A COMPARATIVE PHYSICOCHEMICAL STUDY OF DESMODIUM GENJETICUM DC. AND DESMODIUM LEXIFLORAM DC.

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ABSTRACT
Dashmool is most potent with widely practicably applicable drug of Indian System of Medicin(Ayurveda). It is combination of ten different medicinal plant. In present condition the collection of authentic Dashmool is very difficult, so adulteration of part used or plant species took place. Many pharmacy of Ayurved used stem bark or whole plant in absence of root. On other hand the cultivation of medicinal plant are very less. Shaliparni (Desmodium gangaticum DC.) is included in this combination. The present study was carried out to evaluate and authenticate the substitute of Shaliparni (Desmodium gangaticum DC.) by physicochemical parameters for preparing authentic Dashmool formulation.
Keywords: Desmodium genjeticum, Desmodium lexifloram, substitute

INTRODUCTION
Today Ayurvedic science is spreading its wings all over the world where the drug lore of this system has been the center of global interest. Ayurved advocates that as the Prakriti varies from person to person similarly every drug has got its own physical and chemical characteristics which help to separate it from other closely related drug. The Physicochemical studies of these drugs done by making use of various parameters help in standardizing the drug and authenticate it. In this modern era it is expected an imminent need for a well coordinated research plan touching physiochemical study of drug. It is essential to gratify the international standards and quality control of the drug used by convincing the drug regulatory authorities. The present study was carried out to evaluate the physicochemical parameters of test drugs.

Dashamoola is widely used in many compound Ayurvedic preparations. Shalparni (Desmodium gangeticum. DC.) is one of the important components of Dashamoola. Due to its importance in many medicinal preparations its adulteration is not uncommon and also due to over exploitations its availability in the market has declined or even in the
name of this plant many other species of the same are sold. These factors may affect the quality of the formulation there by leading to observation of less than the expected therapeutic effects and also the danger of adverse drug reactions cannot be ruled out. There are many species of the Desmodium growing in India and many of the same are sold in the market in the name of Shalparni. Desmodium lexiflorum. DC is the most common species which is sold in the market. One of the reasons for this adulteration or substitution is the morphological similarity of these plants with Desmodium gangeticum. DC. Thus in the present study these different species were screened for evaluate the physicochemical parameters with authenticated source of Shalaparni i.e. Desmodium gangeticum. DC.

BOTANICAL DESCRIPTION

Desmodium gangeticum DC.

Habit :- A stout herb or undershrub , up to 1 m. high; Stems: angled, more or less hairy. Leaves:- 1-foliolate; Stipules:- scarious, up to 8 mm. long. Leaflets:- membranous, 7-15x3-7 cm., ovate-oblong or broadly ovate, acute or acuminate, rounded at the base. Flowers:- in large terminal and axillary racemes, usually in small fascicles on a slender rachis; bracts subulate, up to 4 mm. Calyx:- 2 mm. long, hairy. Corolla:- 4-5 mm. long, purple, violet, blue, lilac, or whight, these colours appearing at the same time on the same plant. Pods:- slightly falcate, up to 18 mm. long; joints 6-8, longer then broad, slightly hairy with minute hooked hairs.


Desmodium laxiflorum DC.

HABIT:- An erect herb or undershrub, 25-40 cm. high. STEM:- Angled, more or less hairy.

LEAVES:- Trifoliolate; Petioles:- 2.5 to 5 cm. long. Stipules:- Striate, very acute. Leaflets:- membranous, ovate-elliptic or broadly lanceolate, more or less acute, glabrous above, more or less hairy beneath; Base:- rounded, the terminal slightly larger then the lateral. FLOWERS:- In terminal and axillary racemes, the flowers usually in distant
fascicles, the rachis slightly hairy. Bracts and bracteoles linear, hairy. Calyx:- Rough, with stiff hairs, about 2-4 mm. long. The tube about equaling the lobes. Corolla:- Twice as long as the calyx, standard whight, the wings and keel blue to purplish. PODS:- 2.5-4 cm. long, hairy with minute hooked hairs, scarcely constricted between the seeds; joints 6-10, longer then broad. Local Name:- Runchalo pandadiyo. Flowering:- Second half of the monsoon. Occurrence (in Saurashtra): Hadio hills near Porbander, Barde hill near Bhanvad, Rangit Sagar and Motwa Matli near Jamnagar.

