Advances in Bioresearch
Adv. Biores., Vol 16 (6) November 2025: 274-281
©2025 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr.html
CODEN: ABRDC3
DOI: 10.15515/abr.0976-4585.16.6.274281

Advances in Bioresearch

SHORT COMMUNICATION

Phytochemical Profiling and Therapeutic Evaluation of Dashmoola Taila: A High-Performance Thin-Layer Chromatography (HPTLC) Approach

Kashyap K. Patel*, Aswin Haridas, Akhi Radhakrishnan and Dhairyjeetsinh Gohil
Department of Shalya Tantra, Parul Institute of Ayurved, Parul University Vadodara.
Corresponding Author: Kashyap K. Patel,
Email ID: patelkashyapguj@gmail.com

ABSTRACT
Dashmoola Taila is a classical Ayurvedic formulation referenced from the Bhaishajya Ratnavali. It is a key therapeutic preparation primarily used for managing vitiated Vata Dosha, which plays a pivotal role in maintaining proper physiological functions of the body. In this study, Dashmoola Taila was prepared following the guidelines prescribed in the Indian Pharmacopoeia at the pharmacy. The formulation was analyzed using High-Performance Thin-Layer Chromatography (HPTLC), an analytical technique for identifying, quantifying, and fingerprinting chemical constituents. This article presents a comprehensive HPTLC analysis of Dashmoola Taila, highlighting its phytoconstituents, retention factor (Rf) values, and potential therapeutic applications. The findings provide critical insights into the chemical profile of Dashmoola Taila, ensuring its quality, efficacy, and consistency for clinical use. The study also includes organoleptic and phytochemical analyses to better understand the efficacy of the formulation based on its components. This approach contributes to understanding the formulation's mode of action for its intended therapeutic indications.
Keywords: *Dashmoola Taila, Vata Dosha, HPTLC, Quality assurance, Therapeutic efficacy, Phytochemical analysis.*

Received 24.09.2025 Revised 09.10.2025 Accepted 23.11.2025

How to cite this article:
Kashyap K. Patel, Aswin Haridas, Akhi Radhakrishnan and Dhairyjeetsinh Gohil. Phytochemical Profiling and Therapeutic Evaluation of Dashmoola Taila: A High-Performance Thin-Layer Chromatography (HPTLC) Approach. Adv. Biores. Vol 16 [6] November 2025. 274-281

INTRODUCTION

Dashmoola Taila, a renowned classical Ayurvedic formulation, is referenced in the Bhaishajya Ratnavali and is extensively used for managing disorders associated with vitiated Vata Dosha [1]. In Ayurveda, Vata is considered a fundamental dosha responsible for regulating various physiological functions, including movement, communication, and nervous system activity. An imbalance in Vata leads to a wide array of ailments, and Dashmoola Taila is traditionally employed to restore this balance. This formulation is prepared using Dashmoola, a synergistic combination of ten medicinal roots: Bilva, Agnimantha, Shyonaka, Patala, Gambhari, Brihati, Kantakari, Shalaparni, Prishniparni, and Gokshura, blended with sesame oil (Tila Taila). The unique composition imparts therapeutic properties such as anti-inflammatory, analgesic, and neuroprotective effects, making it a versatile remedy in Ayurvedic clinical practice. High-Performance Thin-Layer Chromatography (HPTLC) has emerged as a reliable analytical tool, enabling the identification, quantification, and fingerprinting of the formulation's phytoconstituents. By analyzing the chemical profile of Dashmoola Taila, HPTLC ensures that the formulation meets established standards, thus enhancing its credibility and acceptance in modern medicine. This study presents a detailed HPTLC analysis of Dashmoola Taila prepared according to the guidelines of the Indian Pharmacopoeia.

