

SCREENING OF INDIAN HERBS FOR HAEMOSTATIC ACTIVITY

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ABSTRACT:

India is one of the important widespread geographic locations on mega biodiversity areas on earth. The rich cultural heritage of India is also associated with the use of available ethno medicinal flora and fauna since ages. To raise this traditional knowledge to global level and to serve the mankind using the same, a systematic modern approach has been adopted here to ascertain the rational use of traditionally applied Indian herbs for the purpose of healing wounds and controlling haemorrhage from cuts and bruises. *In vitro* clotting time of blood in presence and absence of various plant extracts was used as a guide to study haemostatic activity of the herbs under study. Of the ten plants evaluated, aqueous extracts of *Quercus pubescens*, *Thevetia peruviana* proved to have significant haemostatic activity at $P < 0.05$ as judged by Chi Square goodness of fit test, whereas alcoholic extracts of *Zingiber officinale*, *Zanthoxylum rhetsa* and petroleum ether extracts of *Psidium guajava*, *Terminalia chebula*, *Zanthoxylum rhetsa* confirmed the same results.

Keywords: Haemostatic, Indian herbs, Clotting time, Ethno medicine

INTRODUCTION:

In the current era of globalization and intellectual property rights India's folk knowledge of traditional remedies needs to be documented systematically¹. Since 1978, WHO has developed a global classification of traditional medicine and pharmacological properties of several plant extracts have been demonstrated thereafter². However many plants and their pharmacological activities remain unexplored³. Also antibacterial, antifungal anti-infective and anti-inflammatory activity are the most popular amongst scientists.⁴ In the present study 10 Indian herbs that are traditionally used by the Indian tribals to heal the wounds, and check the bleeding from cuts and bruises are screened for their haemostatic activity. It is a crucial time to study systematically and standardise procedure, dosage utilised and rationalisation of utility involved in traditional medicines⁵. Considering a need of taking ethnomedicinal knowledge to global level and identification of efficient haemostatic agents to improve the management of bleeding in various cases this study was undertaken. The study aims to evaluate *in vitro* haemostatic properties of aqueous and organic extracts of 10 selected plants and applying statistical approach to confirm 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

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 concentrated²¹.

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 follows²²:

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 test" at $P < 0.05$ ^{23, 24}.

Table 1: Indian herbs and their parts under current study

Sr.no	Plant Names	Vernacular Name	Part used
1	<i>Eugenia jambolana</i>	Jambhul	Bark
2	<i>Quercus pubescens</i>	Majuphal(Maayaphala)	Fruit
3	<i>Plantago ovata</i>	Isabgol	Seeds
4	<i>Moringa oleifera</i>	Shevga	Seeds
5	<i>Psidium guajava</i>	Peru	Leaves
6	<i>Zingiber officinale</i>	Adrak	Rhizome
7	<i>Terminalia chebula</i>	Hirda(Haritaki)	Fruit
8	<i>Thevetia peruviana</i>	Bitti	Latex
9	<i>Zanthoxylum rhetsa</i>	Teerphal	Fruit
10	<i>Vinca rosea</i>	Sadaphuli	Leaves

RESULTS AND DISCUSSION:

Indian forests are rich in flora and fauna and are famous for the medicinal plants growing there. The tribals usually depend on the natural flora found around them for treating various ailments. The knowledge gained about the efficacy of medicinal plants by the tribes is however kept as a secret for generations together and is orally communicated to their descendents. The knowledge on the uses of medicinal plants leads to open up various ways for effective utilization of herbal medicines to all. Rationalization of medicinal uses of plants also requires a systematic study in this regard.

An attempt is made in this study to evaluate haemostatic activity of various extracts of Indian herbs. Among Aqueous, Ethanolic and Petroleum ether extracts of 10 herbs, namely *Eugenia jambolana*, *Quercus pubescens*, *Plantago ovata*, *Moringa oleifera*, *Psidium guajava*, *Zingiber officinale*, *Terminalia chebula*, *Thevetia peruviana*, *Zanthoxylum rhetsa*, *Vinca rosea*, aqueous extract of latex of *Thevetia peruviana* showed the highest haemostatic activity showing 39.38% reduction in clotting time compared to control. Aqueous extract of fruits of *Quercus pubescens* proved to be the next best, showing 34.89% activity difference (Refer table no.2, figure no.1).