Aims and objectives:
The analytical study of the both Desmodium species samples was undertaken with the following aims and objectives.

- To analyze the samples by using different physicochemical parameters.
- To analyze the Samples by using qualitative method.
- To develop the TLC profile.
- To compare the data and to find out differences and similarities in their analytical profile.

MATERIALS AND METHODS
The both test drugs were personally collected from the different regions of Saurashtra and was authenticated botanically by expert’s, then submitted in pharmacy of IPGT & RA, GAU, Jamnagar for further processing. The two test drug samples were –

- Sample: DG - Desmodium gangaticum DC.
- Sample: DL - Desmodium lexiflorum DC.

Collected from pharmacy in powdered (80 #) and was used for the present study.

OBSERVATION AND RESULTS
### Table: 1 Organoleptic Parameters of Root powder of both Desmodium species

<table>
<thead>
<tr>
<th>sr. no</th>
<th>sample</th>
<th>parameters</th>
<th>texture</th>
<th>colour</th>
<th>odour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sample DG</td>
<td>Fine Powder</td>
<td></td>
<td>Brownish</td>
<td>Not irritant</td>
</tr>
<tr>
<td>2</td>
<td>Sample DL</td>
<td>Fine Powder</td>
<td></td>
<td>Light Brownish cream</td>
<td>Not irritant</td>
</tr>
</tbody>
</table>

### Table: 2 Analytical Data of both Desmodium Species - Powder Samples

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Parameters</th>
<th>Sample DG (% w/w)</th>
<th>Sample DL (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss on drying</td>
<td>6.19</td>
<td>3.37</td>
</tr>
<tr>
<td>2</td>
<td>Ash value</td>
<td>5.86</td>
<td>5.39</td>
</tr>
<tr>
<td>3</td>
<td>Water soluble extractive</td>
<td>10.4</td>
<td>10.9</td>
</tr>
<tr>
<td>4</td>
<td>Methanol soluble extractive</td>
<td>6.3</td>
<td>6.2</td>
</tr>
<tr>
<td>5</td>
<td>pH</td>
<td>6.57</td>
<td>6.62</td>
</tr>
<tr>
<td>6</td>
<td>Partial consistency</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A – above 60</td>
<td>14.44</td>
<td>19.80</td>
</tr>
<tr>
<td></td>
<td>B – between 60 – 85</td>
<td>20.84</td>
<td>52.48</td>
</tr>
<tr>
<td></td>
<td>C – between 85 – 120</td>
<td>59.68</td>
<td>25.66</td>
</tr>
<tr>
<td></td>
<td>D – below 120</td>
<td>4.9</td>
<td>1.49</td>
</tr>
</tbody>
</table>
Table-2 shows the values obtained of the different parameters studied. The result of different parameters is as follows:

LOSS ON DRYING: In which there is much variation in loss on drying of the samples. In Sample-DG the value of loss on drying is 6.19% which indicates that it has more % of water or moisture as compared to sample-DL.

ASH VALUE: There is no more variation in Ash value of both the samples. Both Samples indicates that both have same % of inorganic constituents.

WATER SOLUBLE EXTRACTIVES (WSE): There is no considerable variation in Water soluble extractives (WSE) of both the samples. Both Samples indicates that both have same % of Water soluble extractives.

METHANOL SOLUBLE EXTRACTIVES (MSE): There is no considerable variation in Methanol soluble extractives (MSE). Both Samples indicates that both have same % of Methanol soluble extractives.

pH value: The pH value indicates the potential hydrogen ions available in particular substance. Hear we found mildly different of pH value in both samples of Desmodium species.

The Particle consistency of powdered is carried out to determine the different type of particles size present in that drug sample. The Particle sizes of test samples are having considerable variation of the particles below mesh in both Samples.

