A PRELIMINARY PHARMACOGNOSTICAL AND PHYSICO-CHEMICAL EVALUATION OF SARASWATA CHOORNA
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ABSTRACT
Saraswata choorna is an Ayurvedic medicine used in the treatment of psychosis, depression, low intelligence level, loss of memory etc; conditions. Saraswata choorna is mentioned in Bhaishajya ratnavali text in ‘Unnada chikitsa’. Regular consumption of Saraswata choorna improves buddhi (higher mental functions), medha (intellect), dhriti (control over mind), srmriti (memory power) and kavita shakti (poetic talent). The present study was planned to evaluate the ingredients of Saraswata choorna pharmacognostically and to standardize it on various scientific parameters like organoleptic characters and physico-chemical parameters. Powder microscopic features of all the ingredients of Saraswata choorna were equivalent to the standard profile. Pharmaceutical analysis of Saraswata choorna showed, loss on drying (13.88 % w/w), pH of 5 % aqueous solution (5.45), volatile oil content (1.25 % v/w), particle consistency (% of above 60 mesh - 80.53 % w/w), water extract (26.30 % w/w), alcoholic extract (21.0 % w/w) and ash value (12.33 % w/w). The present study would open up the doors to future workers in the field for identification and to check quality and purity of the Saraswata choorna.

Keywords: Saraswata choorna, Physico-chemical, Pharmacognostical, Pharmaceutical, Standardization

INTRODUCTION
Saraswata choorna is an Ayurvedic medicine used in the treatment of psychosis, depression, low intelligence level, loss of memory etc; conditions. It should be consumed along with ghee and honey. Saraswata choorna contains ingredients like, Kushtha (Saussurea lappa), Ashwagandha (Withania somnifera), Saindhava lavana (Rock salt), Ajamoda (Apium graveolens), Sweta jeeraka (Cuminum cyminum), Krishna jeeraka (Carum carvi), Shunthi (Zingiber officinale), Maricha (Piper nigrum), Pippali (Piper longum), Patha (Cissampelos pareira), Shankhapushpi (Convolvulus pluricaulis), Vacha (Acorus calamus) and Brahmi (Bacopa monnieri) swaras (juice) for bhavana (tirituration) (Table 1). Saraswata choorna is mentioned in Bhaishajya ratnavali text in ‘Unnada chikitsa’. Regular consumption of Saraswata choorna improves buddhi (higher mental functions), medha (intellect), dhriti (control over mind), srmriti (memory power) and kavita shakti (poetic talent).1 Even though it is the most commonly used formulation in Ayurvedic practice, till date no work has been conducted on Saraswata choorna regarding to its standardization. The present study was planned to evaluate the ingredients of Saraswata choorna, pharmacognostically and to standardize it on various scientific parameters like organoleptic and physico-chemical parameters.

AIMS AND OBJECTIVES
• Pharmacognostical study of ingredients of Saraswata choorna
• Physico-chemical analysis of Saraswata choorna

MATERIALS AND METHODS
Collection of raw material
All of the ingredients of Saraswata choorna (Table 1) were identified and collected from the pharmacy, Institute for Post Graduate Teaching and Research in Ayurveda (I.P.G.T and R.A), Gujarat Ayurved University (G.A.U), Jamnagar, India.

Method of preparation of saraswata choorna
All of the ingredients (Plate 1, Figure A, B, C, D, E and F and Plate 2, Figure A, B, C, D and E) were collected, cleaned. They were powdered in a pulverizer separately. All of the eleven ingredients except vacha, were weighed separately and mixed together in equal parts. Then eleven parts of powdered vacha added to this. Brhami swarasa was collected from fresh Brahmi whole plant (Plate 2, Figure F). The powder was kept in fresh Brahmi swarasa and it was subjected to three bhavana’s. After bhavana, the powder was dried in a shade. Then again it was powdered and passed through sieve number 60-80 to obtain a homogeneous blend. It was packed in air tight containers to protect from light and moisture. Saraswata choorna (Plate 3, Figure A) was prepared at pharmacy of I.P.G.T and R.A, GAU, Jamnagar, India.

Pharmacognostical study
Microscopic study of the powders of the ingredients of Saraswata choorna was done at Dept. of Pharmacognosy, I.P.G.T and R.A, GAU, Jamnagar, India.

Physico-chemical study
Saraswata choorna was analyzed on various parameters like, loss on drying, ash value, water soluble extract, methanol soluble extract, pH value, volatile oil content and particle consistency at pharmaceutical chemistry laboratory of I.P.G.T and R.A, GAU, Jamnagar, India.

