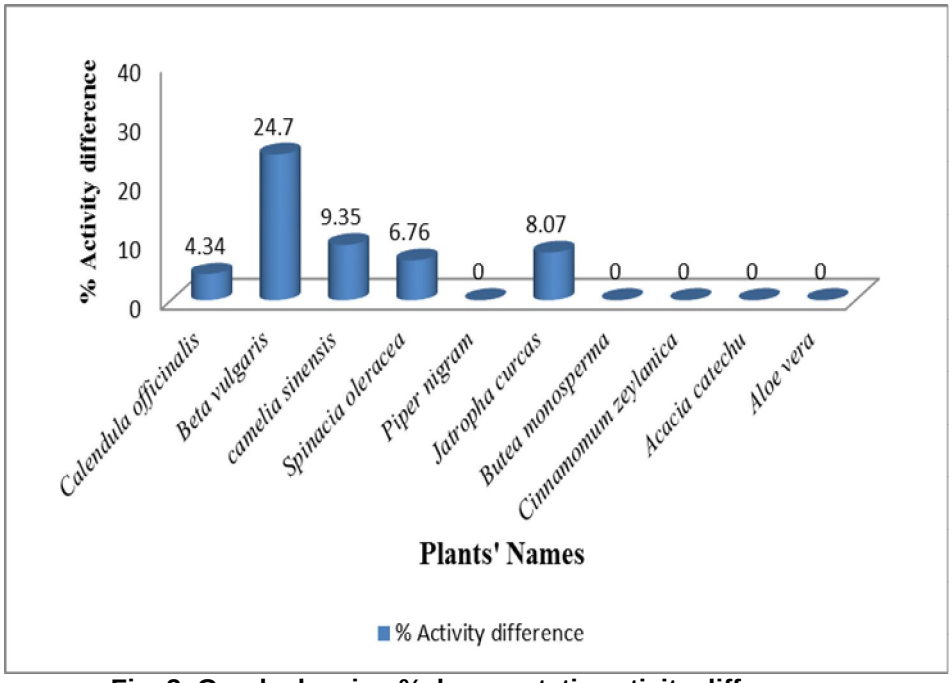


**Fig. 3: Graph showing % haemostatic activity differences in presence of petroleum ether extract preparations compared to control set**

## REFERENCES


1. Koumare M. Experience de la medicine traditionnelle dans les pays de la sous-region africaine de l'OMS.Premiere rencontre des centres collaborateurs OMS de Medecine Traditionnelle de la sous-region Afrique a Niamey.Bureau Regional OMS, Brazzaville.
2. Sui J, Wang BC and Yu ZW. A novel haemostatic model with triple protective functions. Med Hypotheses. 2009;72:186-187.
3. Schreyer N and Allard D. Damage control surgery (DCS): une juste mesure de chirurgie pour le polytraumatise. Revue Medicale Suisse. 2008;167:1754-1758.
4. Fenomanana S, Riel M, Raktotomena D and Andrianampanalinarivo R. The risk's factors of mortality by post-partum haemorrhage at the maternity of Befelatanana-University Hospital of Antananarivo Madagascar.Revue d'Anesthesie Reanimat Med d'URg. 2009;1(3):4-7.
5. Briicker G, Bouvier- Colle M-H, Levy G, Benbassa A, Mercier FJ and Papiernik E. Rapport du comite national d'experts sur la mortalite maternelle en France: Considerations epidemiologigues et cliniques (1999-2000) et recommendations. Bull Epidemiol Hebd. 2006;1-75.
6. Fourn L, Fayomi EB and Yacoubou M. Mortalite maternelle evitable en milieu hospitalier dans un department au Benin. Medicine d'Afrique Noire. 2007;47(1):22-26.
7. Kozen BG, Kircher SJ, Henao J, Godinez FS and Johnson AS. Alternative hemostatic dressing : comparision of CELOX. Hem Con and Quik Clot. Acad Emerg Med. 2008;15:74-81.
8. Wedmore I, McManus JG, Pusateri AE and Holcomb JB. A special report on the chitosan – based hemostatic dressing : experience in current combat operations. J Trauma. 2006;60:655-658.
9. Hooker JD. The flora of British India. L. Reeve and Co Ltd Kent. 1-7:1872-1897.
10. Sharma BD, Balakrishnan NP and Sanjappa M. Flora of India. BSI Calcutta. Deep printers new Delhi. 1993;2.
11. Sharma BD and Sanjappa M. Flora of India. BSI Calcutta. Deep Printers New Delhi. 1993; Vol III.
12. Nadkarni AK. Indian Materia Medica. Popular Prakashan, Bombay. 1954; 3rd Edn.
13. International Library Association. Medicinal plants sourcebook, India. International Library Association, Switzerland. 1996.
14. Wilson DE and Reeder DM. Mannual species of the World. Johns Hopkin University press. 2005; 3rd Edn.