MATERIAL AND METHODS

Drug review

दशमूलक्काथकल्कैस्तैलप्रस्थं विपाचयेत् ।
चतुर्गुणं पयो दत्त्वा शनैर्मृद्वग्निना भिषक् || 8 1 ||
शिरो वात सूर्या दशमदशमूलमिति ख्यातं शोथं हन्ति सुदारुणम् ।
नस्येनाकालपलितं ज्वरारोचकनाशनम् । अभ्यङ्गेनैव सर्वज्ञ शिरःशूलं विनाशयेत् || 8 2 ||
- Bhaishajya Ratnavali 65/81-82

Table 1: Ingredients and Quantities for the Preparation of 10 Liters of Dashmoola Taila

S. No.	*Ingredient*	*Quantity*	*Purpose*
1	Sesame Oil (*Tila Taila*)	10 liters	Base oil for the formulation
2	Dashmoola Roots (*Brihati, Kantakari, Shalaparni, Prishniparni, Gokshura, Bilva, Agnimantha, Gambhari, Shyonaka, Patala*)	2 kg (200 g each)	Medicinal herbs for the decoction and paste
3	Water (*Jala*)	40 liters	For preparing the decoction (*Kwatha*)
4	Cow's Milk (*Dugdha*)	40 liters	Enhances the extraction and therapeutic effect
5	Herbal Paste (*Kalka*)	1 kg	Herbal residue for infusion in oil

Stepwise Detailed Method for the Preparation of 10 Liters of Dashmoola Taila

Step 1: Collection and Authentication of Raw Drugs

1. **Selection of Ingredients:** The roots of the following ten herbs from the Dashmoola group were collected: Brihati **(***Solanum indicum*), Kantakari **(***Solanum xanthocarpum*), Shalaparni (*Desmodium gangeticum*), Prishniparni (*Uraria picta*)**,** Gokshura (*Tribulus terrestris*)**,** Bilva (*Aegle marmelos*), Agnimantha (*Clerodendrum phlomidis*), Gambhari **(***Gmelina arborea*)**,** Shyonaka (*Oroxylum indicum*), and Patala **(***Stereospermum suaveolens*). A quantity of 200 g of each herb root was used, making a total of 2 kg.
2. **Authentication:** The herbs were authenticated for quality, identity, and absence of contamination as per Ayurvedic pharmacopoeial standards.

Step 2: Cleaning and Processing of Raw Drugs

1. **Cleaning:** The roots were thoroughly washed with clean water to remove dirt, mud, and other impurities. They were dried in a shaded area for 2–3 days to prevent the loss of active constituents.
2. **Cutting and Crushing:** The dried roots were chopped into small pieces and crushed coarsely to facilitate decoction preparation.

Step 3: Preparation of Dashmoola Kwatha (Decoction)

1. **Measurement:** Two kilograms of coarsely powdered Dashmoola roots were taken, and 40 liters of water (Chaturguna Jala, equivalent to four times the weight of the herbs) were added.
2. **Decoction Process:** The mixture was boiled over a mild flame (***Mridvagni***) until the water volume reduced to 10 liters, which is one-fourth of the original volume, while being stirred occasionally to prevent the herbs from sticking to the bottom.
3. **Filtration:** The prepared decoction was filtered through a clean muslin cloth to remove solid residues. The filtered liquid was the Dashmoola Kwatha.

Step 4: Preparation of Dashmoola Kalka (Herbal Paste): 1 kilogram of coarse powdered Dashmoola roots was taken, and sufficient water was added to form a thick paste (Kalka), ensuring a smooth and uniform consistency.

Step 5: Preparation of Dashmoola Taila

1. **Base Oil Selection:**10 liters of Sesame Oil (Tila Taila) were taken.
2. **Mixing of Ingredients:** In a suitable vessel, the following ingredients were added: 10 liters of Dashmoola Kwatha (prepared in Step 3), 1 kilogram of Dashmoola Kalka (prepared in Step 4), and 40 liters of cow's milk (***Chaturguna Dugdha***, equivalent to four times the quantity of oil).
3. **Boiling Process:** The mixture was heated over a mild flame (*Mridvagni*) while being stirred continuously to prevent the *Kalka* from sticking or burning. The heating process continued until all the water content evaporated, leaving behind oil infused with the herbal extracts.
4. **Testing for Completion:** The following *Sneha Siddhi Lakshana* tests were performed to ensure the completion of the process: a drop of oil did not splatter when heated, the *Kalka* formed a compact, non-sticky ball, and the characteristic aroma of *Dashmoola Taila* was evident.

