Pharmacogn. Res., 2027; 19(1):146-153.
https://www.phcogres.com

Original Article

GC-MS Analysis and Quality Evaluation of Dashmoola Kashaya

Shreya Balasaheb Nikam[1,*], Rajashekhar Sanapeti[1,*], Anil Koralli[1], Shubham Deepak Anuse[2], Sushmita Sanjay Gengane[1]

[1]Department of Panchakarma, KAHER's Shri B. M. Kankanwadi Ayurveda Mahavidyalaya, Hospital and Research Centre, Shahapur, Belagavi, Karnataka, INDIA.
[2]Department of Kayachikitsa, Shri Shivayogeshwar Rural Ayurvedic Medical College, Hospital and Post Graduate Research Centre, Inchal, Belagavi, Karnataka, INDIA.

ABSTRACT

Background: Dashmoola Kashaya is ayurvedic polyherbal formulation prepared from roots of ten medicinal plants which are traditionally used in the management of disorders like inflammatory conditions, neuromuscular disorders, respiratory diseases and musculoskeletal pain. To validate the quality and pharmacological relevance, scientific evaluation using modern technique is essential. **Objectives:** This study of Gas Chromatography-Mass Spectrometry (GC-MS) analysis to examine the Dashmoola Kashaya, with the aim of identifying links between its biomolecules and medicinal properties it comprises. **Objectives:** To analyse the formulation using GC-MS for identification of bioactive constituents. **Materials and Methods:** Dashmoola Kashaya Choorna was procured from GMP-certified Ayurveda pharmacy Sadvaidyashala Pvt. Ltd. Mysore, and Dashmoola Kashaya was prepared as per classical Sharangadhara Samhita instructions. Physicochemical tests including loss on drying, ash values and extractive values were conducted following API guidelines. GC-MS analysis was performed using a Shimadzu GCMS-QP2010SE system. The sample was extracted in petroleum ether, injected into a DB-5MS column, and compounds were identified using NIST and WILEY libraries. **Results:** All physicochemical parameter were in prescribed limit, indicating purity and good quality of raw drugs. Presence of bioactive constituents is confirmed by the Loss on drying (4.99% w/w), total ash (2.90% w/w) and extractive values. GC-MS profiling revealed multiple phytocompounds including sesamin, fatty acid derivatives, sterol esters, terpenoids, chroman derivatives and glucose analogues many of which possess anti-inflammatory, antioxidant, antimicrobial and analgesic activities. **Conclusion:** Dashmoola Kashaya Choorna demonstrated acceptable physicochemical standards and Dashmoola Kashaya contained several bioactive metabolites that align with its traditional therapeutic uses in inflammatory, respiratory and musculoskeletal disorders. The results scientifically support the classical claims of Dashmoola and highlight the value of integrating modern analytical tools such as organoleptic analysis, Chromatographic analysis with ayurvedic pharmaceutics. Further experimental and clinical studies are recommended to substantiate its therapeutic efficacy.

Keywords Anti-inflammatory, Anti-oxidant, *Ayurveda*, *Dashmoola Kashaya*, GC-MS analysis, Physicochemical analysis.

Correspondence:
Dr. Shreya Balasaheb Nikam
Department of Panchakarma, KAHER's Shri B. M. Kankanwadi Ayurveda Mahavidyalaya, Hospital and Research Centre, Shahapur, Belagavi-590003, Karnataka, INDIA.
Email: shreyanikam25@gmail.com

Dr. Rajashekhar Sanapeti
Department of Panchakarma, KAHER's Shri B. M. Kankanwadi Ayurveda Mahavidyalaya, Hospital and Research Centre, Shahapur, Belagavi-590003, Karnataka, INDIA.
Email: rajashekharpk@gmail.com

Received: 07-05-2026;
Revised: 13-07-2026;
Accepted: 25-08-2026.

INTRODUCTION

Dashmoola Kashaya is classical ayurvedic polyherbal decoction prepared from the roots of the ten medicinal plants collectively known as *Dashmoola*. *Dashmoola Kashaya* is traditionally indicated in a wide spectrum of disorders including Fever (*Jwara*), Respiratory disorders (*Shwasa*), Cough (*Kasa*), Inflammatory conditions (*Shotha*), Abdominal masses (*Gulma*), Facial palsy (*Ardita*), Hemiplegia (*Pakshaghata*), and various musculoskeletal disorders like non-specific low back ache and Sciatica (*Gridhrasi*). Internally it acts by pacifying aggravated *Vata* and *Kapha* by reducing systemic inflammation. Externally *Dashmoola* decoction is used in procedures such as *Parisheka*, *Nadi sweda* and *Sthanik basti* therapies where it employs local anti-inflammatory and analgesic action (AFI, 2003).

