International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 11, Issue 5, 2019

Original Article

STANDARDIZATION OF BALAMULA CHURNA (*SIDA CORDIFOLIA* L. ROOT POWDER)

T. JYOSTNA KUMARI[1], G. PENCHALA PRATAP[2], SHYAM BABOO PRASAD[3], P. H. C. MURTHY[4], GOLI PENCHALA PRASAD[5*]

[1]Dr NRS Medical College, Vijayawada, [2]Central Research Institute of Unani Medicine, Hyderabad, [3]Research Officer (Pharmacognosy), Regional Ayurveda Institute for Fundamental Research, Kothrud, Pune, [4]Dr NRS Medical College, Vijayawada, [4]Assistant Director in Charge, Regional Ayurveda Institute for Fundamental Research, Kothrud, Pune
Email: drprasadgoli@yahoo.com

Received: 12 May 2019, Revised and Accepted: 15 Jul 2019

ABSTRACT

Objective: In this study, an attempt was made to generate information based on, physicochemical parameter preliminary phytochemical screening and HPTLC data needed for proper identification and authentication of *Balamula Churna*.

Methods: The physicochemical parameters such as water-soluble extractive, alcohol soluble extractive and loss on drying at 105 °C, total ash and acid insoluble ash were determined according to standard methods. HPTLC studies were conducted and R_f values were documented.

Results: Physicochemical parameter value were documented as pH (6.81%), LOD (7.5%), water-soluble extractive value (6.32%), alcohol soluble extractive value (5.92%) total Ash (9.00%) and Acid Insoluble Ash (1.60%). Preliminary phytochemical screening reveals the presence of glycoside, alkaloid, carbohydrate, phenol, flavonoid and saponin. HPTLC screening showed the presence of significant phytoconstituents with R_f value 0.02, 0.27, 0.34 and 0.96.

Conclusion: All the results obtained from this study can be helpful in evaluation quality, detection of adulteration and substitution and emphasizing the importance of standardization.

Keywords: Balamula, Bala, Churna, *Sida cordifolia,* Standardization

DOI: http://dx.doi.org/10.22159/ijcpr.2019v11i5.35697

INTRODUCTION

Ayurvedic medicinal plants were used to cure human ailments in every possible condition of time immemorial. In the modern era, we have the option to use them over the synthetic molecules because of lesser side effects [1]. Ayurveda system of medicine is successful due to ancient knowledge, skills, and practices based on the theories and experiences of many practitioners in India. Researchers in India always tried to correlate ancient wisdom in modern parameters [2]. Standardization of herbal drugs is an essential measurement for ensuring the quality control of herbal drugs. Standardization of herbal drugs is not an easy task as numerous factors influence the bioefficacy and reproducible therapeutic effect. In order to obtain quality oriented herbal products, care should be taken right from the proper identification of plants. According to WHO, it is the process involving the physicochemical evaluation of crude drugs covering the aspects such as selection and handling of crude material, safety, efficacy and stability assessment of the finished product, documentation of safety and risk based on experience, provision of product information to consumer [3]. *Sida corifolia* belonging to family Malvaceae is widely dispersed medicinal plant is common throughout the tropical and subtropical plains of India and Srilanka growing wild along the roadside. It grows as wasteland weed and known as the "Bala" in Hindi and Sanskrit. Bala, is an Ayurvedic medicinal plant used to treat bronchial asthma, cold, flu, chills, lack of perspiration, headache, nasal congestion, aching joints and bones, cough, wheezing, and edema. The root infusion is given in nervous, urinary blood and bile related disorder. *S. cordifolia* has been reported to possess analgesic, anti-inflammatory, hypoglycemic activities and hepatoprotective activity. Traditionally the plant *S. cordifolia* has been used for CNS depressant, fat loss, analgesics, anti-inflammatory, hypotensive and hepatoprotective purposes. Presence of ephedrine has highlighted the utility of this plant. Oil preparation of bala is used to cure pain, swelling disorder, and Gritha preparation cures Heart diseases. This plant has great potential to develop a supplement for athletics as nutraceuticals. Ephedrine is known to stimulate the central nervous system (CNS), and as such can enhance weight loss [4]. In recent years the plant materials especially the Ayurvedic herbs are gaining a sustained proportion of the global market, due to the cost effectiveness and lesser side effects. Hence, the World Health Assembly (WHA42.43-1989) has emphasized the need to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards. A complete and accurate physico-chemical value of Ayurvedic herbs not only provide scientific basis but also help in globalization of Ayurveda2. Standardization of medicinal plant is necessary because of the fact that in some cases desirable pharmacological actions are not achieved because the biological action of herbal medicine is due to phytoconstituents which can vary batch to batch. The amount of phytoconstituents in a plant can vary according to the age of the plant, time of collection, environmental condition etc. To overcome this problem standardized medicinal plants, plant extracts and isolated constituents can be used. To consider this an attempt has been taken to standardize this valuable medicinal plant.

