A STUDY ON THE STANDARDIZATION PARAMETERS OF CASSIA ANGUSTIFOLIA

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ABSTRACT

Objective: Now-a-days, the herbal medicines are much efficient for the treatment of various disorders as they have minimal side effects in comparison to the allopathic medicines. Cassia angustifolia, commonly called Senna belongs to the family Leguminosae and is a well-known laxative throughout the world. Senna is mostly found in Tirunelveli, Madurai, and Ramnathpuram districts of Tamil Nadu. Carbohydrates, tannins, alkaloids, flavonoids, and amino acid are the important chemical constituents of C. angustifolia. The objectives of the present study are to investigate various pharmacognostic, phytochemical analysis, and pharmacological properties of C. angustifolia.

Methods: The powdered drug was used for estimating the loss on drying, ash values, fluorescence studies, chemical tests, and extractive values. Macroscopic and microscopic studies were also performed.

Results: The transverse section (T.S.) of leaf showed isobilateral structure along with paracytic stomata, nonlignified unicellular trichomes with warty walls, and fibrovascular bundle. The fluorescence characteristics of leaf powder were studied both in visible light and ultraviolet (UV) light (254 nm and 365 nm) after treatment with various reagents. Senna is composed of carbohydrates, tannins, alkaloids, flavonoids, and amino acid. It was reported that the total ash value was 11.23±0.25 w/w. The acid insoluble ash value was 1.4±0.1% w/w. Water soluble, ethanol, methanol, petroleum ether, and chloroform extractive values were 16.6±0.26% w/w, 3.7±1.75% w/w, 0.83±0.05% w/w, 1.6±0.1% w/w, and 3.2±0.25% w/w, respectively.

Conclusion: The main pharmacological activities of Bouhina variegata are anthelmintic, antitumor, antimicrobial, anti-inflammatory, antidiabetic, anti-inflammatory, antitumor, antimicrobial, and hepatoprotective. The present investigation provides the information on its pharmacognostic, phytochemical analysis, and pharmacological properties.

Keywords: Senna, Sennosides, Laxative, Flavonoids, Ash value.

INTRODUCTION

Cassia angustifolia (senna) and it belongs to Leguminosae family. Senna is used for the treatment of constipation mostly in Eastern and Western countries [1,2]. The laxative activity of senna is due to the presence of two anthraquinone glycosides, i.e., sennoside A and sennoside B. C. angustifolia is also composed of rhein-8-diglucoside, sennosides C and D, rhein, rhein-8-glucoside, aloe-emodin and anthrone diglucoside, and napthalene glycosides such as tinnevellin glycoside and 6-hydroxy musizin glycoside, flavonoid (kaempferol), phytosterols, resin, and calcium oxlate [3,4]. It was reported that the first variety of senna is represented in (Fig. 1). The powdered drug was used for estimating the loss on drying, ash values, fluorescence studies, chemical tests, and extractive values. Macroscopic and microscopic studies were also performed.

The leaves of Cassia angustifolia are represented in (Fig. 2). The plant of Cassia angustifolia is represented in (Fig. 3).

SYNONYMS [6]

| Sanskrit | Swarn patti |
|----------|------------|
| Hindi    |  Sana      |
| Telugu   | Sunamukhi  |
| Tamil    | Nilvarai, nelavakai |
| Malayalam| Sannamukki, connamukki |
| Kannada  | Nela tangedu |
| Gujarati | Nat ki sana |

MEDICINAL USES

C. angustifolia is used for the treatment of splenic enlargements, anemia, typhoid, cholera as a febrifuge, as blood purifier, as an anthelmintic and as remedy for constipation [6]. Senna has been already included in I.P. as a purgative due to the presence of rhein, aloe-emodin, kaempferol, and isoaromaminetin [7].

MACROSCOPIC CHARACTERISTICS

Senna leaves are delicate and grayish-green. The pods and fruits are oblong in shape. The compound leaves are composed of 5-8 pairs of o alliances leaflets (2.5 cm×1.5 cm). Flowers are large and yellow. Senna produces medium-sized pods. The seeds are flat and yellowish [2]. The leaflets possess short and stout petioles which may be rarely broken. The length of leaflets is about 1.5-6.0 cm long and width is 0.5-1.5 cm. They have a specific odor and mucilage-like/slightly bitter taste [4,8].