Gas Chromatography-Mass Spectrometry (GC-MS) is a robust and sensitive analytical platform widely employed for qualitative and semi-quantitative identification of volatile and semi-volatile phytochemicals in herbal formulations. The technique enables structural elucidation based on retention time, mass fragmentation

DOI: 10.5530/pres.20270108

patterns and spectral library matching, thereby facilitating quality control, bioactivity correlation and standardization of complex polyherbal preparations.

The medicinal efficacy of *Ayurveda* formulation is depended on the quality and consistency of the ingredients used (Nhawkar *et al*., 2014). There is a need for analysis of herbal formulation through modern pharmacological analytical technic to establish its therapeutic effect. The present study aims to analyse the physiochemical composition of freshly prepared *Dashmoola Kashaya* using GC-MS and to correlate the identified metabolites with their biological activities. Such analytical validation may contribute to evidence-based integration of classical formulations into contemporary clinical practice.

MATERIALS AND METHODS

Materials

Ingredients of Dashmoola Kashaya

The formulation comprises (Table 1) *Bilwa* (*Aegle marmelos*), *Agnimantha* (*Clerodendrum phlomidis*), *Shyonaka* (*Oroxylum indicum*), *Patala* (*Stereospermum suaveolens*), *Gambhari* (*Gmelina arborea*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*), *Shalaparni* (*Desmodium gangeticum*), *Prishniparni* (*Uraria picta*) and *Gokshura* (*Tribulus terrestris*) (Taru *et al*., 2022).

Procurement of *Dashmoola Kashaya Choorna* (Coarse powder)

The Sadvaidyashala Private Limited, Nanjangud-571301, Mysore, Karnataka, India.

Methods

Preparation of Dashmoola Kashaya

As per the classical reference *Dashmoola Kashaya* was prepared (Savrikar, 2020) The roots of *Dashmoola* are individually taken and physical impurities were removed Coarse powder of each of the above mentioned 10 herbs are taken in equal quantities. The combination is boiled with 16 time the water in a big vessel. It is boiled until 4 times (parts) water remains i.e. reduced to ¼ of the content.

Place of Physicochemical analytical study

The Sadvaidyashala Private Limited, Analytical Laboratory, Nanjangud-571301, Mysore, Karnataka, India.

Ethical Statement

Not applicable.

Statistical Analysis

Not applicable.

Method of analysis

All of the tests listed were carried out in accordance with API standard guidelines (API, 2008).

Place of gas chromatography

Gas Chromatography and Mass Spectrometry (GC-MS): Amrith Labs (Nisargam Private Limited), Shimoga, Karnataka.

Instrument for Gas chromatography

GCMS-QP 2010SE Gas chromatography Shimadzu model.

Sample Preparation

By using above mentioned instrument, 0.1 mL of sample was diluted with 10 mL of petroleum ether and 1micro litre of extract was injected. After agitation of the sample for 10 seconds, the sample was taken for gas chromatography for analysis.

GC-MS protocol

0.1 mL of the *Kashaya* sample was diluted with 10 mL of petroleum ether and a non-polar extract was prepared, filtered through a syringe filter (Nylon 13 mM 0.2 µM) and injected into GC-MS. The GC-MS column consists of DB-5MS (30 mm × 0.25 mm diameter × 0.25 micrometre thickness). Analysis was performed by injecting 1 µL of the sample with an injection temperature of 280.00°C and a split ratio of 1:10. Helium gas (99.999%) was used as a carrier gas with a flow rate of 19.5 mL/min. The analysis was performed in the EI (electron impact) mode with 70 eV of ionisation energy. The injector temperature was maintained at 280°C. The compounds are identified by GC-MS Library (NIST and WILEY). The ion source temperature was set to 200°C and the interface temperature was pointed at 300°C. The solvent cut time was 1.40 min, minimising solvent interference and the detector gain mode was set relative to the tuning result with a gain of 0.95 kV.

Oven temperature

Mass Spectrometry, Group 1- Event

These conditions are set and allowed for the precise separation and identification of analysts.