MATERIALS AND METHODS

Plant material

Root of *S. cordifolia* was collected from the plant growing in hilly area of Tirupathi, Andhra Pradesh. The plant was identified and authenticated by Survey of Medicinal Plants Unit at Central research institute of Unani Medicine, Hyderabad. Herbarium of the plant speciemen were prepared and deposited in the herbarium section of the Central research institute of Unani Medicine, Hyderabad with voucher specimen number SMPU/CRI-Hyd13572

Powder preparation

Shade dried root pieces was made in to powder using grinding mill; passed through #60 sieve and kept in airtight container for further analysis [5].

Organoleptic evaluation

Root powder was evaluated for organoleptic properties.

Determination of pH

10% solution of Root powder extract in water was prepared and the pH of the liquid was determined with the help of pH meter [6].

Determination of physicochemical parameters

Physicochemical parameters namely loss on drying, ash value, insoluble acid ash, water-soluble extractive, alcohol soluble extractive were performed as per the standard procedures [7].

Preliminary phytochemical screening

Preliminary qualitative tests were performed by standard methods [8].

High-performance thin-layer chromatography

Thin-layer chromatography of Alcoholic extract of the powder drug was developed using solvent system toluene: ethyl acetate (6:4) which was saturated for 45 minutes in CAMAG twin trough chamber. The extract was applied manually on TLC Silica gel 60 F_{254} Aluminum coated plate and run up to 8 cm. Plates were observed under daylight, ultraviolet light at 366 nm and subsequently derivatized with Iodine vapour and anisaldehyde-sulphuric acid. Developed band colours and retention factor (R_f) were recorded.

Limit tests for heavy metals

The test for heavy metals is designed to determine the content of metallic impurities that are coloured by sulphide ion under specified conditions. The limit for heavy metals is indicated in the individual monographs in terms of the parts of the heavy metal per million parts of the substance (by weight), as determined by visual comparison of the colour produced by the substance with that of a control prepared from a heavy metal standard solution.

Limit test for arsenic and lead

The glass tube is lightly packed with cotton wool, previously moistened with lead acetate solution and dried, so that, the upper surface of the cotton wool would not be less than 25 mm below the top of the tube. The upper end of the tube was then inserted into the narrow end of one of the pair of rubber bungs to a depth of about 10 mm. A piece of mercuric chloride paper was placed flat on the top of the bung and the other bung placed over it and secured by means of the rubber band in such a manner that the borings of the two bungs (or the upper bung and the glass tube) meet to form a true tube 6.5 mm in diameter interrupted by a diaphragm of mercuric chloride paper. The test solution was prepared as per norms and placed in the wide-mouthed bottle, 1 gm of potassium iodide as T and 10 gm of zinc as T added, and the prepared glass tube was placed quickly in position. The action was allowed to proceed for 40 min. The yellow stain which was produced on the mercuric chloride paper was compared by daylight with the standard stains produced by operating in a similar manner with known quantities of the dilute arsenic solution as T. The comparison of the stains was made immediately at the completion of the test. By matching the depth of colour with standard stains, the proportion of arsenic in the substance was determined. A stain equivalent to the 1 ml standard stain, produced by operating on 10 gm of substance indicates that the proportion of arsenic is 1 part per million[2]. The prepared sample was added with 6 ml of ammonium citrate solution Sp, and 2 ml hydroxylamine hydrochloride solution Sp. Two drops of phenol red solution were added and the solution was made just alkaline (red in colour) by the addition of strong ammonia solution. The solution was cooled and added with 2 ml of potassium cyanide solution Sp. Immediately the solution was extracted with several quantities each of 5 ml, of dithizone extraction solution, draining off each extract into another separating funnel, until the dithizone extraction solution retains its green colour. The combine dithizone solutions were shaken for 30 seconds with 30 ml of a 1% w/v solution of nitric acid and discard the chloroform layer. The solution was added with exactly 5 ml of standard dithizone solution and 4 ml of ammonia-cyanide solution Sp. and shaken for 30 seconds; the colour of the chloroform layer is of no deeper shade of violet than that of control made with a volume of dilute standard lead solution equivalent to the amount of lead permitted in the sample under examination [2].