Step 6: Filtration: While still warm, the oil was filtered through a clean muslin or cotton cloth. The solid residues were discarded, and the clear, filtered oil was retained.
Step 7: Cooling: The oil was allowed to cool naturally to room temperature in a clean, dust-free area.
Step 8: Storage

1. **Container Selection:** The oil was stored in sterilized, airtight glass or stainless-steel containers.
2. **Labeling:** The containers were labeled with the formulation name (Dashmoola Taila), preparation date, batch number, and storage instructions.
3. **Storage Conditions:** The containers were stored in a cool, dry place, away from sunlight and moisture.

Step 9: Quality Control and Testing

1. **Phytochemical Analysis:** HPTLC analysis was performed to confirm the presence of key phytoconstituents for quality assurance.
2. **Organoleptic Characteristics**

Table 2: Organoleptic Characteristics

Color	Brownish orange
Odor	Aromatic
Consistency	Liquid (Oil form)

3. Physico-Chemical Parameters

Table 3 : Physico-Chemical Parameters

	SAMPLE	
Sr. No	**PARAMETRE**	**Value**
1.	Loss on Drying at 110 c(%w/w)	0.009
2.	Total Ash Value (%w/w)	0.0499
3.	P^H Value	4.3
4.	Specific gravity	0.9271
5.	Refractive index	1.4560
6.	Acid Value	3.366
7	Saponification value	98.175
8	Unsaponification value	16.763

High performance thin layer chromatography

The HPTLC analysis for the Methanol extract of Dashamoola Taila and Unsaponifiable matter of Dashamoola Taila at concentrations10.0µL and 15.0µL was carried out. The Chromatography was performed on 10 × 10 cm thin layer chromatography (TLC) plates coated with 0.2 mm layers of silica gel F254 (Merck). The samples were applied to the plate as 6 mm wide bands by means of a Linomat 5 sample applicator (CAMAG, Switzerland). The plate was developed to a distance of 8.0 cm with Toluene: Diethyl ether: Methanol (7:1.5:1.5 v/v/v) as mobile phase in a CAMAG twin-trough chamber saturated with mobile phase vapor. The plate was then dried and scanned after derivatisation at 254 nm and 366 nm by use of a CAMAG TLC scanner 3 using win CATS 4 software (CAMAG, Switzerland).

Figures 1,2,3,4,5 and 6 shows the Chromatograms of Dashamoola Taila and Unsaponifiable matter of Dashamoola Taila at concentrations10.0µL and 15.0µL under UV 254 nm and UV 366 nm using (Toluene: Diethyl ether: Methanol (7:1.5:1.5 v/v/v)) and Table 1 and 2 gives the Rf values of Dashamoola Taila and Unsapponifiable matter of Dashamoola Taila.