RESULTS

Results of Organoleptic and Physicochemical Analysis of Raw Drugs

The sample had a brownish colour, a distinct taste, and a distinctive odour according to conventional quality characteristics (Table 2). There was no evidence of extraneous material. It was discovered that the physicochemical characteristics fell within the limits of in-house specifications mentioned in Table 2: Analysis of Raw Drugs used in *Dashmoola Kashaya Choorna*. Low moisture is shown by the drying loss (4.99% W/W), which

is significantly less than the maximum limit (NMT 10% W/W). The total ash measurement (2.90% W/W) indicates few inorganic contaminants and is within acceptable limits (NMT 5% W/W). The alcohol-soluble extractive value (12.05% W/W) satisfies the minimal criterion (NLT 12% W/W), whereas the acid-insoluble ash was 0% W/W (Table 2).

Result of GC-MS Analysis of Dashmoola Kashaya

The chemicals found were (Table 3 and Figure 1) 9,12-Octadecadienoyl chloride, (Z, Z)-, (+)-Sesamin, Cholest-5-en-3-ol (3β)-, tetradecanoate. 2H-Pyran, 2-(7-heptadecynyloxy) tetrahydro-. (+)-Sesamin, Cholest-5-en-3-ol (3β)-, tetradecanoate, (R)-6-Methoxy-2,8-dimethyl-2-((4R,8R)-4,8,12-trimethyltridecyl)chroman, Undec-10-ynoic acid, undecyl ester, Oleic acid, 15-Tetracosenoic acid, (Z)-, TMS derivative, 3-O-Methyl-d-glucose, 9,12-Octadecadienoic acid, methyl ester, (E,E)-, 15-Octadecenoic acid, methyl ester, (2-Cyclohexylpropyl)(methyl)amine, 3,7-Dimethyl-6-nonen-1-ol acetate, 9,12-Octadecadienoyl chloride and (Z, Z)-, 9-Octadecen-12-ynoic acid, methyl ester. These compounds are recognised for their anti-inflammatory, anti-oxidant, analgesic effect. The result of GC-MS analysis of Dashmoola Kashaya includes retention time, Possible compound, molecular weight and percentage peak area are mentioned in Table 3.

DISCUSSION

Discussion on Physicochemical Analysis

Physicochemical (Table 2) analysis can be used for identification and assessing herbal mixture. The formulation has brownish color, distinctive flavor and odor which anticipates its quality. The coarse particle size was appropriate for the preparation of the formulations like *Kashaya*.

The loss on drying (4.99% w/w) was within the standard limit (10%w/w), suggesting that the sample had a low moisture content, this is important for preventing microbial development, enzymatic degeneration, and formulation deterioration during storage.

Standard acceptable total ash value (2.90% w/w) and acid-insoluble ash (0% w/w) indicates that the formulation has minimal impurities such as, siliceous elements or mineral matter, demonstrating an excellent and purity of the raw material utilised in the preparation.

The alcohol-soluble extractive value (12.05% w/w) which is less than normal (12% w/w) suggest presence of alcohol-soluble phytoconstituents such as flavonoids, alkaloids, phenolic compounds and other active components.

DISCUSSION

Discussion on GC-MS Analysis

9,12-Octadecadienoyl chloride, (Z, Z)-

9,12-octadecadienoyl chloride (Z, Z) (Table 3 and Figure 2) is a linoleic derivative with antimicrobial and anti-quorum sensing properties (Singh and Singh, 2019). Such chemicals inhibit bacterial communication (QS pathways), lowering biofilm formation and virulence expression. The fatty acids from this class exhibits membrane modulating action, which contribute to antibacterial activity (Begum *et al*., 2025).

(+)-Sesamin

Sesamin, (Table 3 and Figure 3) a main compound found in *Sesamum indicum*, has potent antioxidant, anti-inflammatory, hypolipidemic and cardioprotective properties. It regulates NF-κB signalling, improves hepatic fatty acid oxidation, and lowers oxidative stress markers. Some clinical and experimental studies demonstrate better lipid profiles and Cytokine inhibition and endothelial protection property. Sesamin also shows hepatoprotective and neuroprotective effects through ROS scavenging and cytokine modulation (Dalibalta *et al*., 2020).

Table 1: Ingredients of *Dashmoola Kashaya*.