In the alcoholic extract group *Zanthoxylum rhetsa*, *Zingiber officinale* and *Eugenia jambolana* had substantial haemostatic activity with % activity difference of 29.53, 27.26 and 9.92 respectively (Refer table no.2, figure no.2). Petroleum ether extracts of various plants also showed considerable potential of haemostatic activity. The best among them were from extracts of *Terminalia chebula* and *Zanthoxylum rhetsa* which could bring about an increase in haemostatic activity around 21% as compared to control (Refer table no.2, figure no.3). Similar extract preparation of *Psidium guajava*, *Zingiber officinale* had shown substantial decrease in clotting time with % activity difference ranging from 4 to 16 % (Refer table no.2, figure no.3).

‘Chi Square goodness of fit test’ was applied to check statistical significance of screened herbs for their haemostatic activity^(23, 24). Statistical analysis revealed that aqueous extracts of *Quercus pubescens*, *Thevetia peruviana* are found to be significant at $P < 0.05$. However alcoholic extracts of *Zingiber officinale*, *Zanthoxylum rhetsa* and petroleum ether extracts of *Psidium guajava*, *Terminalia chebula*, *Zanthoxylum rhetsa* also showed the same statistical findings.

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	<i>Eugenia jambolana</i>	289 ± 4.04	289 <	260 ± 1	289 <
2	<i>Quercus pubescens</i>	321 ± 1.15	209 ± 0.57	321 ± 0.57	307 ± 1
3	<i>Plantago ovata</i>	306 ± 0.57	294 ± 0.57	306 <	306 <
4	<i>Moringa oleifera</i>	263 ± 0.57	263 <	263 <	263 <
5	<i>Psidium guajava</i>	392 ± 1	390 ± 0.57	393 ± 2.30	329 ± 1.15
6	<i>Zingiber officinale</i>	408 ± 0.57	408 <	297 ± 1	355 ± 0.57
7	<i>Terminalia chebula</i>	280 ± 1.52	280 <	280 <	222 ± 2.08
8	<i>Thevetia peruviana</i>	320 ± 0.57	194 ± 0.7	320 <	320 <
9	<i>Zanthoxylum rhetsa</i>	286 ± 0.58	251 ± 0.57	202 ± 0.58	229 ± 1.15
10	<i>Vinca rosea</i>	325 ± 0.57	310 ± 0.58	325 <	325 <

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

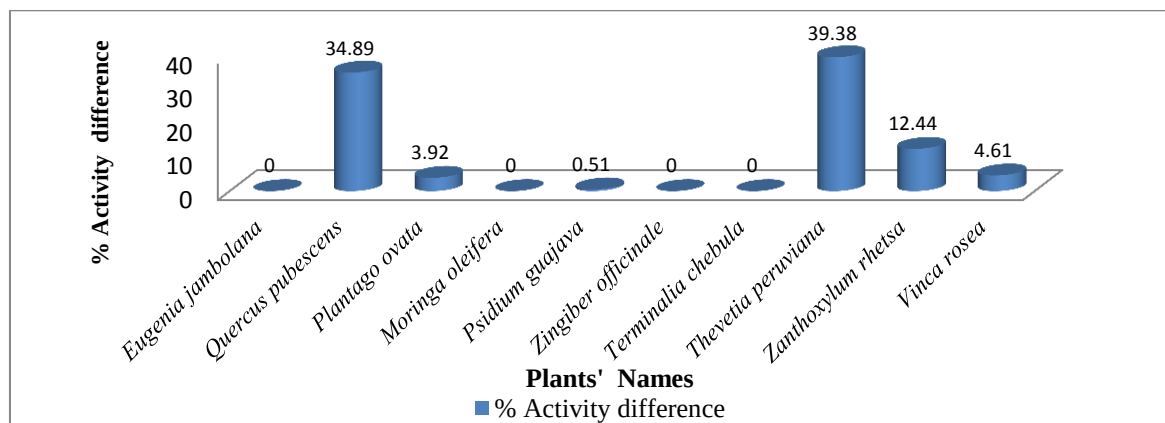


Figure 1: Graph showing % haemostatic activity differences in presence of aqueous extract preparations compared to control set.