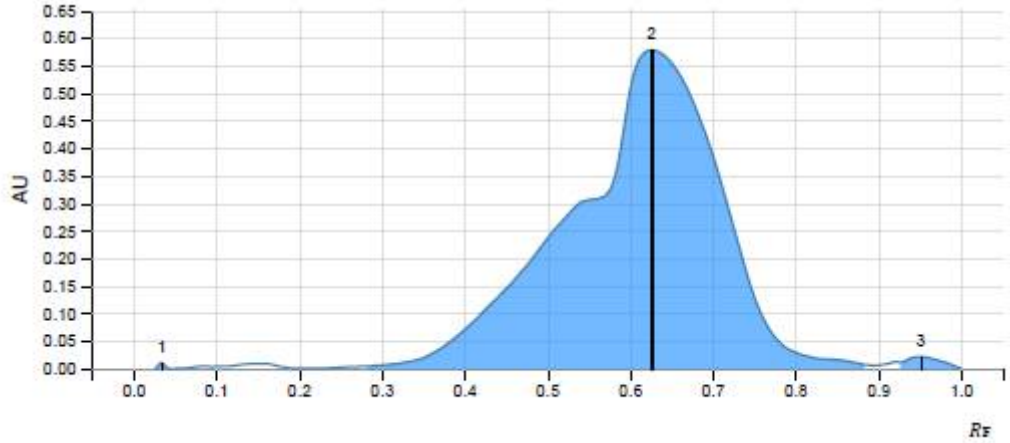

Figure 1: Chromatogram of Dashamoola Taila at concentration10.0 µL under 254 nm

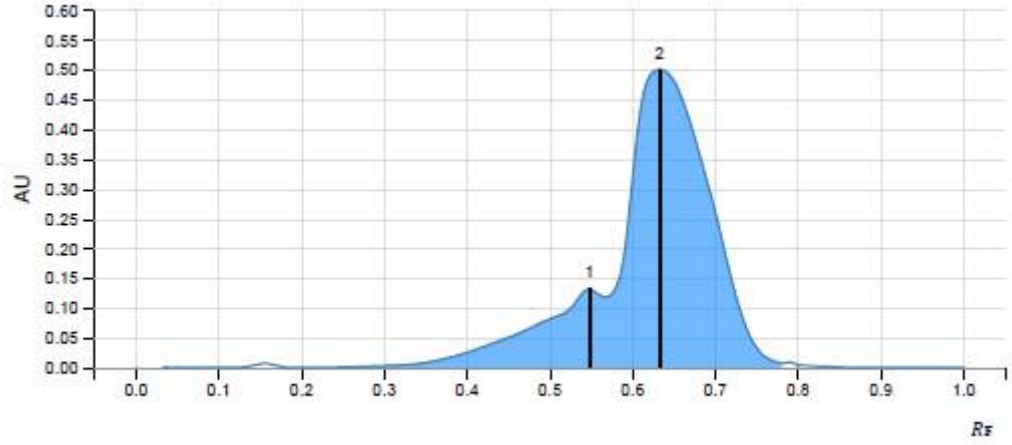

Figure 2: Chromatogram of Dashamoola Taila at concentration 10.0 µL under 366 nm

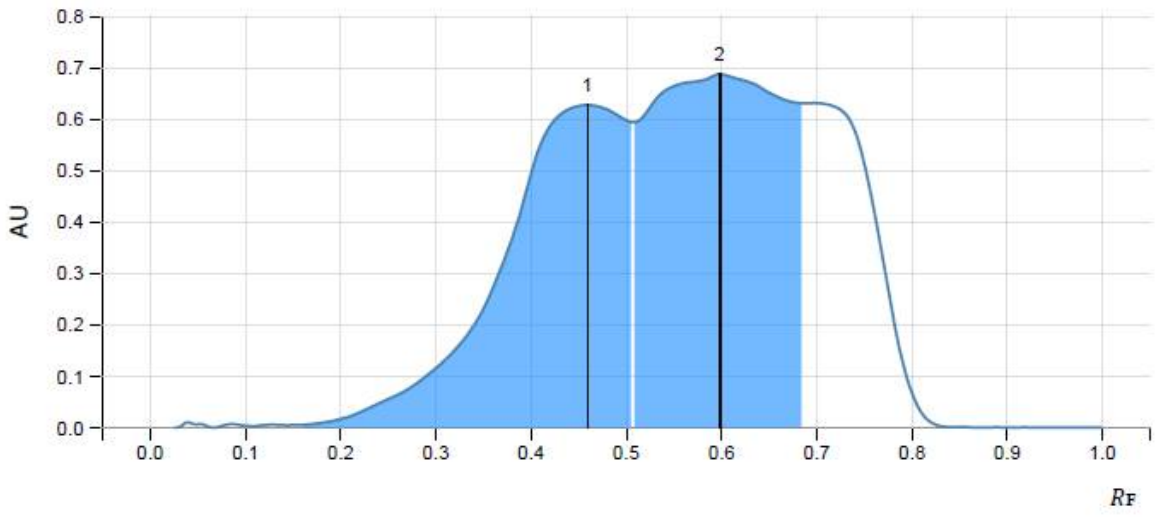

Figure 3: Chromatogram of Unsaponifiable matter of Dashamoola Taila at concentration10.0 µL under 254 nm