Sl. No.	*Dravya*	Latine Name	Part Used
1.	Bilva	Aegle marmelos	1 Part
2.	Agnimantha	Premna integrifolia	1 Part
3.	Shyonaka	Oroxylum indicum	1 Part
4.	Patala	Stereospermum suaveolens	1 Part
5.	Gambhari	Gmelina arborea	1 Part
6.	Brihati	Solanum indicum	1 Part
7.	Kantakari	Solanum xanthocarpum	1 Part
8.	Shalaparni	Desmodium gangeticum	1 Part
9.	Prishniparni	Uraria picta	1 Part
10.	Gokshura	Tribulus terrestris	1 Part

Cholest-5-en-3-ol (3β)-, tetra decanoate

Sterol metabolism (Table 3) is related to this cholesterol ester derivative. Cholesterol metabolites affect inflammatory signalling pathway and glucose homeostasis. Sterol derivative studies have shown that they can modulate lipid metabolism and may have anti-inflammatory properties (Maganga *et al.*, 2024).

2H-Pyran, 2-(7-heptadecynyloxy) tetrahydro-

Pyran derivatives, (Table 3) identified in phytochemical investigations of *Erythrina variegata* which have antibacterial and antioxidant activity (Amutha *et al.*, 2014). These heterocyclic compounds have membrane-protective and radical scavenging characteristics. Anti-inflammatory and cytoprotective effects implied by experimental models (Muthukrishnan *et al.*, 2016). Their biological function is often attributed to oxygen-containing ring structures.

R-6-Methoxy-2,8-dimethyl-2-((4R,8R)-4,8,12-trimethyltridecyl) chroman

This is a chroman derivative (Table 3), shares structural similarities with tocopherol analogues, which are substances that resemble vitamin E. Research emphasizes the potential of antioxidants and enzyme inhibitors, such as scavenging free radicals and preventing lipid peroxidation. It exhibits anti-aging property, cryoprotection, and potential anti-inflammatory effects (Velmani *et al.*, 2025).

Undec-10-ynoic acid, undecyl ester

This molecule, derived from 10-undecynoic acid (Table 3), has potent antibacterial and antibiofilm properties, particularly against oral *Streptococcus* species. It acts by inhibiting microbial adherence and biofilm development (Goc *et al.*, 2019). Antifungal and topical antimicrobial treatments contain comparable chemicals.

Oleic acid

It is monounsaturated fatty acid (Table 3) in plant. It improves the gut-liver axis and controls lipid metabolism through modulating SCD1. Some studies established its insulin-sensitizing, cardioprotective and anti-inflammatory activities. It promotes endothelial health and lowers LDL oxidation (Sener *et al.*, 1999).

15-Tetracosenoic acid, (Z)-, TMS derivative

It is a long chain unsaturated fatty acid (Table 3), which can reduce inflammation by modulating the NF-κB pathway and suppressing cytokine production. Fatty acid derivatives can lower inflammatory mediators and oxidative damage (Li *et al.*, 2025). They may also help maintain membrane structural integrity.

3-O-Methyl-d-glucose

A glucose analogue (Table 3) was investigated for transport and metabolic pathway studies. It is useful for assessing glucose absorption pathways involving GLUT transporters (Jay *et al.*, 2018). While not directly therapeutic, it provides information about carbohydrate metabolism and cellular glucose regulation.

Table 2: Analysis of Raw Drugs used in *Dashmoola Kashaya Choorna*.

Tests	In-house Specifications	Observed Values
Organoleptic Analysis		
Colour	Brownish	Brownish
Odour	Characteristic	Characteristic
Taste	Characteristic	Characteristic
Fineness	Coarse powder	Coarse powder
Physical Characteristics		
Loss on Drying	NMT 10% W/W	4.99% W/W
Ash content (w/w)	NMT 5% W/W	2.90% W/W
Acid-insoluble Ash	NMT 3% W/W	0% W/W
Alcohol soluble Extractive	NLT 12% W/W	12.05% W/W
Water-soluble Extractive	NLT 15% W/W	17.0% W/W
Foreign Matter	NIL	NIL

