

**SCIENTIFIC EVALUATION OF LAVANGADI CURNA –A  
CLASSICAL AYURVEDIC COMPOUND FORMULATION**

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**ABSTRACT**

Ayurveda comprises of various types of medicines including asavas (fermented infusions), arishtas (fermented decoctions), Curnas (fine powder) and Kvatha curnas (coarse powder). These are regarded as valuable therapeutics due to their efficacy and desirable features. Identification and quality evaluation of crude drugs is a fundamental requirement of industry and other organizations dealing with natural health products. Thus, there is an urgent need to evaluate such parameters which can be adopted by the pharmaceutical industries. In

the present communication attempts have been made to standardize Lavangadi curna a classical Ayurvedic compound formulation which is used to treat Grahaṇi (malabsorption syndrome); atisāra (diarrhoea); āmātisara (diarrhoea due to indigestion); raktatisāra (diarrhoea with blood); sula (pain); sotha (inflammation) and formulated by twenty five ingredients viz. Lavanga (*Syzygium aromaticum* (Linn.) Merr. & M. Perry.- Flower bud), Tankaṇa (śuddhā), Musta (mustā) (*Cyperus rotundus* Linn.- Rhizome), Dhātakî (*Woodfordia fruticosa* Kurz.-Flower), Bilva (*Aegle marmelos* Corr.- Fruit pulp), Dhānyaka (*Coriandrum sativum* Linn.-Fruit), Sarjika (*Vateria indica* Linn.- Exd.), Jātiphala (*Myristica fragrans* Houtt.-Fruit), Śatāhvā (*Anethum sowa* Kurz.-Fruit), Dāḍima (*Punica granatum* Linn.-Fruit), Jīraka (śvetajīraka) (*Cuminum cyminum* Linn.-Fruit), Saindhava (Rock salt), Moca ( śālamalī) (*Salmalia malabarica* Schott & Endl.- Exd.), Nilotpala (utpala)( *Nymphaea stellata* Wild.-Flower), Rasānjana (dāruharidrā) ( *Berberis aristata* DC.- Exd.), Abhraka bhasma, Vanga bhasma, Samangā (lajjālu) (*Mimosa pudica* Linn.-Root), Rakta candana (*Pterocarpus santalinus* Linn. F. – Heart wood), Cavya (*Piper chaba* Hunter-Stem), Ativiṣā

(*Aconitum heterophyllum* Wall.-Root), Sṛṅgî (karkaṭaśṛṅgî) (*Pistacia integerrima* Burgo-Gl.), Khadira (*Acacia catechu* Wild.-Heart wood), Bālaka (hrîvera) (*Coleus vettiveroides* K.C. Jacos.-Root), Bhr̄ngarāja (svarasa) (*Eclipta alba* Husk-Whole plant). Three samples procured from different manufacturers were subjected to HPTLC fingerprinting and physicochemical analysis was done. Physicochemical parameters average value of total ash 13%, acid insoluble ash 4%, alcohol soluble extractive 14%, water soluble extractive 35%); *pH* (10 % aqueous solution): 5 to 6 and loss on drying at 105<sup>0</sup>c 7%. It was observed that the chromatographic analysis complements each other in their findings and can be used effectively for the identification of raw materials in the compound formulation.

**KEYWORD:** Lavangadi curna, Scientific evaluation, HPTLC fingerprints, Physicochemical analysis.

## INTRODUCTION

Ayurveda is a traditional Indian medicinal system being practiced for thousands of years. More than 1200 species of plant nearly 100 minerals and over 100 animal products comprise the Ayurvedic Pharmacopoeia. Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics of Ayurveda has been carried out and thereby numerous drugs have entered into the international pharmacopoeia.<sup>[1]</sup> Ayurvedic system of treatment has been estimated to meet 70-80% of the healthcare needs of India.<sup>[2]</sup> The study was undertaken to develop methods for evaluation of Lavangadi curna a classical Ayurvedic compound formulation which is formulated by twenty five single ingredients *viz.* . Lavanga (*Syzygium aromaticum* (Linn.) Merr. & M. Perry.- Flower bud), Tankaṇa (śuddhā), Musta (mustā) (*Cyperus rotundus* Linn.- Rhizome), Dhātakî (*Woodfordia fruticosa* Kurz.-Flower), Bilva (*Aegle marmelos* Corr.- Fruit pulp), Dhānyaka (*Coriandrum sativum* Linn.-Fruit), Sarjika (*Vateria indica* Linn.- Exd.), Jātiphala (*Myristica fragrans* Houtt.-Fruit), Śatāhvā (*Anethum sowa* Kurz.-Fruit), Dāḍima (*Punica granatum* Linn.-Fruit), Jīraka (śvetajīraka) (*Cuminum cyminum* Linn.-Fruit), Saindhava (Rock salt), Moca ( śālamalī) (*Salmalia malabarica* Schott & Endl.- Exd.), Nilotpala (utpala) (*Nymphaea stellata* Wild.-Flower), Rasānjana (dāruharidrā) (*Berberis aristata* DC.- Exd.), Abhraka bhasma, Vanga bhasma, Samangā (lajjālu) (*Mimosa pudica* Linn.-Root), Rakta candana (*Pterocarpus santalinus* Linn. F. – Heart wood), Cavya (*Piper chaba* Hunter-Stem), Ativiṣā (*Aconitum heterophyllum* Wall.-Root), Sṛṅgî (karkaṭaśṛṅgî) (*Pistacia integerrima* Burgo-Gl.), Khadira (*Acacia catechu* Wild.-Heart wood), Bālaka (hrîvera) (*Coleus vettiveroides* K.C. Jacos.-Root), Bhr̄ngarāja