RESULTS AND DISCUSSION
The preliminary step in the standardization of traditional medicine is to strictly follow the parameters of pharmacognosy and phyto chemistry. Pharmacognosy study helps in authentication of the commonly used drugs through morphological and organoleptic parameters. The accurate identification and guarantee of purity through pharmacognosy and pharmaceutical chemistry measures is inescapable ladder needed for the quality assurance and standardization of all herbal formulations.2 The objective of
the present article is to explore, analyze and standardize the Saraswata choorna through pharmacognostical measures and by physico-chemical analysis. Small quantity of powders of the ingredients of Saraswata choorna were dissolved separately in little amount of distilled water, studied under carl zeiss trinocular microscope (20X) attached with camera with and without stain. The photographs were also taken under the microscope. Powder microscopic features of Kushta (Plate 4, Figure A, B, C, D and E), Ashwagandha (Plate 5, Figure A, B, C, D and E), Ajamoda (Plate 6, Figure A, B, C, D, E and F), Sweta jeeraka (Plate 7, Figure A, B, C, D, E and F), Shunti (Plate 9, Figure A, B, C, D, E and F), Maricha (Plate 10, Figure A, B, C, D, E, F and G), Pippali (Plate 11, Figure A, B, C, D and E), Patha (Plate 12, Figure A, B, C, D, E, F and G), Shankhapushpi (Plate 13, Figure A, B, C, D, E, F and G), Vacha (Plate 14, Figure A, B, C, D and E) and Brahmi (Plate 15, Figure A, B, C and D) were equivalent to standard profile. Total ash value helps in determining both the physiological ash (plant tissue) and non physiological ash (extraneous matter like sand and soil), whereas acid insoluble ash gives an idea about the amount of silica present, especially as sand and siliceous earth. Physico-chemical parameters like loss on drying, ash value, water soluble extract, methanol soluble extract, pH value, volatile oil content and particle consistency were studied on Saraswata choorna (Table 2). Even though Thin Layer Chromatography (TLC) and High Performance Thin Layer Chromatography (HPTLC) are indicated in the standardization of herbal formulation, unfortunately in the present study these were not done. It is thus expected that, the present study would open up the doors to future workers in the field for identification and to check quality and purity of the Saraswata choorna. These results may help to carry out further works like isolation of active molecules and standardization technique.

Table 1: Ingredients of Sarasvata Choorna

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Ingredient</th>
<th>Part used</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kushta</td>
<td>Root</td>
<td>One part</td>
</tr>
<tr>
<td>2</td>
<td>Ashwagandha</td>
<td>Root</td>
<td>One part</td>
</tr>
<tr>
<td>3</td>
<td>Saindhava lavana</td>
<td>-</td>
<td>One part</td>
</tr>
<tr>
<td>4</td>
<td>Ajamoda</td>
<td>Fruit</td>
<td>One part</td>
</tr>
<tr>
<td>5</td>
<td>Sweta jeeraka</td>
<td>Fruit</td>
<td>One part</td>
</tr>
<tr>
<td>6</td>
<td>Krishna jeeraka</td>
<td>Fruit</td>
<td>One part</td>
</tr>
<tr>
<td>7</td>
<td>Shunti</td>
<td>Rhizome</td>
<td>One part</td>
</tr>
<tr>
<td>8</td>
<td>Maricha</td>
<td>Fruit</td>
<td>One part</td>
</tr>
<tr>
<td>9</td>
<td>Pippali</td>
<td>Fruit</td>
<td>One part</td>
</tr>
<tr>
<td>10</td>
<td>Patha</td>
<td>Root</td>
<td>One part</td>
</tr>
<tr>
<td>11</td>
<td>Shankhapushpi</td>
<td>Whole plant</td>
<td>One part</td>
</tr>
<tr>
<td>12</td>
<td>Vacha</td>
<td>Rhizome</td>
<td>Eleven parts</td>
</tr>
<tr>
<td>13</td>
<td>Brahmi</td>
<td>Whole plant</td>
<td>Quantity sufficient for three times bhavana</td>
</tr>
</tbody>
</table>