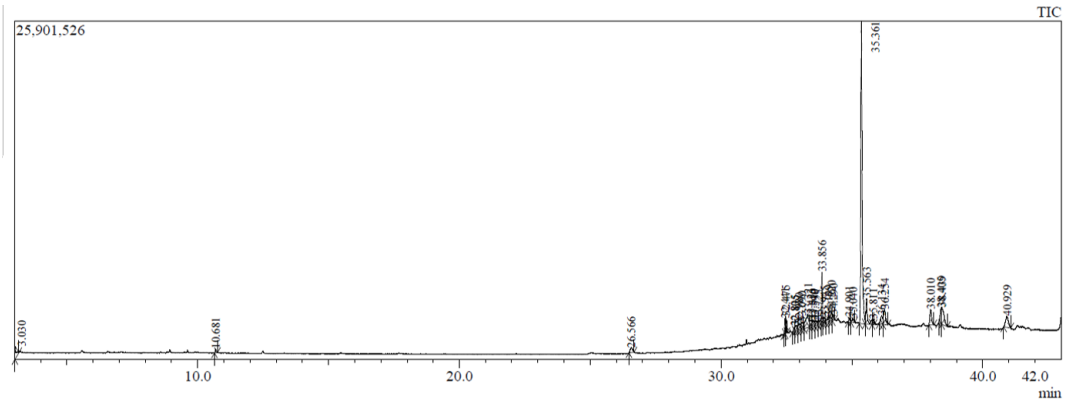

Figure 1: Chromatographic Presentation of Compounds of *Dashmoola Kashaya*.

Table 3: GC-MS Analysis of *Dashmoola Kashaya*.

Sl. No.	Retention Time	Compound Name	Mol. Formula	Mol. Weight	% Peck Area	Medicinal Role
1.	35.361	9,12-Octadecadienoyl chloride, (Z, Z)-	$C_{18}H_{31}C_lO$	298	45.17	Anti Microbial Anti quorum Antibacterial
2.	38.440	(+)-Sesamin	$C_{20}H_{18}O_6$	354	4.42	Anti-inflammatory Antioxidant Cardioprotective Hepatoprotective Neuroprotective
3.	33.320	Cholest-5-en-3-ol (3β)-, tetradecanoate	$C_{41}H_{72}O_2$	596	4.73	Anti-inflammatory
4.	36.255	2H-Pyran, 2-(7-heptadecynyloxy) tetrahydro-	$C_{22}H_{40}O_2$	336	3.63	Antimicrobial Anti-inflammatory Antioxidant
5.	36.135	Cholest-5-en-3-ol (3β)-, tetradecanoate	$C_{41}H_{72}O_2$	596	1.83	Lipid metabolism Anti-inflammatory
6.	34.220	(R)-6-Methoxy-2,8-dimethyl-2-((4R,8R)-4,8,12-trimethyltridecyl) chroman	$C_{28}H_{48}O_2$	416	1.74	Antioxidant Anti-aging Cytoprotective Anti-inflammatory
7.	34.110	Undec-10-ynoic acid, undecyl ester	$C_{22}H_{40}O_2$	336	1.07	Antibacterial Antifungal
8.	33.510	Oleic acid	$C_{18}H_{34}O_2$	282	1.34	Anti-inflammatory Anti-cancer Hypocholesterolemic
9	32.980	15-Tetracosenoic acid, (Z)-, TMS derivative	$C_{27}H_{54}O_2Si$	438	1.69	Suppresses cytokine production Anti-inflammatory Antioxidant
10.	26.566	3-O-Methyl-d-glucose	$C_7H_{14}O_6$	194	1.21	Carbohydrate metabolism Cellular glucose regulation
11.	32.441	9,12-Octadecadienoic acid, methyl ester, (E,E)-	$C_{19}H_{34}O_2$	294	1.08	Hepatoprotective Antihistaminic Hypocholesterolemic
12.	32.475	15-Octadecenoic acid, methyl ester	$C_{19}H_{36}O_2$	296	1.16	Anti-inflammatory
13.	3.030	(2-Cyclohexylpropyl)(methyl)amine	$C_{10}H_{21}N$	155	1.55	Anti-inflammatory Suppresses cytokine production Antioxidant
14.	34.290	3,7-Dimethyl-6-nonen-1-ol acetate	$C_{13}H_{24}O_2$	212	0.89	Anti-inflammatory Antioxidant Cytoprotective
15.	34.900	9,12-Octadecadienoyl chloride, (Z, Z)-	$C_{18}H_{31}C_lO$	298	0.61	Antioxidant Anti diabetic
16.	35.040	9-Octadecen-12-ynoic acid, methyl ester	$C_{19}H_{32}O_2$	292	0.83	Anti-inflammatory Antioxidant

9,12-Octadecadienoic acid, methyl ester, (E, E)-

A methyl ester of linoleic acid (Table 3) with antioxidant and anti-inflammatory properties. Studies show that free radicals are scavenged and lipid peroxidation is inhibited (Muzahid *et al.*, 2022). It may help to protect the cardiovascular system.

15-Octadecenoic acid, methyl ester

It is said to be an anti-inflammatory chemical found in plant extracts that controls inflammatory mediators and lowers cytokine expression (Table 3) (Dong *et al.*, 2000). Fatty acid methyl esters frequently exhibit antioxidant and membrane-stabilizing effects.