(svarasa) (*Eclipta alba* Husk-Whole plant). The cūrna is formulated in house and Chitrakoot Rasshala Pharmacy, Chitrakoot, which is very effective in Grahaṇi (malabsorption syndrome); atisāra (diarrhoea); āmātsara (diarrhoea due to indigestion); raktatisāra (diarrhoea with blood); sula (pain); sotha (inflammation) and its ingredients also used to cure several diseases and preparation of ayurvedic compound formulations.<sup>[3,4]</sup> The cūrna was analysed following scientific parameters including organoleptic characters, macroscopic characterization, physico-chemical analysis and chromatographic patterns.

## MATERIALS AND METHODS

### Preparation of the kvatha curna

All the ingredients were used of pharmacopoeial quality.<sup>[5]</sup> Cleaned, washed, dried and ground the Lavanga, Musta, Dhataki, Bilva, Dhanyaka, Jatiphala, Satahva, Dadima, Jīraka, Moca, Nilotpala, Rasānjana (Dāruharidrā), Samangā, Bālaka, Rakta candana, Cavya, Ativiṣā, Sṛṅgī, Khadira individually, passed through 180 μm IS Sieve (old sieve number 85) to obtain coarse powder. Treated *Tankaṇa* for *sodhana* (purification), powdered and passed through 180 μm IS Sieve (sieve number 85). Cleaned Sarjika and Saindhava separately, roasted in a stainless steel pan on low flame till free from moisture and enough to pass through 180 μm IS Sieve (old sieve number 85). Treated Abhraka bhasma and Vanga bhasma for *śodhana*, weighed separately and mixed them equal proportions to ensure a homogenous mixture and passed through 355 μm IS Sieve (old sieve number 44). Soaked the powder in Bhr̥ngarāja svarasa (juice) in a ceramic vessel and dried under sunlight till the powder absorbs all the juice, this process repeated for three times. These were stored in airtight containers to protect from light and moisture. Two samples were prepared at research laboratory Ayurveda Sadan, Chitrakoot Batch-01 and Batch-02 where Batch-03 was prepared by Chitrakoot Rasshala Pharmacy, Chitrakoot.

### Physicochemical tests

Organoleptic characters, particle size and physico-chemical analysis of all the samples were carried out. Quantitative analysis for loss on drying at 105°C, alcohol soluble extractive, water soluble extractive, total ash, acid insoluble ash.<sup>[6,7]</sup>

### TLC profile

For HPTLC, 2gm of each sample was extracted with 25 ml of methanol on boiling water bath for 25 minutes consecutively of 3 times using fresh portion of 25 ml methanol, filtrate and concentrated. TLC of extracts of all the samples was carried out on Silica Gel 60 F<sub>254</sub>

precoated plates (0.2 mm thickness; from Merck India Limited Mumbai). An applicator from Camag Linomat-5 (Camag Switzerland 140443) was used for band application and photo documentation unit (Camag Reprostar-3: 140604) was used for documentation of chromatographic fingerprints. The mobile phase used *Toluene: Ethyl acetate (7:3)*. The plate was developed over a distance of 9 cm in a saturated development chamber (Twin trough chamber (10 x 10 cm with SS lid, and visualized under visible light, 254nm and 366nm. After spraying with 5% *Anisaldehyde - sulphuric acid* followed by heating at 110°C for 5-10 minute.<sup>[8,9]</sup>

## RESULT AND DISCUSSION

**Description:** Reddish brown colour, fine powder with a characteristic odour and astringent in taste. The powder completely passes through 355 IS Sieve (old sieve number 44) and not less than 50 percent passes through 180 IS Sieve (old sieve number 85).

