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Pharmacognostical, phytochemical and High Performance Thin Layer Chromatography evaluation of *Bala Taila*

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ABSTRACT

Introduction: *Bala Taila* is one of the most popular oil preparations of Ayurveda which not only serves the purpose as curative but also plays role in preventive and promotive aspects. **Materials And Method:** *Bala Taila* was evaluated for pharmacognostic and pharmaceutical analysis. **Results and Discussion:** Pharmacognostic study showed the presence of contents such as simple trichome, pollen grain, rhomboidal crystals, annular and pitted vessels. Physico-chemical analysis showed that the loss on drying 0.735% w/w, Specific gravity 0.916g, Acid value 2.186, Saponification value 156.89, Iodine value 87.6 and Refractive index 1.4840. **Conclusion:** From the study, data developed can be espoused for laying down the standards of *Bala Taila.*

Key words: *Bala Taila, Pharmacognostic, Physicochemical analysis, HPTLC*

INTRODUCTION

Bala Taila[1] is one of the most popular oil preparations of Ayurveda which is mentioned under *Vatavyadhi. Bala* is said to be *Shreshta Rasayana, Vrishya, Balya, Stanyajanana* and *Ojovardhaka. Sida cordifolia* Linn. Commonly called as *Bala* is a perennial subshrub that belongs to the mallow family Malvaceae. *Bala* is mentioned under *Balya, Brimhaneeya* and *Prajasthapana Gana* by *Acharya Charaka* and *Sushrutacharya* mentioned it under *Vatasamshamana.*

The pharmacological and other biological effects of *Bala* (*Sida cordifolia*) have been extensively elucidated to include actions on the cardiovascular system, CNS, anti-inflammatory, analgesic effect, hypoglycemic effect, anti-pyretic, antiulcerogenic activity, antiHIV-1 activity, and hepatoprotection. In a recent animal study on rats, to investigate the action of ethanolic extract of *Sida cordifolia* root on quinolinic acid induced neurotoxicity, *Sida cordifolia* exhibited neuroprotective, anti-inflammatory and antioxidative effects comparable to the standard drug diphenyl. Quinolinic acid is an endogenous neurotoxin implicated in a number of neurological disorders and is used as an investigational tool.[2] Any plant, which is used medicinally, requires detailed study prior to its use because the therapeutic efficacy absolutely depends on the quality of the plant used. If the plant drugs are adulterated, then the quality of preparation cannot give the desirable results [3]. Pharmaceutics is the discipline of pharmacy which deals with the formulation of a pure drug substance into a dosage form. It is also called the science of dosage form design.

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OBJECTIVES

To analyze the pharmacognostic, physicochemical and HPTLC of *Bala Taila.*

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Materials and Methods

Collection and preparation of the drug

Whole plant of *Bala* was collected from the Pharmacy of ITRA, Jamnagar. The obtained drugs were shade dried. Drugs were made into coarse powder with the help of mechanical grinder. *Sookshma Choorna* was evaluated for pharmacognostic analysis. *Bala Taila* was prepared and analyzed for various pharmaceutical parameters. Ingredients of *Bala Taila* are summarized in Table 1.

Observation and Results

Organoleptic evaluation

Organoleptic characters of *Bala Choorna* in dry form were scientifically studied as shown in Table 2.

Microscopic characters

The microscopic characters of the powdered drug are analyzed under microscope showed various characteristics. The photo plates of the same are given in photo plate 1.

Analytical Study

1. **Loss on Drying:**[4] For determination of the loss on drying, 2 g. sample was taken in a previously dried and weighed dish and dried initially on a water bath and finally in an oven at 110°C temperature until constant weight was obtained. From the weights noted, loss on drying of the sample was calculated and expressed as % w/w. (Table 3)
2. **Specific gravity:**[5] The specific gravity of a liquid is the weight of a given volume of the liquid at 25^0C (Unless otherwise specified) compared with the weight of an equal volume of water at the same temperature, all weights being taken in air. A Pycnometer of 25 ml. capacity is cleaned, dried and weighed. It is filled up to the mark with water at the required temperature and weighed. The Pycnometer is next filled up to the mark with the sample, at the same temperature and weighed. The specific gravity is determined by dividing the weight at the sample in grams by the weight of the water, expressed in gram. (Table 3)

Specific gravity = weight of the object / Weight of water

3. **Acid value:**[6] Oil was dissolved in the neutral mixture of alcohol: ether (1:1). This mixture was titrated against 0.1mol/l. sodium hydroxide solution using phenolphthalein as an indicator. (Table 3)

Acid value= (v x 5.61)/ w

Where, v= number of ml of 0.1 NaOH required; w= weight of sample in g.