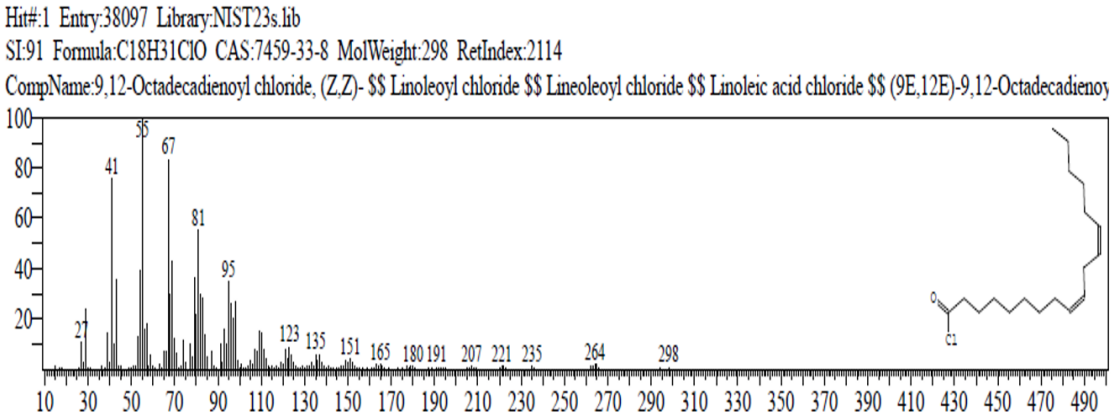

Figure 2: 9,12-Octadecadienoyl chloride, (Z, Z)-.

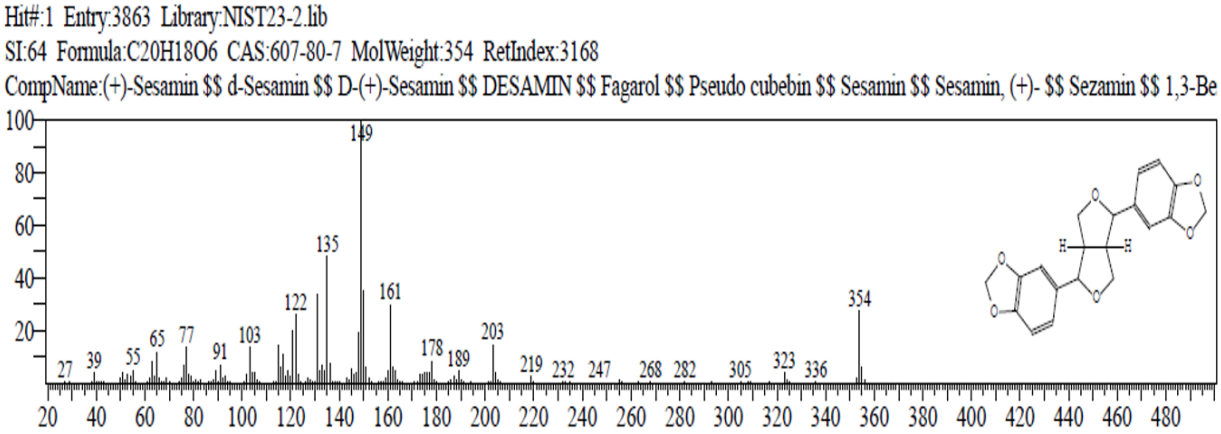

Figure 3: (+)-Sesamin.

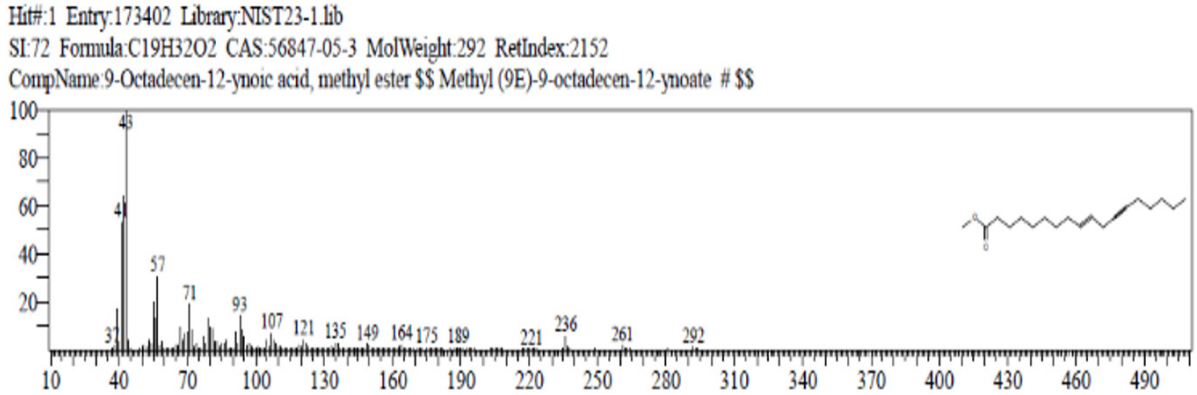

Figure 4: 9-Octadecen-12-ynoic acid, methyl ester.