**Physicochemical parameters:** Physicochemical tests were done and results are given in table -1 to 5

**Table 1: Physico-chemical parameters of Lavāngadi cūrna and its single ingredients**

Name of Curna	LOD (%)w/w	Total ash (% w/w)	AI ash (% w/w)	ASE (% w/w)	WSE (% w/w)
Lavāngadi cūrna (Batch 01)	6.00	12.36	3.56	14.60	35.37
Lavāngadi cūrna (Batch 02)	6.15	12.6	3.81	14.47	35.16
Lavāngadi cūrna (Batch 03)	6.19	12.36	3.43	14.60	35.18
Lavanga	3.23	5.36	0.66	14.16	9
Musta (mustā)	7.54	2.87	1.86	9.78	17.40
Dhātakî	6.95	8.04	0.85	6.29	32.55
Bilva	8.17	1.78	0.79	18.66	73.22
Sarjika	4.71	0.83	-	71.5	-
Dhānyaka	5.79	4.69	0.94	23.40	22.22
Jātiphala	4.86	1.94	0.38	18.26	9.09
Śatāhvā	4.34	7.84	0.88	8.08	5.57
Dādima	6.85	2.5	0.29	12.2	24.73
Jīraka (śveta jīraka)	8.98	6.26	0.65	17.46	31.79
Moca.( śālamalī)	11.22	8.75	1.53	4.53	12.75
Nilotpala (utpala)	6.71	7.18	1.85	7.82	16.99
Rasāñjana (dāruharidrā)	5.51	5.45	0.48	22.93	16.99
Samangā (lajjālu)	7.17	8.0	3.31	13.06	14.5
Rakta chandana	7.50	1.11	0.38	4.13	3.11

Cavya	5.78	4.92	0.84	8.97	17.54
Ativisā	6.31	1.84	0.63	8.92	29.82
Srngî (karkataśrṅgî)	6.67	4.66	0.18	33.19	32.53
Khadira	7.96	1.15	0.15	4.10	10.79
Bālaka (Hrîvera)	6.44	7.92	2.36	30.36	23.02

**Table 2: Physico-chemical test of *Sandhava Lavaṇa***

S.N.	Type of Salt	Physical property	Effect of Heat	Solubility	Assay
1.	Saindhava ( <i>Rock salt</i> )	Crystalline coarse grained aggregates, off white coloured, salty taste	On burning gives yellow sodium fumes. When heated through blowpipe, produces blue flame of chlorine	soluble in water	Sodium : 1629.0 ppm Potassium: 253.3 ppm

**Table 3 : Physico-chemical test of *Tankana***

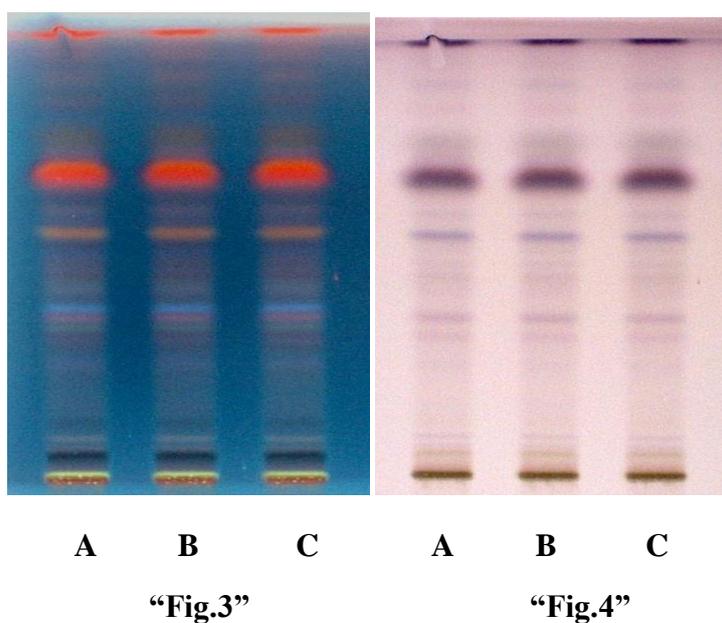
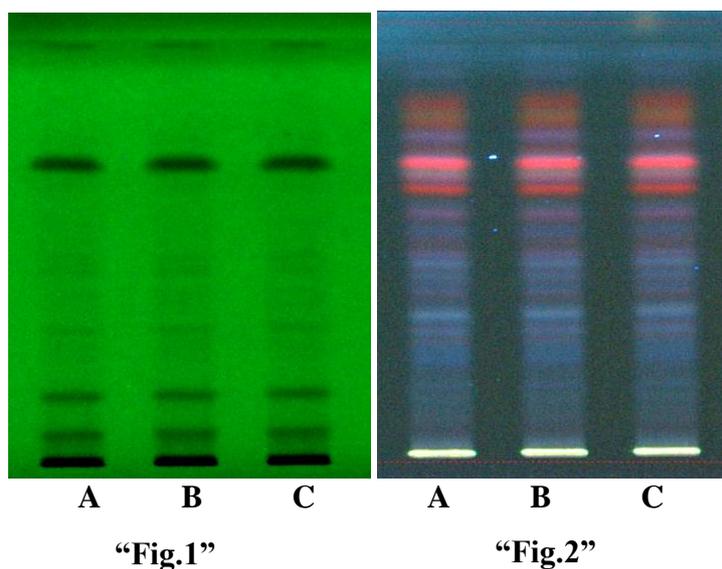
S.N.	Test	Results
1.	Colour	white
2.	Specific. gravity	1.68
3.	Effect of Heat	Gives yellow flame, and gives green flame when moistened with sulphuric acid and alcohol.
4.	Reaction with hydrochloric acid	Gives yellow colour solution in cold condition and dissolve completely on boiling.
5.	Reaction with Sulphuric acid	Gives colour less solution in cold condition and dissolve completely on boiling
6.	Solubility in water	Completely soluble in purified water.
7.	Assay: Boron Trioxide	41%
8.	Assay: Sodium	21%

