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RESEARCH ARTICLE

An Analytical Study to Ascertain the Safety of *Dashmooli Kwath* (Syrup)

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ABSTRACT

Introduction: Worldwide, respiratory problems pose a serious threat to public health. Asthma is among one of the most prevalent respiratory conditions. According to WHO estimates, 300 million people worldwide suffer with bronchial asthma at the moment. In India, the prevalence at age six to seven varies between 4 and 32%. According to its signs and symptoms, causation, prognosis, and treatment, *Tamaka Shwasa* is a disease entity in *Ayurveda* that is comparable to bronchial asthma in contemporary terminology. The use of bronchodilators, corticosteroids, and anticholinergics, which have long-term adverse effects and dose dependency, are among the modern therapeutic techniques for bronchial asthma. In the present scenario, one of the effective *Ayurvedic* formulations used for the present study was *Dashmooli Kwath (Syrup). Dashmooli kwath (syrup)* was prepared as per the *Ayurvedic* classics indicated in *Tamaka Shwasa* (Bronchial Asthma). *Dashmooli kwath* (syrup) reference was taken from the *Chakradatta* text book chapter *Hikka Shwasa* and prepared in *Nagarjuna Rasayanashala* of Post Graduate Institute of Ayurved, Jodhpur. **Aims and Objectives:** To analyze the organoleptic character, physiochemical parameters and TLC of *Dashmooli kwath* (syrup) *Dashmooli Kwath* (syrup). **Materials and Methods:** *Dashmooli Kwath* (syrup) formulations was evaluated. **Results and Discussion**: The analytical values of the formulation were under the normal values, which indicates that the formulation are standardized, safe and effective in the management of *Tamaka Shwasa* (Bronchial Asthma). **Conclusion**: On the basis of the present study it was concluded that *Dashmooli Kwath* (Syrup) was found safe in analytical study which was deployed in the treatment of *Tamaka Shwasa* in children.

Keywords: Analytical study, *Ayurvedic* formulation, *Dashmoola Kwath, Dashmooli* syrup

INTRODUCTION

An analytical study in the context of *Ayurvedic* formulations involves examining the composition, quality, and safety of the traditional medicines using modern scientific techniques. The aim is to bridge the gap between ancient knowledge and contemporary standards, ensuring that the formulations are both effective and safe for use. To conduct an analytical study of an *Ayurvedic* formulation, several steps can be followed to ensure the quality, safety, and efficacy of the formulation like raw material collection, preparation of formulation, organoleptic evaluation, phytochemical analysis, physiochemical analysis, heavy metal studies, and documentation and reporting.[1] Analytical study of *Dashmooli kwath* (syrup) was carried out under the clinical trial title "single arm open label prospective clinical study to evaluate the efficacy of *Dashmooli kwath* (syrup) and *Anuloma- Viloma Pranayam* in the management of bronchial asthma (*Tamaka Shwasa*) in children" registered on Clinical Trials Registry- India (CTRI) with registration no: CTRI/2023/06/053859. *Dashmooli kwath* (syrup), described in the *"Chakradatta"* under the "*Hikka Shwasa*" chapter 12th, was taken for trial.[2] This *Kwath* (syrup) primarily consists of *Shothaghna*

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herbs that are taken in equal amount, which is considered the preferred drug for respiratory system in *Ayurveda*.

Method of Preparation

Herbs of *Dashmooli Kwath* (syrup) (Table 1) were procured from local market which was identified by pharmacologist. After proper identification, all ingredients were clean and dried. After that, *Dashmooli Kwath* (syrup) was prepared under aseptic condition in pharmacy attached to University of Post Graduate Institute of Ayurveda for Research and Studies, Jodhpur, under the supervision of competent authority. During preparation of drug, all related SOP's was strictly followed. After the preparation of medicine, drug was stored in airtight container and labeled with the date of manufacturing and drug license number. Dose of *Dashmooli Kwath* (syrup) decided as per *Young* Formula (Adult dose of *Kwath* was considered during the calculation of dose as per *Acharya Sharangdhara*).

Objectives

- To analyze the physical, organoleptic character, physiochemical parameters of *Dashmooli kwath* (syrup)
- Formulation prepared by the classical method
- To standardize the parameters of *Dashmooli kwath* (syrup) formulation
- To validate the safety and efficacy of formulation in children.

MATERIALS AND METHODS

Parameters studied in *Dashmooli Kwath* (syrup) were taken from *Ayurveda* Pharmacopoeia of India published by the Government of India, Department of *Ayurveda, Yoga — Naturopathy, Unani, Siddha* and *Homeopathy*, New Delhi, served as the basic for the parameters used in the numerous investigations.