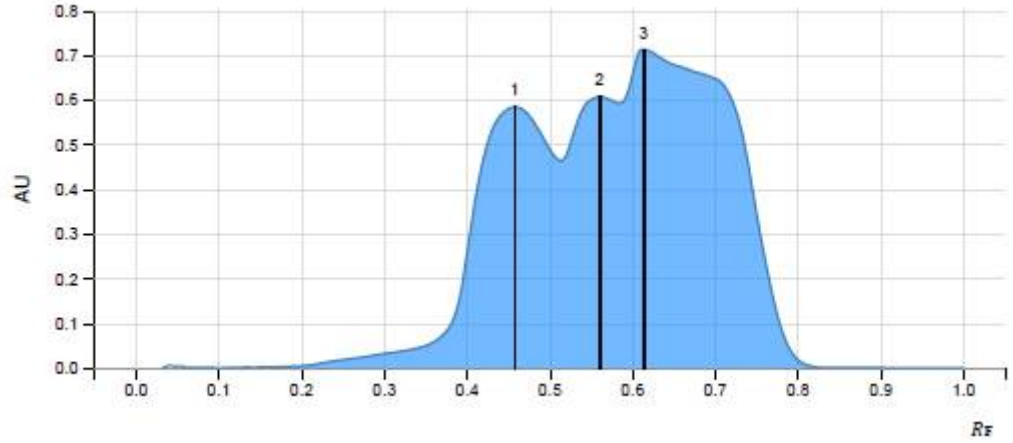

Figure 4: Chromatogram of Unsaponifiable matter of Dashamoola Taila at concentration10.0 µL under 366 nm

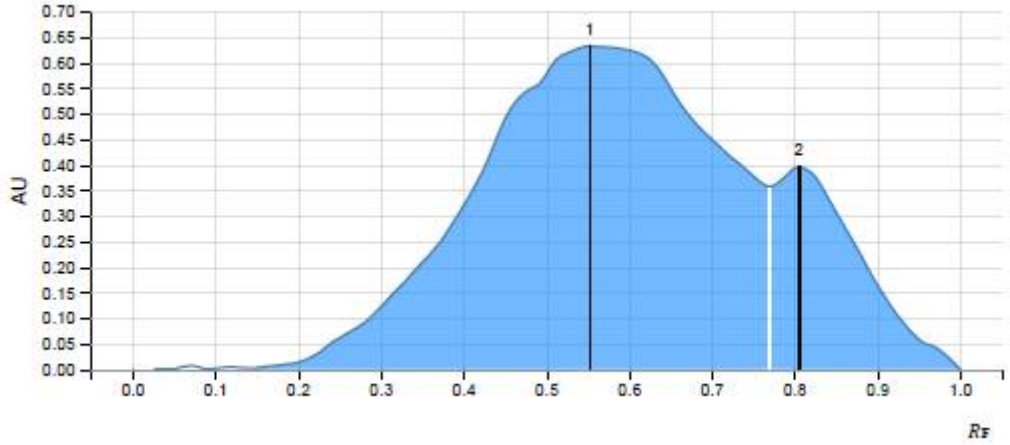

Figure 5: Chromatogram of Unsaponifiable matter of Dashamoola Taila at concentration 15.0 µL under 254 nm