RESULTS AND DISCUSSION

The root powder is cream in color, course fibrous in nature, the odor is pleasant and a little bit bitter in taste. Image of powder is depicted in fig. 1d. The value of pH and physicochemical parameters such as loss on drying, total ash, acid insoluble ash, water-soluble ash, water and alcohol soluble extracts are depicted in table 1. In heavy metal analysis, arsenic and lead content were found to be less than 2 and 20 PPM respectively. Preliminary phytochemical screening reveals the presence of phytoconstituents as depicted in table 2.

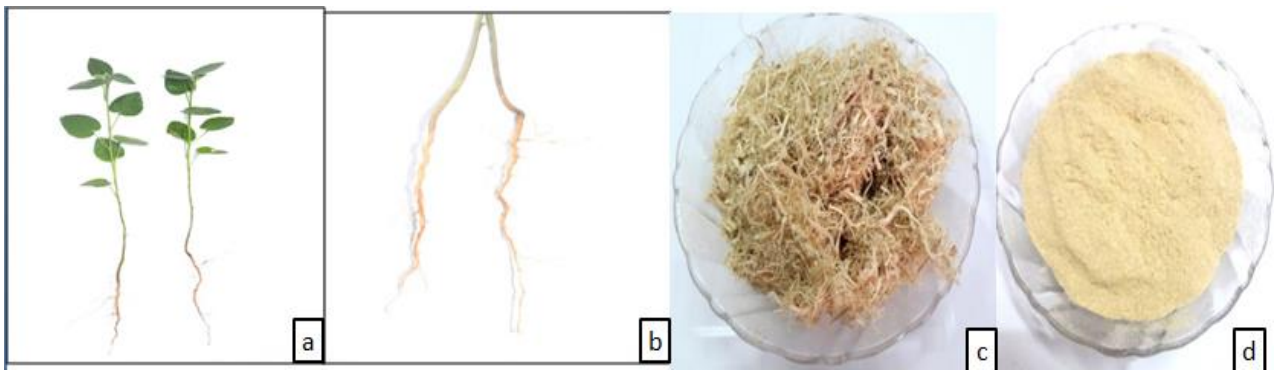

Fig. 1: Morphology of *Sida cardifolia* (a. Whole plant, b. Fresh Root, c. Dried Roots, d. Root powder

Table 1: pH and physicochemical parameter (s)

S. No.	Parameter	Value (%)
1	pH	**6.81**
2	Loss on Drying	**7.5**
3	Water-soluble extractive value	**6.32**
4	Alcohol soluble extractive value	**5.92**
5	Total Ash	**9.00**
6	Acid Insoluble Ash	**1.60**

Table 2 Preliminary phytochemical studies

Secondary metabolites	Result
Glycoside	+
Alkaloid	+
Carbohydrate	+
Phenol	+
Flavonoid	+
Saponin	+

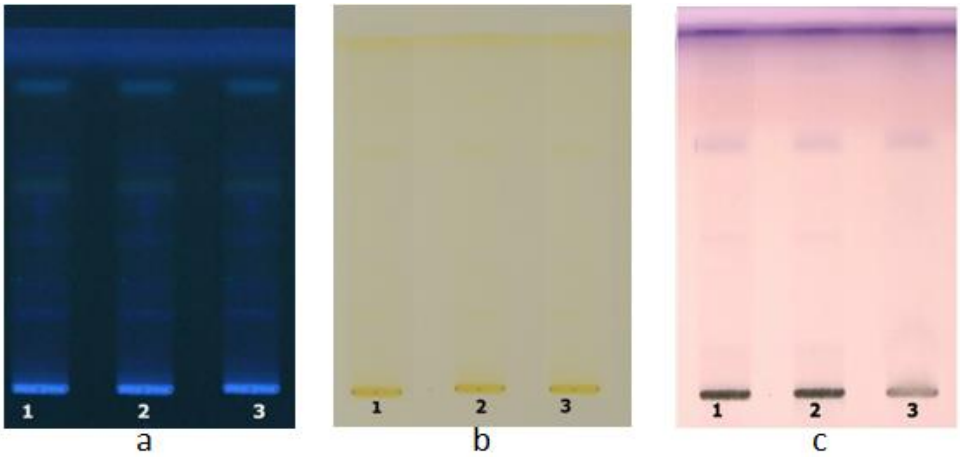

Fig. 2: TLC chromatogram (a. At UV 366 nm, b. Derivatized with Iodine vapors, c. Derivatized with anisaldehvde sulphuric acid