Analytical Study of *Dashmooli Kwath* (Syrup)

Place of work

Cultivator Phyto Lab Pvt. Ltd. Sonamukhi Nagar, Sangaria Fanta, Jodhpur. Sample Registration No.– CPL/O/24/09/01482/1. Sample sent to lab date and start of analysis- September 13, 2023 and completed on September 21, 2023 in 9 days.

Analytical Study was Done Under the Following Headings

1. Organoleptic characters
2. Physiochemical parameters
3. Chromatographic fingerprint – thin layer chromatography (TLC).

Organoleptic characters

Organoleptic characters refer to the sensory properties of a substance, which are evaluated using the senses (sight, smell, taste, touch, and hearing). This characters help in assessing the quality and authenticity of the product. These characters include appearance, odor, taste, texture, etc.

Physiochemical parameters

Physicochemical parameters refer to the physical and chemical characteristics of *Ayurvedic* formulations. These parameters are crucial for assessing the quality, consistency, and stability of the formulations. Parameters include pH value, refractive index, non-reducing sugar, reducing sugar, specific gravity (at 25°), and total solids.

Finger printing of Dashmooli kwath (syrup) by TLC

TLC is a widely used analytical technique in the assessment of physiochemical analysis. TLC is particularly useful for the standardization and quality control of *Ayurvedic* formulations, as it allows for the identification of multiple active constituents simultaneously. It is a relatively simple, cost-effective, and reliable method for ensuring the consistency and efficacy of *Ayurvedic* products.

Method of TLC

To perform TLC on syrup, these step were followed: About 2 g of the *Kwath* (syrup), the sample was mixed with a suitable solvent (e.g., methanol or ethanol) by shaking it for 30 min and the extract was filtered and concentrate in to a small volume.
A pre-coated silica gel TLC plate was taken; a baseline was drawn about 1 cm from the bottom of the plate using a pencil. Small spots of the concentrated extract were applied on the baseline using a capillary tube or micropipette and dried.
A suitable mobile phase (solvent system) was prepared in a TLC chamber (e.g., a mixture of chloroform and methanol) and after that TLC plate placed in the chamber, ensuring the baseline is above the solvent level. The chamber was covered and allowed the solvent to rise up the plate by capillary action until it reaches about 1 cm from the top. The plate was removed from the chamber and allowed to dry. Visualize the spots under ultraviolet (UV) light or by spraying with a suitable detecting reagent (e.g., iodine vapor or anisaldehyde-sulfuric acid). The distance traveled by each spot and the solvent front was measured. The Rf value was calculated for each spot using the formula: [3]

RESULTS AND DISCUSSION

Organoleptic Study

The organoleptic characters of *Dashmooli kwath* (syrup) are mentioned in Table 2. The Physiochemical parameters of formulation along with normal values are detailed in Table 3. TLC photo documentation of methanolic fraction of formulation is shown in Figure 1 and Rf values are detailed in Table 4. The physiochemical standards would serve as preliminary test for the standardization of the formulation. Tests such as pH value, refractive index, non-reducing sugar, reducing sugar, specific gravity at 25°C, and total solids results of TLC photo documentation, the unique Rf values, obtained under UV at 365 nm wavelength can be used as fingerprint to identify the polyherbal formulation of *Dashmooli kwath* (syrup).
Organoleptic characters of *Dashmooli kwath* (syrup) were normal, *Kwath* was in syrup form, having pleasant odor and normal color syrup was Reddish brown. Physiochemical factors of *Dashmooli kwath* (syrup) like pH were measured to prevent stomach discomfort, and the moisture content was measured to identify any weight gain brought on by moisture absorption. It was discovered that the value obtained fell within the acceptable range.

Physiochemical Study

pH value[4]

To determine the pH value of an *Ayurvedic Kwath* (syrup), 1 g of the *Ayurvedic Kwath* (syrup) dissolved in 100 mL of distilled water to prepare a 1% w/v solution with proper stir. The pH meter was calibrated using standard buffer solutions (usually pH 5.19) to ensure accurate readings. The electrode of the pH meter was rinsed with distilled water and

Table 1: Ingredients of *Dashmooli kwath* (syrup)