Table 2: Physico-chemical parameters of Saraswata choorna

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss on drying at 105°C</td>
<td>13.88 % w/w*</td>
</tr>
<tr>
<td>2</td>
<td>Ash value</td>
<td>12.33 % w/w</td>
</tr>
<tr>
<td>3</td>
<td>Water soluble extract</td>
<td>26.30 % w/w</td>
</tr>
<tr>
<td>4</td>
<td>Methanol soluble extract</td>
<td>21.0 % w/w</td>
</tr>
<tr>
<td>5</td>
<td>pH (5 % aqueous solution)</td>
<td>5.45</td>
</tr>
<tr>
<td>6</td>
<td>Volatile oil content</td>
<td>1.25 % v/w**</td>
</tr>
<tr>
<td>7</td>
<td>Particle consistency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. % of above 60 mesh</td>
<td>80.53 % w/w</td>
</tr>
<tr>
<td></td>
<td>B. % of between 60- 85 mesh</td>
<td>8.37 % w/w</td>
</tr>
<tr>
<td></td>
<td>C. % of between 85-120 mesh</td>
<td>4.38 % w/w</td>
</tr>
<tr>
<td></td>
<td>D. % of below 120 mesh</td>
<td>0.08 % w/w</td>
</tr>
</tbody>
</table>

*Weight/weight; ** Volume/Weight
Plate 1: Ingredients of Saraswata choorna – I

A. Kushta root  
B. Ashwagandha root  
C. Ajamoda fruit  
D. Shveta jeeraka fruit  
E. Krishna jeeraka fruit  
F. Santhi rhizome

Plate 2: Ingredients of Saraswata choorna – II

A. Maricha fruit  
B. Pippali fruit  
C. Patha root  
D. Shankhpushpi whole plant  
E. Vacha rhizome  
F. Brahmi whole plant

Plate 3: Saraswata choorna
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Plate 4: Powder microscopic features of Kushta

A. Unstained annular vessels  B. Unstained oleoresin fragments
C. Stained oleoresin fragments  D. Unstained phloem fibres
E. Unstained broken bits of parenchyma

Plate 5: Powder microscopic features of Ashwagandha

A. Scaliform vessel  B. Simple hair
C. Stained pitted vessel  D. Starch grains
E. Trichome  F. Unstained pitted vessel

Plate 6: Powder microscopic features of Ajamoda

A. Unstained calcium oxalate crystals  B. Unstained rosette crystals
C. Stained trichome with simple hair  D. Stained stone cells
E. Stained oil globules with Aleurone grains  F. Stained glandular trichome

Plate 7: Powder microscopic features of Sweta jeeraka

A. Unstained epidermal cells with parenchymal cells of vittae  B. Unstained epidermal cells
C. Unstained vittae  D. Unstained calcium oxalate crystals
E. Stained pitted tracheidies  F. Stained oil globules
Plate 8: Powder microscopic features of Krishna jeeraka

A. Unstained trichome  
B. Unstained aleurone grains

C. Unstained patch of oil cells  
D. Unstained endodermal cells

E. Stained tubular cells  
F. Stained vascular bundles with ridges

G. Stained aleurone grains with oil globules  
H. Stained carpophores with slender fibres

Plate 9: Powder microscopic features of Shunthi

A. Unstained spiral vessels - I  
B. Unstained spiral vessels - II

C. Stained spiral vessels  
D. Stained phloem vessels

E. Stained annular vessels  
F. Stained oleo resin

Plate 10: Powder microscopic features of Maricha

A. Stained stone cells with starch grains  
B. Stained starch grains

C. Oil globules & aleurone grains  
D. Unstained vessels with oil

E. Unstained simple fiber  
F. Unstained spiral vessels

G. Unstained stone cells

Plate 11: Powder microscopic features of Pippali

A. Oil globules with starch grains  
B. Stained phloem fiber

C. Unstained phloem fiber  
D. Stained cork cell

E. Stained pitted vessel  
F. Stained stone cells - I

G. Stained stone cells - II
Plate 12: Powder microscopic features of Patha

A. Unstained oil globules
B. Stained stone cells
C. Stained simple fibres
D. Stained oil globules & epidermal cells
E. Stained oil globules with stone cells, parenchyma

Plate 13: Powder microscopic features of Shankhpushpi

A. Unstained stomata - I
B. Unstained stomata - II
C. Unstained unicellular hairs
D. Unstained spiral vessels
E. Unstained pitted vessel
F. Stained pitted & spiral vessels
G. Stained aseptate fiber

Plate 14: Powder microscopic features of Vacha

A. Unstained annular vessels with starch grains
B. Unstained oil globules
C. Unstained pitted vessels
D. Stained annular vessels - I
E. Stained annular vessels - II

Plate 15: Powder microscopic features of Brahmi

A. Stained palisad parenchyma with coil spiral vessels
B. Fragment of pitted vessels
C. Unstained starch grains
D. Stained barrel shaped parenchyma
CONCLUSION
The present study may be useful to supplement the information with regard to the standardization, identification and also in carrying out future works on Saraswata choorna.

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