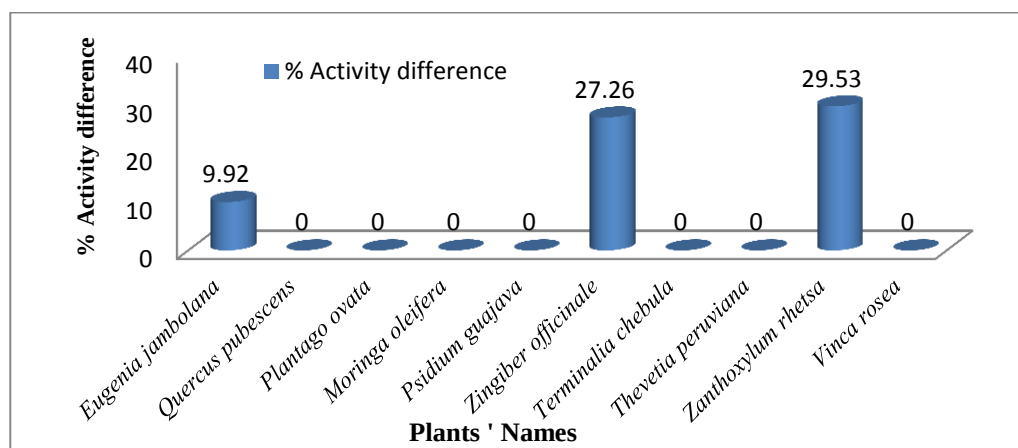


Figure 2: Graph showing % haemostatic activity differences in presence of alcoholic extract preparations compared to control set.

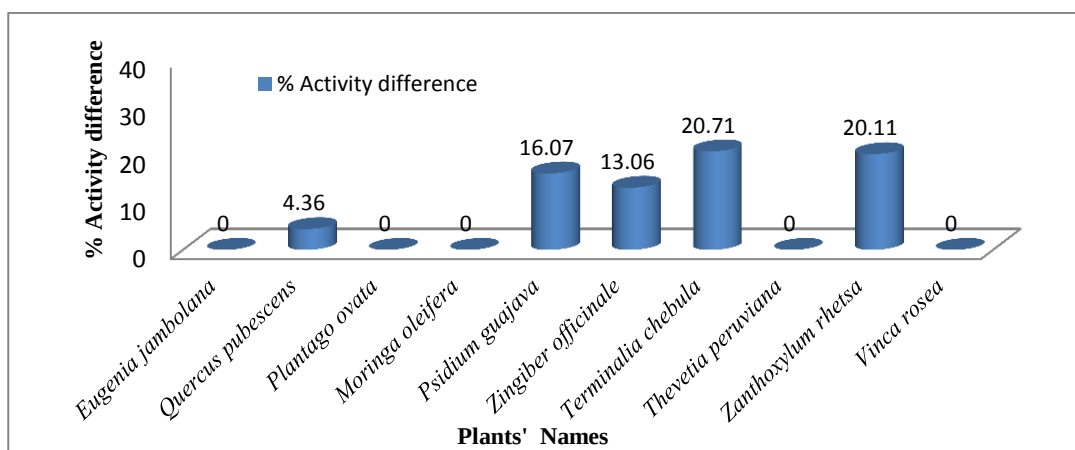


Figure 3: Graph showing % haemostatic activity differences in presence of petroleum ether extract preparations compared to control set.

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 ⁽²⁵⁻²⁹⁾. This results in the production of improvised drugs. The current study undertaken certainly revealed the haemostatic ability of *Thevetia peruviana*, *Quercus pubescens*, *Zanthoxylum rhetsa*, *Zingiber officinale*

Terminalia chebula, *Psidium guajava*, *Eugenia jambolana*, *Vinca rosea* and *Plantago ovata* thus justifying their perspective candidature for further studies to come up with future generation haemostatic medicine.

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