4. **Saponification value:**[7] It may be defined as number of milligrams of KOH required to saponify 1gm of fat or oil. It is calculated by refluxing a weighed amount (1-2 g) of the fat or oil with known excess of standard alcoholic caustic potash solution and back titrating the excess alkali with a standard acid. (Table 3)

Saponification value = (b-a) × 0.02804 × 100/w

5. **Iodine value:**[8] It may be defined as the number of grams of iodine taken up by 100gm of fat or oil. Iodine value of a fat or oil may be regarded as a measure of its degree of unsaturation and gives an idea of its drying character. (Table 3)

Iodine value = (a- b) x 1.27/w

Where a = reading for the blank experiment.

b =reading for actual experiment. w= weight of oil taken.

6. **Refractive index:**[9] The refractive index of a substance is the ratio of velocity of light in vacuum to its velocity in the substance. It varies with the wave-length of light used in the sine of the angle of incidence to the sine of angle of refraction. (Table 3)

Refractive index μ= sin i / sin r

7. **HPTLC:**[10] HPTLC is an automated form of TLC. It is an invaluable quality assessment tool for the evaluation of botanical materials. It allows for the analysis of a broad number of compounds both efficiently and cost effectively. Additionally, numerous samples can be run in a single analysis thereby dramatically reducing analytical time. (Table 4) (Plate 2)

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Discussion

The *Sookshma Choorna* of *Bala* under pharmacognostical evaluation showed their particular microscopic characters, which prove the purity and quality of the drugs. Simple trichome, pollen grain, parenchyma cells, annular and pitted vessels, rhomboidal crystals and stellate trichome are observed in the ingredients. The microscopic and macroscopic characteristics identified in dry powder form assisted in the authentication of the drugs. HPTLC results showed the presence of 3 spots at 254nm. and 1 spot at 366nm. *Bala* has been used in females for leucorrhoea which develops due to weakness in the body. One teaspoonful of fine *Sida cordifolia* powder prescribed twice daily provides the desired strength.[11] Kalaiarasan and John performed the phytochemical screening and antibacterial investigation of *Sida cordifolia* Linn. leaf extract. The ethanol and methanol extracts revealed the presence of alkaloids, glycosides, carbohydrates, flavonoids, phenols, saponins, and tannins. The results of the antibacterial activity studied using agar–disc diffusion method showed that both extracts inhibit the growth in selected organisms, i.e., Escherichia faecalis, Escherichia coli, Pseudomonas aeruginosa.[12]

Auddy *et al.* screened the antioxidant activity of three Indian medicinal plants; *Sida cordifolia, Cynodon dactylon, Evolvulus Alsinoides* traditionally used for the management of neurodegenerative diseases and found that water infusion and ethanolic extract of all the three *Rasayana* plants have antioxidant activity tested by two methods; 2,2'-azinobis-3-ethyl-benzothiazoline-6-sulfonic acid (ABTS+) radical cation decolorization assay and inhibition of lipid peroxidation of rat brain homogenate by plant infusions. All these plants were found to have significant antioxidant activity in all the above-mentioned tests.[13]

Conclusion

The analytical data generated here may be considered for the development of standard parameters for the formulation. Further studies may be carried out on it on the basis of observation made and results of experimental studies. This study may be beneficial for future researchers for the further quality control researches.