S. No.	Ingredients	Latin name	Part used	Quantity
1	*Shalparni*	*Desmodium gangeticum* DC	Whole plant	1 Part
2	*Prishniparni*	*Uraria picta* Disv.	Whole plant	1 Part
3	*Brihati*	*Solanum indicum* Linn.	Whole plant	1 Part
4	*Kantakari*	*Solanum surratence Burm.*f.	Whole plant	1 Part
5	*Gokshura*	*Tribulus terrestris* Linn.	Whole plant	1 Part
6	*Bilva*	*Aegle marmelos* Corr.	Root	1 Part
7	*Agnimantha*	*Clerodendrum phlomidis* Linn.	Root	1 Part
8	*Gambhari*	*Gmelina arborea* Linn.	Root	1 Part
9	*Shyonak*	*Oroxylum indicum* Vent.	Root	1 Part
10	*Patala*	*Stereospermum suaveolens* DC.	Root	1 Part
11	*Pushakar mool*	*Inula racemosa* Hook.f.	Root	1 Part

gently dried. The electrode was immersed into the prepared solution; after stabilization, the pH value displayed on pH meter.[5]

***Refractive index*[6]**

The refractive index of herbal oil was determined using a refractometer. The oil was ensured to be free from impurities and maintained at 20°C. The refractometer was calibrated with distilled water, adjusting at refractive index of 1.4121. A few drops of the herbal oil were placed on the prism, and the cover plate was closed to spread it evenly. The eyepiece was adjusted until the boundary line was sharp, and the refractive index was read from the scale. The recorded value indicated the purity and quality of the herbal oil.

***Non reducing sugar*[7]**

A 10% sodium hydroxide solution was prepared to neutralize the sample. The solution was then evaporated at 50°C until its volume was reduced by half. After cooling, clarifying and clearing solutions were added, mixed, and filtered. Hydrochloric acid was then poured into the filter, and the mixture was boiled for 2 min. After boiling, phenolphthalein was added, and the solution was neutralized with sodium hydroxide. Titration was performed, and the solution was transferred to a volumetric flask. Finally, the total sugar content was calculated. Subtract the percentage of the reducing sugar from the sugar to obtain non-reducing sugar value in syrup was found 35.40%.

Table 2: Organoleptic characters of *Dashmooli Kwath (syrup)*

S. No.	Organoleptic characters	*Dashmooli Kwath (syrup)*
1	Appearance	*Kwath* (syrup)
2	Color	Reddish brown
3	Odor	pleasant

***Reducing sugar*[7]**

The Benedict's test was performed to detect reducing sugars in *Dashmooli kwath* (syrup). A small amount of syrup was dissolved in boiling water mixed with benedict's reagent and heated in a boiling water bath for 2–5 min, the solution changed from blue to green, yellow, orange, or brick-red, depending on the concentration of reducing sugar. The observed color change confirmed their presence in the *Dashmooli kwath* (syrup) and reduced sugar value was 5.93%.

***Specific gravity at 25°C*[4]**

The specific gravity of the syrup at 25°C was determined using a hydrometer. The hydrometer

Table 3: Physiochemical parameters assessed in *Dashmooli Kwath* (syrup)

S. No.	Test parameter (s)	Unit	Result	Test method
Discipline chemical			**Product group AYUSH products**	
		Physiochemical		
1	pH value	-	5.19	API Part II Vol: II 2008
2	Refractive index	-	1.4121	API Part II Vol: II 2008
3	Non reducing sugar	%	35.40	API Part II Vol: II 2008
4	Reducing sugar	%	5.93	API Part II Vol: II 2008
5	Specific gravity (at 25°)	-	1.2561	API Part II Vol: II 2008
6	Total solids	%	3.47	API Part II Vol IV: 2017

Table 4: TLC values of *Dashmooli Kwath* (syrup)

Test parameter (s)	Unit	Rf values	Test method
Discipline: Chemical		**Product group: AYUSH products**	
		Physiochemical	
Dashmooli kwath (syrup)			
Thin-layer chromatography	-	0.188, 0.225, 0.275 and 0.475	API Part II Vol IV: 2017
Viscosity	mPas	12.2	CPL/STP/60
Total sugar	%	41.33	CPL/STP/02

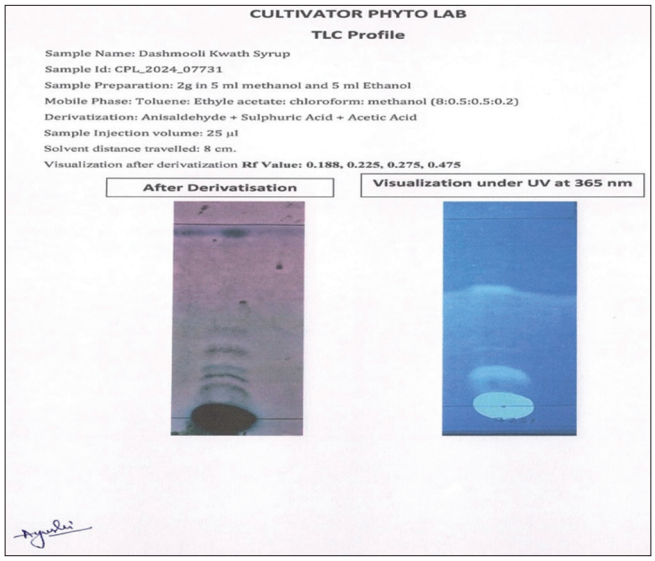

Figure 1: Report of thin layer chromatography of *Dashmooli kwath* (syrup)