15. Bhattacharjee SK and De LC. Medicinal Herbs and Flowers. Avishkar publishers, Jaipur India. 2005.
16. Small Indian civet- Viverricula indica http:// www.vietlinh.vn/langviet/toilamnd/cogni/khac/cyhuong_muskcat.html.October 20,2008.
17. Ziziphus xylopyrus. http:// zipcodezoo.com/Plants/Z/Ziziphus_ xylopyrus/.October 20,2008.
18. Nadkarni AK. Indian Materia Medica. Popular Prakashan Bombay.1954;3rd Edn: Vol.II.
19. Indrajao- Flowers of India. http:// www. Flowers of india.net/catalog/slides/Indrajao.html. October 20, 2008.
20. Wilson DE and Reeder DM. Mammal species of the world- A Taxonomic and Geographic Reference. Johns Hopkins University Press. 2005; 3rd Edn.
21. Blepharis- Wikispecies.http://species.wikimedia.org/wiki/Blepharis. October 20, 2008.
22. Whitaker R. Common Indian Snakes- A Field Guide.1987.
23. Medicinal Plants of Tamil Nadu. http:// envis.frlht.org.in/checklist/TN.pdf. October 20, 2008.
24. Harbone JB. Phytochemical Methods- A Guide to Modern Techniques of plant analysis. Champman and hall Ltd. Lodon.1984; 2nd Edn:11-12.
25. Godkar PB and Godkar DP. Textbook of Medical Laboratory Technology. Bhalani Publishing House. 2006; 2nd Edn:109.
26. Bolton S and Bon C. Pharmaceutical Statistics Practical and Clinical Applications. Informa Health care, USA. 2010; 5th Edn: 114-117.
27. Chap T Le. Introductory Biostatistics. John Wiley and Son's Publication.2003:213-226.
28. Fozia F, Rai M,Tiwari A and Khan AA. Medicinal properties of Moringa oleifera: an overview of promising healer.J Med Plants Res.2012;6(27):4368-4374.
29. Shatoor AS. Cardio-tonic effect of the aqueous extract of whole plant of Crataegus aronica syn: azarolus (L) on isolated rabbit's heart. Afr J Pharm Pharmacol. 2012;6(26):1901-1909.
30. Fagbohun ED and Faleye OS. Effect of storage on chemical compostition and mycoflora of okra (Abelmoschus esculentus). Int J Biosci. 2012;2(7):83-89.
31. Jakkulwar AM and Wadhai VS. In vitro propagation of Chlorophytum borivilianum (Safed musli) and its root regeneration. Int J Curr Res. 2012;4(5):95-97.
32. Jeyaseelan EC, Jenothiny S, Pathmanathan MK and Jeyadevan JP. Antibacterial activity of sequentially extracted organic solvent extracts of fruits, flowers and leaves of Lawsonia inermis L.from Jaffna. Asian Pac J Trop Biomed. 2012;2(10):798-802.