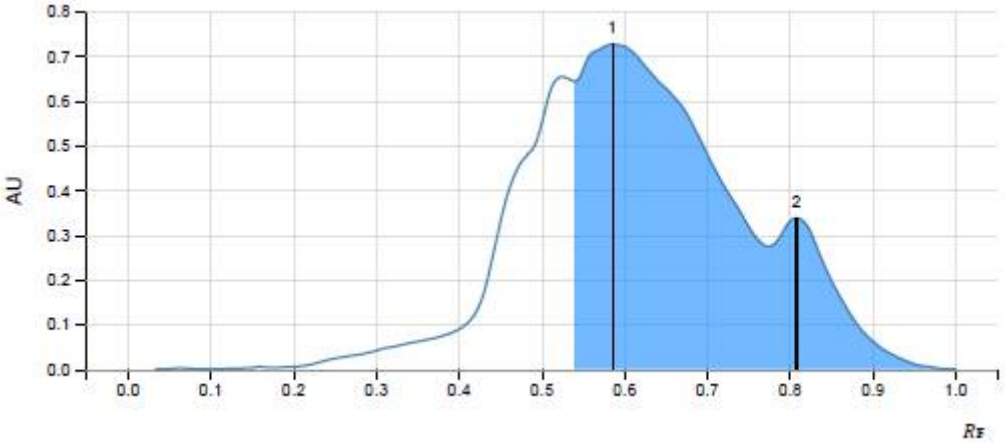

Figure 6: Chromatogram of Unsaponifiable matter of Dashamoola Taila at concentration15.0 µL under 366 nm

Table 4: Rf values for Dashamoola Taila at 10.0 µL concentration

Sl. No.	254 nm		366 nm	
	Rf value	Area%	Rf value	Area%
1	0.043	0.07	0.567	19.68
2	0.896	99.05	0.782	80.32
3	1.000	0.88	-	-

Table 5: Rf values for Unsaponifiable matter of Dashamoola Taila at10.0µL and 15.0µL concentration

Concentration	10.0 µL				15.0 Ml			
Visualisation	254 nm		366 nm		254 nm		366 nm	
Sl. No.	Rf value	Area%	Rf value	Area%	Rf value	Area%	Rf value	Area%
1	0.507	44.89	0.512	30.20	0.769	82.02	0.774	81.23
2	0.688	55.11	0.583	18.04	1.000	17.98	0.993	18.77
3	-	-	0.839	15.76	-	-	-	-

Less number of peaks have been observed in the HPTLC Chromatograms of the samples. This might be because of the solvent system. A better solvent system can be tried for in future for HPTLC analysis of the product in order to elucidate a greater number of spots and phytochemicals. The difference in concentrations of the sample has not affected the analysis and results of the HPTLC analysis of the product with special reference to number of spots.

Table 6: Probable compounds present in the formulation

Rf value	Phytochemical	Pharmacological activity
0.51	p-coumaric acid [2]	antimicrobial activities, antioxidant and anti-inflammatory [3]
0.58	Stigmaterol [4]	anticancer, anti-osteoarthritis, anti-inflammatory, anti-diabetic, immunomodulatory, antiparasitic, antifungal, antibacterial, antioxidant, and neuroprotective properties [5]
0.78	Vitexin [6]	anti-oxidant, anti-cancer, anti-inflammatory, anti-hyperalgesic, and neuroprotective effects [7]
0.97±0.02	Quercitin [8]	anti-cancer, anti-oxidant, anti-inflammatory, anti-cardiovascular, anti-aging, and neuroprotective activities [9]
0.88	(4Z,12Z)-cyclopentadeca-4, 12-dienone [10]	Potent antidiabetic compound [10]

RESULTS

The HPTLC analysis revealed distinct spots, each corresponding to specific phytoconstituents present in the Dashmoola Taila. The identified Rf values and the likely phytoconstituents associated with each are summarized below:

