

## Chemical Examination of the Leaves of *Sphaeranthus indicus*

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In the present work, the authors report the chemical examination of the leaves of *Sphaeranthus indicus*.

### INTRODUCTION

*Sphaeranthus indicus*<sup>1-3</sup> belongs to the natural order compositae and is known as “Gorakmundi” in Hindi. It is found abundantly in damp situations in the plains all over India, ascending to an altitude of 1,500 m in the hills, especially as a weed in the rice fields. The roots and seeds of this plant are considered as anthelmintic. It is also reported to be used as a digestible tonic and for indigestion, asthma, leucoderma and dysentery.

### EXPERIMENTAL

Air dried powdered leaves of *Sphaeranthus indicus* were mixed with a small quantity of calcium carbonate in distilled water [500 mL] and refluxed for 4 h on a water bath. The reaction mixture was decanted. This process was repeated several times with distilled water. The solution of lead tetraacetate [10%] was added to complete the precipitation of the combined aqueous extract obtained after decantation. The solution was filtered and made alkaline with ammonia and H<sub>2</sub>S gas was bubbled through the filtrate to remove the excess of lead acetate as lead sulphide. The neutral solution of the filtrate obtained above was concentrated under reduced pressure to give a viscous mass.

TABLE 1  
SOLVENT SYSTEM (I) *n*-Butanol : Acetic acid : Water<sup>4</sup>  
[ 4 : 1 : 5 v/v ] *Sphaeranthus indicus*

| S. No. | Sugar       | R <sub>f</sub> Found | R <sub>f</sub> Reported |
|--------|-------------|----------------------|-------------------------|
| 1.     | D-Arabinose | 0.23                 | 0.21                    |
| 2.     | L-Rhamnose  | 0.34                 | 0.37                    |
| 3.     | Lactose     | 0.08                 | 0.09                    |
| 4.     | Raffinose   | 0.04                 | 0.05                    |
| 5.     | D-Galactose | 0.15                 | 0.16                    |
| 6.     | Maltose     | 0.09                 | 0.11                    |
| 7.     | D-Fructose  | 0.25                 | 0.23                    |
| 8.     | D-Glucose   | 0.17                 | 0.18                    |

## RESULTS AND DISCUSSION

Identification of Sugars: For identification of sugars chromatograms were obtained for both the test mixture and authentic sugars using Whatman No. 1 filter paper and were developed in the following solvent systems:

(I) *n*-Butanol : Acetic acid : water (4 : 1 : 5 v/v)<sup>4</sup>, and (II) *S*-collidine<sup>4</sup>.

Chromatograms were dried in air and sprayed with aniline hydrogen phthalate<sup>5</sup> reagent. After a few minutes colour was developed. The identities of the sugars were confirmed by comparison of their  $R_f$  values with those of authentic sugars (Tables 1 and 2).

TABLE-2  
SOLVENT SYSTEM: (II) *S*-COLLIDINE<sup>4</sup>

| S. No. | Sugar               | $R_f$ Found | $R_f$ Reported |
|--------|---------------------|-------------|----------------|
| 1.     | <i>D</i> -Arabinose | 0.45        | 0.43           |
| 2.     | <i>L</i> -Rhamnose  | 0.56        | 0.59           |
| 3.     | Lactose             | 0.22        | 0.24           |
| 4.     | Raffinose           | 0.19        | 0.20           |
| 5.     | <i>D</i> -Galactose | 0.33        | 0.34           |
| 6.     | Maltose             | 0.31        | 0.32           |
| 7.     | <i>D</i> -Fructose  | 0.41        | 0.42           |
| 8.     | <i>D</i> -Glucose   | 0.37        | 0.39           |

For determining amino acid composition the leaves [20 g] were hydrolysed for 24 h at 110°C with 6N HCl. The hydrolysate was diluted with 50 mL water, filtered and concentrated to dryness. The excess of acid was removed by repeated evaporation and was finally dissolved by 10% isopropanol. The solution was subjected to paper chromatography and co-chromatography with authentic specimens to confirm the identity of amino acids. The results were recorded in Table-3.

TABLE-3

| S.No | Amino acids identified | $R_f$ reported <sup>4-6</sup> | $R_f$ observed |
|------|------------------------|-------------------------------|----------------|
| 1.   | Alanine                | 0.61                          | 0.64           |
| 2.   | Histidine              | 0.79                          | 0.80           |
| 3.   | Aspartic               | 0.44                          | 0.46           |
| 4.   | Cysteine               | 0.28                          | 0.27           |
| 5.   | Lysine                 | 0.48                          | 0.49           |
| 6.   | Glutamic               | 0.51                          | 0.53           |
| 7.   | Leucine                | 0.76                          | 0.75           |
| 8.   | Valine                 | 0.41                          | 0.40           |
| 9.   | Glycine                | 0.55                          | 0.57           |

The quantitative estimation of amino acids [expressed in mg of glycine per 16 mg of nitrogen] was done by photometric<sup>5</sup> method. The results were recorded in Table-4.

TABLE-4

| S.No. | Amino acids | Quantity<br>[expressed in mg] |
|-------|-------------|-------------------------------|
| 1.    | Alanine     | 1.34                          |
| 2.    | Histidine   | 0.99                          |
| 3.    | Aspartic    | 2.28                          |
| 4.    | Cysteine    | 1.60                          |
| 5.    | Lysine      | 2.48                          |
| 6.    | Glutamic    | 1.80                          |
| 7.    | Leucine     | 1.52                          |
| 8.    | Valine      | 2.89                          |
| 9.    | Glycine     | 2.75                          |

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