(2-Cyclohexylpropyl)(methyl)amine

Plant extracts have been reported to have an anti-inflammatory chemical that controls inflammatory mediators and lowers cytokine expression (Table 3) (National Centre for Biotechnology Information, 2026) Methyl esters of fatty acids frequently exhibit membrane-stabilizing and antioxidant characteristics.

3,7-Dimethyl-6-nonen-1-ol acetate

A terpenoid ester (Table 3) commonly identified in plant essential oils. Terpenoids show antimicrobial, anti-inflammatory, and antioxidant actions. They may also contribute to aroma-therapeutic and mild cytoprotective effects (Salisu *et al*., 2025).

9-Octadecen-12-ynoic acid, methyl ester

9-Octadecen-12-ynoic acid (Table 3 and Figure 4), methyl ester is showing its ability to cross the BBB and potentially reach the central nervous system. Based on the pharmacokinetic parameters 9-Octadecen-12-ynoic acid, methyl ester was selected as the best choices due to their BBB penetration ability, superior absorption profile and permeability (Ilyas *et al*., 2025).

CONCLUSION

The present study is conducted to establish the quality and suitability of the ingredients of the formulation through. The organoleptic, physicochemical and GC-MS analysis. Acceptable moisture content, ash values, and extractive values indicate the stability of the formulation and the presence of bioactive constituents.

The formulation reveals the bioactive compounds through GC-MS analysis, serves anti-inflammatory, antioxidant, antimicrobial, and analgesic activities.

The compounds present in the *Kashaya* which were discovered through GC-MS analysis, they serve anti-inflammatory, antioxidant, antimicrobial, and analgesic activities, which support its traditional therapeutic effect in systemic inflammatory disorders, respiratory diseases, musculoskeletal and metabolic conditions.

The results provide scientific support for the traditional use of *Dashmoola Kashaya* and may validates its quality standards by emphasizing the importance of integrating modern analytical parameters like GC-MS analysis with *Ayurvedic* knowledge. Further pharmacological and clinical researches are recommended to validates its therapeutic efficacy.

ACKNOWLEDGEMENT

The author extends sincere gratitude to Sadvaidyashala Private Limited, Nanjangud-571301, Mysore, Karnataka, India and Amrith Labs (*Nisargam* Private Limited), Shimoga, Karnataka laboratories for providing the necessary facilities, guidance, and support to carry out this work successfully.

ABBREVIATIONS

GMP: Good Manufacturing Practice; **NA:** Not applicable; **GC-MS:** Gass Chromatography and Mass Spectrometry; **ASU:** *Ayurveda, Siddha,* and *Unani*; **UV:** Ultraviolet; **API:** *Ayurvedic* Pharmacopoeia of India; **EI:** Electron Impact; **NIST:** National Institute of Standards and Technology; **NF-κB:** Nuclear factor kappa-light-chain-enhancer of activated B cells; **m/z:** Mass-to-charge ratio; **eV:** Electron volt; BBB: Blood-brain barrier; **QS:** Quorum sensing; **ROS:** Reactive oxygen species; **LDL:** Low-density lipoprotein; **GLUT:** Glucose transporter; **TMS:** Trimethylsilyl; **SCD1:** Stearoyl-CoA desaturase-1; **KAHER:** KLE Academy of Higher Education and Research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

Dr. Shreya Balasaheb Nikam: Collection of data, data analysis and interpretation, writing article, critical revision of the article. **Dr. Rajashekhar V. Sanapeti:** Research concept and design, collection of data, data analysis and interpretation, writing article, critical revision of the article, final approval of article. **Dr. Anil Koralli:** Data analysis and interpretation, writing article, critical revision of the article, final approval of article. **Dr. Shubham Deepak Anuse:** Data analysis and interpretation, writing article, critical revision of the article. **Dr. Sushmita Sanjay Gengane:** Data analysis and interpretation, writing article, critical revision of the article.