METHODS

The leaves of C. angustifolia were collected from Gutturnal and Company, Shivaji Marg, Bareilly, Uttar Pradesh, India and identified (specimen...
Powdered drug was used for moisture content, ash values, swelling index, and fluorescence studies were carried out by treating 0.5 g of powdered drug with different reagents and observation in color was made in visible light, UV light of short (254 nm), and long wavelength (365 nm) under UV chamber. Photomicrograph was performed using Olympus C7070 camera [9].

RESULTS AND DISCUSSION

Microscopical examination of leaf
The T.S. of leaf showed isobilateral structure along with paracytic stomata, non lignified unicellular trichomes with warty walls, fibrovascular bundle lined with abundant prisms of calcium oxalate, 4-5 tier palisade, and sclerenchyma. The transverse section of leaf of Cassia angustifolia is represented in (Fig. 4).

Pharmacognostic evaluation of the plant
The plant material was used for quantitative determination of physicochemical values. Ash values, loss on drying, and extractive values of Cassia angustifolia are represented in Table 4.

Phytochemical screening
The dried leaves were powdered and extracted with petroleum ether, chloroform, ethanol, and water in soxhlet apparatus. The percentage yield was analyzed. The phytochemical tests were performed for the estimation of alkaloids, glycosides, flavonoids, and tannins in various plant extracts and resulted in the presence of carbohydrates, gums, proteins, alkaloid, saponins, flavonoids, and tannins and results are given in Table 1.

Fluorescent studies of powder drugs
The fluorescence characteristics of leaf powder were studied both in visible light and UV light (254 nm and 365 nm) after treatment with various reagents and is represented in Table 2 [10-12].

The physicochemical parameters of leaf of C. angustifolia Linn are tabulated in Table 3. The loss on drying at 105°C in leaf was found to be 1.90%. Total ash value of leaf represents minerals and earthy materials attached in the plant material. It was reported that the total ash value was 11.2%. The acid insoluble ash value was 1.5%. The water-soluble ash value represents the presence of acids, sugar, and inorganic compounds and was found to be 4.7%. The results are given in Table 3.

CONCLUSIONS
Preliminary phytochemical and physicochemical investigations of C. angustifolia were performed in this study. These parameters are necessary for the identification of drugs and investigation of the bioactive constituents in medicinal herbs [13]. The presence of various chemical constituents in C. angustifolia may be a potential cause of treatment of various disorders. The quality of the plant can be estimated by determining the physical parameters. These investigations are of
Table 1: Chemical tests

| Phytochemical tests          | Petroleum ether | Methanol | Water | Ethanol | Chloroform |
|-----------------------------|-----------------|----------|-------|---------|------------|
| Carbohydrates               |                 |          |       |         |            |
| Molish test                 | +               | +        | +     | +       | -          |
| Fehling’s test              | -               | +        | -     | +       | -          |
| Benedict’s test             | -               | -        | -     | -       | +          |
| Barfoed’s test              | -               | -        | -     | -       | +          |
| Proteins                    |                 |          |       |         |            |
| Biuret test                 | +               | +        | +     | +       | -          |
| Millon’s test               | -               | +        | -     | +       | -          |
| Xanthoprotein test          | +               | +        | -     | -       |            |
| Amino acids                 |                 |          |       |         |            |
| Nihydrin test               | +               | +        | +     | +       |            |
| Tyrosin test                | -               | -        | -     | -       | +          |
| Cystein test                | -               | -        | -     | +       |            |
| Triterpenoid                |                 | +        |       |         | -          |
| Noller’s test               | -               | +        |       | -       | -          |
| Steroid                     |                 |          |       |         |            |
| Salkowski reaction          | -               | +        | +     | +       | -          |
| Liebermann-burchard reaction| +               | +        | +     | -       |            |
| Cardiac glycosides          |                 |          |       |         |            |
| Bajer’s test                | +               | +        | +     | +       |            |
| Legal’s test                | -               | +        | -     | +       | -          |
| Keller-Killiani test        | -               | +        | +     | +       | -          |
| Anthraquinone glycosides    |                 |          |       |         |            |
| Borntrager’s test           | -               | -        | -     | -       | -          |
| Modified Borntrager’s test  | -               | -        | -     | -       | -          |
| Saponin glycosides          |                 |          |       |         |            |
| Foam test                   | +               | +        | +     | +       |            |
| Cyanogenetic glycosides     | Na- picrate test | +       | +     |         | +          |
| Flavonoids                  |                 |          |       |         |            |
| Shinoda test                | -               | +        | +     |         | +          |
| Lead acetate                | -               | +        | +     | +       | -          |
| NaOH                        | +               | +        |       | +       |            |
| Alkaloids                   |                 |          |       |         |            |
| Dragendorff’s test          | +               | +        | +     | +       | -          |
| Mayer’s test                | -               | +        |       | +       | -          |
| Wagner’s test               | +               | +        | +     | +       | -          |
| Hager’s test                | -               | +        | +     | +       | -          |
| Tannins                     |                 |          |       |         |            |
| 5% FeCl₃                    | +               | +        |       | +       | -          |
| Lead acetate                | -               | +        | +     | +       | -          |
| Dil. HNO₃                   | -               | +        | +     | +       | -          |
| Acetic acid                 | -               | +        | +     | +       | -          |