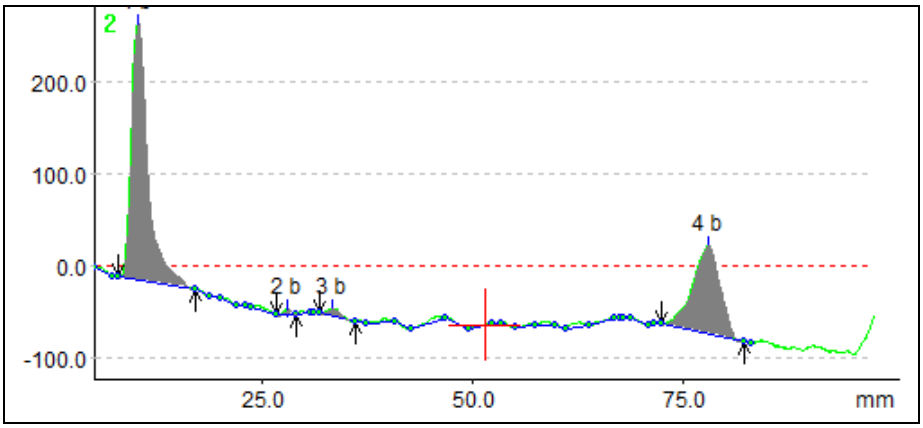

Fig. 3: Densitogram of *S. cordifolia* root powder at UV 366 nm

TLC plates shows four major spots under UV 366 nm at Rf values 0.07 (blue), 0.43 (blue), 0.57 (light green), and 0.86 (blue); and under Iodine vapours shows one spot at Rf value 0.71 (brown); and under visible region after derivatizing with anisaldehydesulphuric acid shows one spot at Rf value 0.71 (purple).

Table 3: Peak list of SC powder at UV 366 nm

Peak no	Y-Pos	Area	Area (%)	Height	Rf value
1	10.3	622.77	62.33	274.85	0.02
2	28.1	6.13	0.61	5.89	0.27
3	33.4	15.94	1.59	9.04	0.34
4	78.1	354.35	35.46	94.97	0.96

CONCLUSION

The results of this studies would be useful for identification, authentication and standardization of Balamula churna (*Sida cordifolia* L. root powder) and also helpful in detecting spurious adulteration of the genuine drug.

AUTHORS CONTRIBUTIONS

All the author have contributed equally

CONFLICT OF INTERESTS

Declare none

REFERENCES

1. Verma H, Prasad SB, Yashwant, Singh H. Herbal drug delivery system: a modern era prospective. Int J Current Pharma Rev Res 2013;4:88-101.
2. Goli PP, Trimurtulu G, Reddy KN, Naidu ML. Standardization of an herbal preparation–V ṛ ddhadaruka mula cur ṇ a [Argyreia nervosa (Burm. f.) Boj.] root powder. Indian J Traditional Knowledge 2011;10:612-6.
3. Prasad SB, Sharma A. Standardisation of convolvulus pluricaulis choisy herbs collected from Jalandhar, Punjab. Int J Pharmacogn Phytochem Res 2016;8:1412-6.
4. Jain A, Choubey S, Singour PK, Rajak H, Pawar RS. Sida cordifolia (linn)-an overview. J Appl Pharm Sci 2011;1:23-31.
5. Anonymous. Quality control methods for medicinal plants materials. Geneva: World Health organization; 1998.
6. Kaur D, Prasad SB, Verma S. Formulation and evaluation gel from the extract of plumbago indica for acne. Int J Drug Delivery Technol 2016;6:95-8.
7. Anonymous. The ayurvedic pharmacopoeia of india part 1 volume 5. Ministry of Health and family welfare Government of India, Department of AYUSH; 2006. p. 2013-214.
8. Khandelwal KR. Practical pharmacognosy techniques and experiments. Pune: Nirali Prakashan; 2003.