**Table 4: Physico-chemical test of *Abhraka bhasma***

	Test	Result
1.	Description	Fine powder, reddish brown in colour , tasteless
2.	Identification	Yields the reaction Characteristic of silicates, calcium, Magnesium , Aluminium and iron
3.	Loss on drying at 110 °C	0.45 percent w/w
4.	Loss on ignition	Not more than 0.85 percent w/w
5.	Acid insoluble ash	38 to 45 percent w/w
6.	Assay for Iron	13 to 16 percent w/w

**Table 5: Physico-chemical test of *Vanga bhasma***

S.N.	Test	Result
1.	Description	A Fine yellowish grey and tasteless powder
2.	Identification	Yields the reaction Characteristic of tin
3.	Loss on drying at 110 °C	0.4 percent w/w
4.	Loss on ignition	0.8 percent w/w
5.	Acid insoluble ash	75 percent w/w
6.	Assay for Tin	64 to 72 percent w/w



**Abbreviation:** “Fig.1” 254nm before derivatization; “Fig.2” 366nm before derivatization; “Fig. 3” 366nm after derivatization; “Fig. 4” visible light after derivatization;

Track A- Batch 01; Track B-Batch 02; Track C-Batch 03

### Plate 1: HP TLC Finger prints of test solution of Lavāngadi cūrna

#### HPTLC finger print profile

HPTLC fingerprint profile of the formulations are depicted in (“Fig. 1-4”) indicates the presence of all the ingredients in proportional quantity in the formulations. This confirms the batch- to- batch consistency of the finished products. Development fingerprint profile would serve as a reference standard of the formulation. The TLC plate was examined under 254nm, 366nm, after derivatization 366nm and visible light. The  $R_f$  values and colours of the bands

obtained were recorded. It shows major spots at 254nm  $R_f$  0.08, 0.17, 0.67, 0.95 (all black). At 366nm  $R_f$  0.31, 0.45(both blue), 0.62 (pink), 0.68, 0.80 (both red). And after derivatization the plate shows major spots at 366nm  $R_f$  0.08(black), 0.11(brown), 0.36(green), 0.40(pink), 0.42(blue), 0.56(yellow), 0.69, 0.90(both red) and visible light  $R_f$  0.08, 0.11(both brown), 0.35(blue), 0.40(brown), 0.52(black), 0.66, 0.90 (both dark brown).

The physicochemical tests, have been established to identify and strength Lavangadi Cūrna. HPTLC finger print profile helps in identification of various ingredients present in the Lavangadi Curna thereby substantiating and authenticating of crude drug. These finding could be helpful in identification and authentication.

## CONCLUSION

Thus from ongoing observations it can be concluded that the distinguishing bands in the HPTLC profiles may be utilized as a marker parameters for monitoring the quality of the formulation. Hence the HPTLC fingerprint profiles and the physicochemical parameters may be used for standardization and quality evaluation of Lavangadi cūrna compound formulation. Spiking of the formulations with the different genuine ingredients further confirms the presence of individual components in them.

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