Table 2: Fluorescence activity of C. angustifolia leaves

| Material/treatment                              | Observation under UV cabinet |
|------------------------------------------------|-----------------------------|
|                                                | Visible light | Short UV 254 nm | Long UV 365 nm |
| Drug powder as such                             | Muddy green | Green | Light brown |
| Powder treated with concentrated HCl            | Golden | Dark green | Blackish green |
| Powder treated with 1 molar NaOH in water       | Dark green | Black | Brownish black |
| Powder treated with concentrated ethanol        | Golden | Green | Light green |
| Powder treated with concentrated acetic acid    | Golden | Dark green | Light green |
| Powder treated with 5% FeCl₃                    | Pine forest | Dark green | Dark green |
| Powder treated with concentrated benzene        | Golden | Green | Reddish green |
| Powder treated with methanol                    | Golden | Pine forest | Green |
| Powder treated with 1 M H₂SO₄                   | Red | Reddish brown | Brown |
| Powder treated with concentrated HNO₃           | Red | Reddish black | Black |
| Powder treated with chloroform                  | Golden | Dark brown | Reddish brown |
| Powder treated with distilled water             | Green | Greenish brown | Brown |

UV: Ultraviolet, C. angustifolia: Cassia angustifolia

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great importance for carrying out the revalidation and estimation of its other pharmacological activities. It was concluded from the phytochemical study that the ethanolic extract contains flavonoids, glycosides, carbohydrates, and tannins which are responsible for various pharmacological activities such as anti-inflammatory, chemoprotective activity, antioxidant, antidiabetic, antianxiety, and antidepressant.
Table 3: Physiochemical parameters

| Parameters                  | Values (% w/w) | Values (% w/w) | Values (% w/w) | Mean±SD (% w/w) |
|-----------------------------|----------------|----------------|----------------|-----------------|
| Total ash value             | 11.2           | 11.5           | 11.0           | 11.23±0.25      |
| Water - insoluble ash value | 6.5            | 6.75           | 6.1            | 6.45±0.32       |
| Water - soluble ash value   | 4.7            | 4.5            | 4.2            | 4.46±0.25       |
| Acid-insoluble ash value    | 1.5            | 1.3            | 1.4            | 1.4±0.1         |
| Loss on drying              | 1.90           | 1.8            | 1.9            | 1.86±0.05       |

UV: Ultraviolet, SD: Standard deviation

Table 4: Extractive values of C. angustifolia L.

| Solvent        | Extractive value (% w/w) | Extractive value (% w/w) | Extractive value (% w/w) | Mean±SD (% w/w) |
|----------------|--------------------------|--------------------------|--------------------------|-----------------|
| Water          | 16.5                     | 16.9                     | 16.4                     | 16.6±0.26       |
| Ethanol        | 3.8                      | 3.9                      | 3.6                      | 3.7±1.75        |
| Chloroform     | 0.8                      | 0.9                      | 0.8                      | 0.83±0.05       |
| Petroleum-ether| 1.5                      | 1.6                      | 1.7                      | 1.6±0.1         |
| Methanol       | 3.0                      | 3.2                      | 3.5                      | 3.2±0.25        |

C. angustifolia: Cassia angustifolia, SD: Standard deviation

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