Table 7: Rf Values and Corresponding Phytoconstituents

Rf Value	Likely Phytoconstituent	Plant Source in Dashmool
0.549	Flavonoid (rutin[11], quercetin, oroxylin A, daidzein) or Tannin	Bilva, Shyonaka, Patala
0.633	Steroid	Gambhari, Patala
0.035	Alkaloid (marmin, stereospermine, solanine, solasodine)	Brihati, Kantakari
0.626	Saponin (protodioscin)	Gokshura, Shalaparni
0.951	Terpenoid	Bilva, Agnimantha
0.599	Saponin (protodioscin)	Gokshura
0.533	Flavonoid (rutin, quercetin) or Tannin	Shyonaka, Gokshura
0.806	Steroid	Gambhari, Patala
0.458	Alkaloid or Tannin	Brihati, Kantakari
0.561	Flavonoid (rutin, quercetin) or Tannin	Shyonaka, Patala
0.614	Saponin (protodioscin)	Gokshura, Shalaparni

VISUALIZATION

The spots observed under UV light at 254 nm and 366 nm indicate the presence of multiple phytoconstituents in the Dashmoola Taila. The visualization highlights prominent chemical compounds that contribute to the formulation's medicinal properties [7].

The HPTLC analysis of Dashmoola Taila revealed the presence of several bioactive compounds, identified through their respective retention factors (Rf) under UV light at 254 nm and 366 nm. The notable findings are as follows:

1. **Rf 0.51**: p-Coumaric acid, known for its antimicrobial and anti-inflammatory properties.
2. **Rf 0.58**: Stigmaterol, a compound with neuroprotective, anti-inflammatory, and anti-diabetic effects.
3. **Rf 0.78**: Vitexin, a flavonoid with significant anti-inflammatory, antioxidant, and neuroprotective activities.
4. **Rf 0.97 ± 0.02**: Quercetin, a well-known antioxidant and anti-inflammatory compound.

These results confirm the presence of therapeutically potent phytochemicals that align with the formulation's intended use in traditional medicine.

DISCUSSION

The therapeutic efficacy of Dashmoola Taila can be attributed to its phytochemical constituents, which target a variety of pathological conditions.

1. **p-Coumaric Acid:** exhibits significant anti-inflammatory and antimicrobial properties by modulating inflammatory mediators and reducing microbial load, making it helpful in managing skin infections, inflammatory skin conditions, and wound healing.
2. **Stigmaterol:** acts as a neuroprotective agent by stabilizing neuronal membranes and reducing oxidative stress. It also improves glucose metabolism, contributing to its anti-diabetic effect, and is beneficial in neurological disorders such as sciatica and neuropathies, as well as arthritis and metabolic syndromes.
3. **Vitexin:** demonstrates neuroprotective and antioxidant effects by scavenging free radicals, reducing oxidative stress, and inhibiting pro-inflammatory cytokines, making it effective in managing degenerative diseases such as Alzheimer's and Parkinson's, as well as chronic inflammatory conditions.
4. **Quercetin:** is a potent antioxidant that reduces oxidative stress and inflammation by inhibiting NF-κB pathways. It supports vascular health and immune modulation, making it beneficial for chronic inflammatory diseases like rheumatoid arthritis, cardiovascular disorders, and liver protection.

Implications of Findings: The synergistic action of these bioactive compounds makes Dashmoola Taila highly effective in managing Vata disorders, particularly in neurological, musculoskeletal, and inflammatory conditions. The oil-based formulation ensures deeper tissue penetration, enhancing bioavailability and therapeutic efficacy.

CONCLUSION

The HPTLC analysis of Dashmoola Taila validates its traditional use in Ayurveda and highlights its chemical composition as the basis for its therapeutic potential. Key bioactive compounds, such as p-Coumaric acid, Stigmaterol, Vitexin, and Quercetin, contribute to its efficacy in addressing inflammatory, neurological, and degenerative diseases.

Future research should focus on exploring its molecular mechanisms and clinical efficacy through advanced analytical techniques and clinical trials. This study underscores the relevance of integrating traditional formulations with modern science to expand their therapeutic applications.

Conflicts of interest: There are no conflicts of interest.

Acknowledgement: I gratefully acknowledge the financial support provided for this research under Parul University's Intramural Research (IMR) scheme. This funding has been instrumental in facilitating the successful completion of my study.