was first cleaned and calibrated at 25°C. A clean, dry hydrometer cylinder was then filled with the syrup sample. The hydrometer was gently lowered into the syrup, ensuring it floated freely without touching the sides of the cylinder. The reading was taken at the point where the surface of the syrup intersected the scale on the hydrometer, providing the specific gravity of the syrup at 25°C was observed 1.2561.

***Total solids*[8]**

The total solids in the syrup were determined using a refractometer to measure the Brix value. The refractometer was first cleaned and calibrated according to the manufacturer's instructions. A few drops of the syrup were placed on the glass surface of the refractometer. The cover plate was closed, and the reading was taken by looking through the eyepiece towards a light source. The Brix value was identified at the point where the shadow line intersected the scale. About 3.47% value was represented the percentage of total soluble solids in the syrup.

TLC Study

Finding in TLC study after derivatization and visualization under UV is shown in Figure 1. TLC was done under the visualization of UV rays at 365 nm in which 2 g solution was mixed with 10 mL ethanol and the distance traveled by solvent is 8 cm with values of 0.188, 0.225, 0.275, and 0.475 which lies under normal range.

***Viscosity*[9]**

The viscosity of the syrup was measured using a rotational viscometer. The viscometer was first cleaned and calibrated as per guidelines. The syrup sample was then poured into the viscometer's sample chamber. The spindle was carefully inserted into the syrup. The viscometer was turned on, allowing the spindle to rotate while measuring the torque required for rotation. This measurement was used to calculate the viscosity of the syrup. In this analytical study, the viscosity value was 12.2 mPas recorded.

***Total sugar*[10]**

The total sugar content in *Dashmooli kwath* (syrup) was determined using a refractometer to measure the Brix value. The refractometer was first cleaned and calibrated according to the manufacturer's instructions. A few drops of the syrup were placed on the glass surface of the refractometer. The cover plate was then closed, and the reading was taken by looking through the eyepiece toward a light source. A scale with a shadow line appeared, and the Brix value was identified at the point where the shadow line intersected the scale. This recorded Brix value represented the percentage of total soluble solids in the syrup, primarily indicating its sugar content. Total sugar value was 41.33% in *Dashmooli kwath* (syrup).

CONCLUSION

Only a small number of *Ayurvedic* formulas have been standardized to date, despite the use of contemporary technologies. Enough information was obtained for accurate identification using the present standardization process. The development of analytical methods can be used as a specialized tool in the study of herbal drugs, enabling producers to establish quality requirements and standards to apply for regulatory bodies' marketing approval for the medicinal effectiveness, safety, and shelf life of herbal medications. It goes without saying

that the goal of standardizing medicinal herbs is to guarantee their effectiveness. Thus, it is crucial to preserve the quality of these plant-based goods. The results of *Dashmooli kwath* (syrup) analysis revealed specific identities which will be useful in preparation and identification of the formulation. The method of preparation of *Dashmooli kwath* (syrup) and analytical data mentioned in Table 3 is important findings for evaluation of quality control parameters for polyherbal *Ayurvedic* formulations.

REFERENCES

1. Shah S, Patil S. Pharmacognostical and analytical study of Ayurvedic formulation: Gandhak Vati. J Emerg Technol Innov Res 2019;6:942-949.
2. Tripathi I. Chakradatta, Hikka Shwasa. 8th ed. Varanasi: Chaukhambha Sanskrit Bhawana; 2022. p. 12.
3. Available from: https://www.chemistnotes.com/biochemistry/iodine-value-definition-principle-procedure-formula-and-2-reliable-applications [Last accessed on 2024 Dec 06].
4. The Controller of Publications Civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2008. p. 213.
5. Deshmukh AA, Bari PR, Ahire SS, Ahire SK. Preparation and standardization of an ayurvedic herbal Avaleha. Int J Creat Res Thoughts 2024;12:360-363.
6. The Controller of Publications Civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2008. p. 212.
7. The Controller of Publications Civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2008. p. 265.
8. The Controller of Publications civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2017. p. 221.
9. The Controller of Publications Civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2008. p. 220.
10. The Controller of Publications Civil Lines. The Ayurvedic Pharmacopoeia of India. Part 2., 1st ed., Vol. 2. Delhi: The Controller of Publications Civil Lines; 2008. p. 264.