Table: 3 Observation of qualitative analysis of Desmodium species

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DG</td>
</tr>
<tr>
<td>1</td>
<td>Alkaloids</td>
<td>+(0.34 %)</td>
</tr>
<tr>
<td>2</td>
<td>Tannins</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Phenol</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Flavanoid</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Steroid</td>
<td>+</td>
</tr>
</tbody>
</table>
Table: 4 TLC observed under UV light

<table>
<thead>
<tr>
<th>Sample</th>
<th>Solvent system</th>
<th>No. of spots</th>
<th>Observed under short UV light (254mm) Rf values</th>
<th>Observed under long UV light (366mm) Rf values</th>
</tr>
</thead>
<tbody>
<tr>
<td>DG</td>
<td>Toluene: Ethyl acetate: Diethaiel ammonia (7: 2: 1)</td>
<td>2</td>
<td>-- 0.78</td>
<td>-- 0.92</td>
</tr>
<tr>
<td>DL</td>
<td>(7: 2: 1)</td>
<td>3</td>
<td>-- 0.42</td>
<td>-- 0.89</td>
</tr>
</tbody>
</table>

This table shows the TLC profile of the both Desmodium species having not much variation in Rf value.

DISCUSSION

The loss on drying of any sample is directly related to its moisture content. If the moisture content is very high in any drug it may affect its preservation. Hence, the loss on drying of the sample was determined and it was found 6.19 % (DG) and 3.37 % (DL). The ash value is indicates the presence of inorganic and salt materials in the sample. Here both the samples have almost same inorganic and salt materials. The Water soluble extractives (WSE) is indicates that both samples have similar Water soluble contain. The Methanol soluble extractive is indicates that samples DG and samples DL have similar Methanol soluble contain. The pH of given samples are almost same no major different are found both species are mildly acidic.

TLC pattern obtained using Toluene: Ethyl acetate: Diethaiel ammonia (7: 2: 1) as mobile phase shows retention behavior components of Alkaloid content of the both Desmodium species. Hear found Sample DG has two spots while in Sample DL three spots. The TLC profile shows that the Rf value of the both Desmodium species are almost similar.
PLATE-1 Thin layer chromatography of *Desmodium* gangaticum and other species.

Stationary phase: T.L.C. plate of silica gel G (Merck)

Mobile phase: Toluene: Ethyl acetate: Diethaiel ammonia (7:2:1)

Fig1.1- long UV (366nm)
- T1- *Desmodium gangaticum*
- T3- *Desmodium laxiflorum*

Fig1.2- Spraying with Dragendorff’s reagent
- T1- *Desmodium gangaticum*
- T3- *Desmodium laxiflorum*

Qualitative tests are used to detect the presence of functional groups which plays very important role in expression of biological activity present study reveals the presence of Tannins, Flavanoid, Steroid, Phenol and Alkaloids in both *Desmodium* species. Hearer we found Flavanoid, Steroid, Phenol and Alkaloids are present in both *Desmodium*
species, while Tanins are not present in both Desmodium species. The Total Alkaloid content is indicates the presence of Alkaloid content in the sample. The Desmodium lexiflorum having high alkaloid content in compare to Desmodium gangaticum species. Alkaloids have very bitter taste. Principal pharmacological and therapeutic uses of alkaloids include mydriatic, antimalarial, expectorant, strong analgesic, hypotensive, antimitotic, oxytocic, muscle relaxant etc. It means that both Desmodium species may have bitter taste due to alkaloids. Flavonoids in general show anti-inflammatory and antimicrobial activities. This activity may be responsible for the anti-inflammatory activity of both the Desmodium species. Tannins are medicinally significant due to their astringent properties. They are also used in gastro-intestinal diseases like diarrhoea. In present study Tanins are not present in both Desmodium species.

CONCLUSION

Identity, purity and strength of the plant Desmodium gangeticum is as follows.
Loss on drying 6.19 % w/w, Total ash content 5.86 % w/w, Water soluble extractive value 10.4 % w/w, Alcohol soluble extractive value 6.3 % w/w and pH 6.57.

Identity, purity and strength of the plant Desmodium lexiflorum is as follows. Loss on drying 3.37 % w/w, Total ash content 5.39 w/w, Water soluble extractive value 10.9 % w/w, Alcohol soluble extractive value 6.2 % w/w and pH 6.62.

Flavanoid, Steroid, Phenol and Alkaloids are present in both Desmodium species so it indicate that the pharmacological action of both the species are may be same.

So in the base of Physicochemical study, It can be concluded that Desmodium lexiflorum may be used in the scarcity of Desmodium gangeticum.

REFERENCES

8. Rangari Vinod, Pharmacognosy and phytochemistry, Part-1, Ed. 1st, Career publications, Nashik-Pune, 2007; 298

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