Table 1: Ingredients of *Bala Taila*

SN	Drug	Botanical source	Part used	Dosage
1.	*Bala Kalka*	*Sida cordifolia* Linn.	Whole plant	1 part
2.	*Bala Kwatha*	*Sida cordifolia* Linn.	Whole plant	16 parts
3.	*Tila Taila*	*Sesamum indicum* Linn.	Seed oil	4 parts

Table 2: Organoleptic Characters of *Bala Choorna*

SN	Character	Result
1.	Color	Light green
2.	Touch	Fine
3.	Odor	Characteristic
4.	Taste	Sweetish mucilaginous

Table 3: Physico-chemical Analysis of *Bala Taila*

SN	Parameters/ Sample	*Bala Taila*
1.	Loss on drying	0.735 % w/w
2.	Specific Gravity	0.916g at room temp.
3.	Acid value	2.186
4.	Saponification value	156.89
5.	Iodine value	87.6
6.	Refractive Index	1.4840

Table 4: Chromatographic results of *Bala Taila*

SN	Conditions	No. of Spots	Rf Values
1.	Short ultra violet (254nm.)	3 spots	0.04, 0.46, 0.76

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2.	Long ultra violet (366nm.)	1 spot	0.04

Plate 1: Microphotographs of *Bala Choorna*

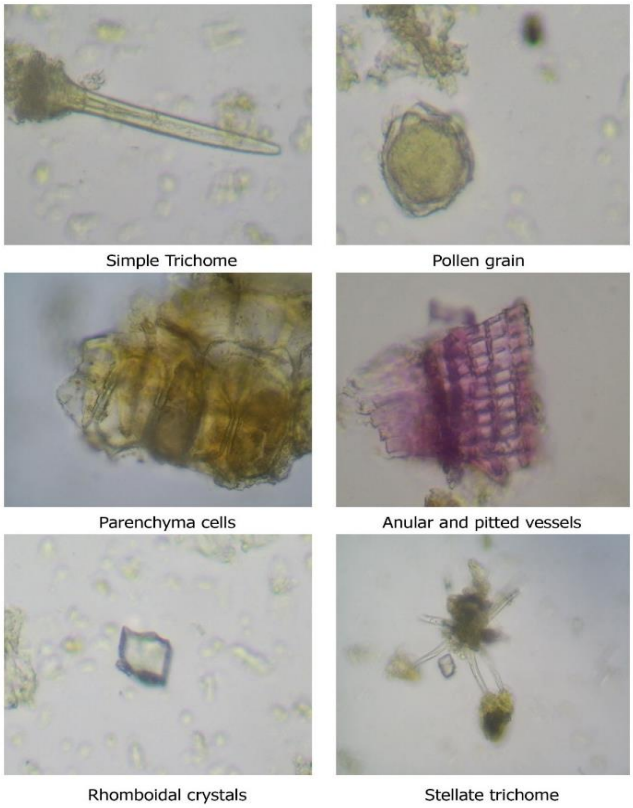
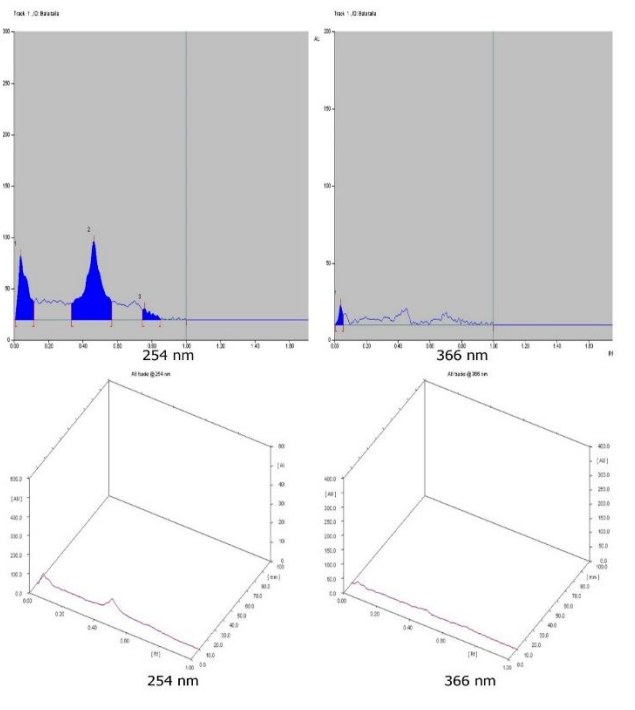


Plate 2: Densitogram and 3D Graph of *Bala Taila*



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