REFERENCES

1. Govind Das Sen. Bhaishajya Ratnavali. 1st ed. Varanasi; Chaukhamba Surbharati Prakashan; 2008. p. 872.
2. Neena Srivastava, Sayadda Khatoon, A.K.S. Rawat, Vartika Rai, Shanta Mehrotra, (2021). Chromatographic Estimation of *p*-Coumaric Acid and Triacontanol in an Ayurvedic Root Drug Patala (*Stereospermum suaveolens* Roxb.), *Journal of Chromatographic Science*, Volume 47, Issue 10, Pages 936–939.

3. Chen F, Zhang X, Wang J, Wang F, Mao J. (2024). P-coumaric Acid: Advances in Pharmacological Research Based on Oxidative Stress. Curr Top Med Chem. 24(5):416-436. doi: 10.2174/0115680266276823231230183519. PMID: 38279744.
4. P. Pratheema, L. Cathrine. (2017). Identification, quantification and validation of stigmasterol from *Alpinia calcarata* using high performance thin layer chromatography method. Int JPharm Pharm Sci;9(9):126-131.
5. Pei YQ. (1983). A review of pharmacology and clinical use of piperine and its derivatives. Epilepsia. Apr;24(2):177-82. doi: 10.1111/j.1528-1157.1983.tb04877.x. PMID: 6832079.
6. Bakrim S, Benkhaira N, Bourais I, et al. (2022). Health Benefits and Pharmacological Properties of Stigmasterol. *Antioxidants (Basel)*. 2022;11(10):1912. doi:10.3390/antiox11101912
7. Nile SH, Park SW. (2014). HPTLC Analysis, Antioxidant and Antigout Activity of Indian Plants. *Iran J Pharm Res*. 13(2):531-539.
8. https://drugs.ncats.io/drug/9VP70K75OK#:~:text=Vitexin%20is%20an%20active%20component,%2Dhyperalgesic%2C%20and%20neuroprotective%20effects.
9. Abhishek Verma, Preeti Patel, Alok Sharma, Balak Das Kurmi, (2023). Quercetin in ayurvedic formulations: High-performance thin-layer chromatography based rapid fingerprinting profiling, Phytomedicine Plus,Volume 3, Issue 1,100416, https://doi.org/10.1016/j.phyplu.2023.100416
10. Haoyang Zou, Haiqing Ye, Rajamanikkam Kamaraj, Tiehua Zhang, Jie Zhang, Petr Pavek, (2021). A review on pharmacological activities and synergistic effect of quercetin with small molecule agents, Phytomedicine, Volume 92,2021,153736. https://doi.org/10.1016/j.phymed.2021.153736.
11. Natarajan, Abirami & Balasubramaniyan, Natarajan. (2014). Isolation and characterization of (4Z, 12Z)-cyclopentadeca-4, 12- dienone from Indian medicinal plant *Grewia hirsuta* and its hyperglycemic effect on 3t3 and l6 cell lines. International Journal of Pharmacognosy and Phytochemical Research. 6. 393-398.
12. Yang J, Guo J, Yuan J. (2008). In vitro antioxidant properties of rutin. *LWT - Food Science and Technology*. 41(6):1060-1066. Doi: 10.1016/j.lwt.2007.06.010.
13. Sharma RK, Dash B, editors. Charaka Samhita: Sutrasthana. 1st ed. Varanasi: Chaukhambha Sanskrit Series Office; 2008. p. 87–93.
14. Shastri AD, editor. Sushruta Samhita: Sutrasthana. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2005. p. 51–58.
15. Murthy KRS, editor. Ashtanga Hridaya: Sutrasthana. 9th ed. Varanasi: Chaukhambha Orientalia; 2012. p. 29–35.
16. Gupta A, Kumar S, Pandey AK. (2015). Antioxidant and antimicrobial potential of *Solanum xanthocarpum* extracts against multidrug-resistant bacteria. *Asian Pacific Journal of Tropical Biomedicine.*;5(11):884-891. Doi: 10.1016/j.apjtb.2015.09.008.