EVALUATION OF INDIAN HERBS FOR HAEMOSTATIC ACTIVITY

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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 ethnomedical 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, Ethnomedicine.

INTRODUCTION
In various developing countries a large proportion of population depends on and uses traditional medicines for healing¹. 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 ethnomedical 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 mortality²-⁶. Though minor in every day cut and bruises, haemorrhage threatens life safety of patients and the wounded in trauma care and surgical procedures⁷,⁸. 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 monographs⁹-²³.
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 concentrated24.

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 follows25:

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<0.0526, 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 nigrum, Jatropha curcas, Butea monosperma, Cinnamomum 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 activity26-27. 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 world28-32. 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>
<thead>
<tr>
<th>S. No.</th>
<th>Plant Names</th>
<th>Vernacular name</th>
<th>Part used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calendula officinalis</td>
<td>Zendu</td>
<td>Bracts</td>
</tr>
<tr>
<td>2</td>
<td>Beta vulgaris</td>
<td>Beet</td>
<td>Root</td>
</tr>
<tr>
<td>3</td>
<td>Camellia sinensis</td>
<td>Tea</td>
<td>Leaves</td>
</tr>
<tr>
<td>4</td>
<td>Spinacia oleracea</td>
<td>Palak</td>
<td>Leaves</td>
</tr>
<tr>
<td>5</td>
<td>Piper nigrum</td>
<td>Kali miri</td>
<td>Seeds</td>
</tr>
<tr>
<td>6</td>
<td>Jatropha curcas</td>
<td>Jamalgotia</td>
<td>Fruit</td>
</tr>
<tr>
<td>7</td>
<td>Butea monosperma</td>
<td>Palas</td>
<td>Leaves</td>
</tr>
<tr>
<td>8</td>
<td>Cinnamomum zeylanica</td>
<td>Dalanchi</td>
<td>Bark</td>
</tr>
<tr>
<td>9</td>
<td>Acacia catechu</td>
<td>Khair</td>
<td>Bark</td>
</tr>
<tr>
<td>10</td>
<td>Aloe vera</td>
<td>Korphad</td>
<td>Leaves</td>
</tr>
</tbody>
</table>
Table 2: Clotting time determination in presence of various extracts of Indian medicinal herbs

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Plant names</th>
<th>Clotting time (in Seconds)</th>
</tr>
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<tr>
<td></td>
<td>Control*</td>
<td>Aqueous extract</td>
</tr>
<tr>
<td>1</td>
<td>Calendula officinalis</td>
<td>345 ± 3</td>
</tr>
<tr>
<td>2</td>
<td>Beta vulgaris</td>
<td>425 ± 0.57</td>
</tr>
<tr>
<td>3</td>
<td>Camellia sinensis</td>
<td>310 ± 0.57</td>
</tr>
<tr>
<td>4</td>
<td>Spinacia oleracea</td>
<td>296 ± 1.52</td>
</tr>
<tr>
<td>5</td>
<td>Piper nigrum</td>
<td>320 ± 1</td>
</tr>
<tr>
<td>6</td>
<td>Jatropha curcas</td>
<td>322 ± 2</td>
</tr>
<tr>
<td>7</td>
<td>Butea monosperma</td>
<td>266 ± 0.57</td>
</tr>
<tr>
<td>8</td>
<td>Cinnamomum zeylanica</td>
<td>234 ± 0.57</td>
</tr>
<tr>
<td>9</td>
<td>Acacia catechu</td>
<td>247 ± 0.58</td>
</tr>
<tr>
<td>10</td>
<td>Aloe vera</td>
<td>235 ± 0.42</td>
</tr>
</tbody>
</table>

Control*: Control tube contained 0.5 ml 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