SUMMARY

In *ayurveda* traditional decoction of *Dashmoola* is recommended for *Vata- Kaphaj* diseases which is having analgesic, anti-inflammatory and anti-oxidant properties. Good quality and purity were confirmed by physicochemical examination of raw pharmaceuticals, which revealed all parameters within API norms. Suitable moisture, total ash and extractive values show the presence of active phytoconstituents. GC-MS analysis discovered the compounds like Fatty acid derivatives, sesamin, sterol esters, terpenoids and tocopherol analogues. These compounds are known their analgesic, antibacterial, antioxidant, and anti-inflammatory qualities. Overall, the results support the classical therapeutic claims and scientifically may validate the pharmacological relevance of the formulation.

REFERENCES

Government of India. (2008). The A*yurvedic p*harmacopoeia of India (Part II, Vol. II, 1st ed.). 2008, New Delhi: Controller of Publications.

National Centre for Biotechnology Information. (2026). PubChem compound summary for CID 43930: (2-cyclohexylethyl)(methyl)amine. Retrieved March 29, 2026, from https://pubchem.ncbi.nlm.nih.gov/compound/2-Cyclohexylethyl_methyl_amine

Savrikar S.S.(2020) Sharangdhar Samhita First Edition (Part 2, p. 24) Chaukhamba Sanskrit pratishthan.

Government of India. (2003). The Ayurvedic formulary of India (Part I, p. 55).

Amutha, I. D. J., and Kottai, M. A. (2014). Gas chromatography-mass spectrometry analysis of bioactive constituents in the ethanolic extract of Saccharum spontaneum Linn. International Journal of Pharmacy and Pharmaceutical Sciences, 6(2), 755-759.

Begum, S. N., Reddy, P. D. S., and Prasad, G. S. (2025). GCMS analysis of anti-diabetic and antioxidant metabolites *from Penicillium* javanicum. *Biosciences Biotechnology Research Asia, 22(2), 733. h*ttps://doi.org/10.13005/bbra/3398

Dalibalta, S., Majdalawieh, A. F., and Manjikian, H. (2020). Health benefits of sesamin on cardiovascular disease and its associated risk factors. Saudi Pharmaceutical *Journal, 28(10),* 1276-1289. https://doi.org/10.1016/j.jsps.2020.08.018https://doi.org/10.1016/j.jsps.2020.08.018

Dong, M., Oda, Y., and Hirota, M. (2000). (10E,12Z,15Z)-9-hydroxy-10,12,15-octadecatrienoic acid methyl ester as an anti-inflammatory compound from Ehretia dicksonii.Bioscience, biotechnology, and biochemistry,64(4), 882-886. https://doi.org/10.1271/bbb.64.882

Goc, A., Sumera, W., Niedzwiecki, A., and Rath, M. (2019). 10-undecynoic acid is a new anti-adherent agent killing biofilm of oral Streptococcus spp. PLOS ONE, 14(4), e0214763. https://doi.org/10.1371/journal.pone.0214*763*

*Ilyas, S., Cahaya Situm*orang, P., Ahmad, H., Khairani, D., Prastyo Wati, D., and Sawitri Polem, W. (2025). Exploring Nanoherbal Paraboea leuserensis as a Therapeutic Agent in Traumatic Brain Injury: In silico and In vivo App*roaches. Iranian j*ournal of medical sciences, 50(12), 819-831. https://doi.org/10.30476/ijms.2025.106167.4027

Jay, T. M., Dienel, G. A., Cruz, N. F., Mori, K., Nelson, T., and Sokoloff, L. (1990). Metabolic stability of 3-O-m*ethyl-D-glucose in* brain and other tissues.Journal of neurochemistry,55(3), 989-1000. https://doi.org/10.1111/j.*1471-4159*.1990.tb04588.x

Li, Y., Gao, X., Gao, Z., Cao, Z., Xiong, P., and Liu, X. (2025). Sources and biological functions of nervonic acid: Advances and perspectives. Chemistry and Physics of Lipids, 273, 105554. https://doi.org/10.1016/j.chemphyslip.2025.105*554*

Maganga, P. *Y., Mbusi,* L. *D.*, Hamisi, M. I., Mgina, C. A., and Lyimo, T. J. (2024). Bioactive compounds of seven seagrass species from the Western Indian Ocean identified by gas chromatography-mass spectrometry. Asian Journal of Natur*al Product Bio*chemistry, 22(2), 74-88. https://doi.org/10.13057/biofar/f220204

Muthukrishnan, S., Palanisamy, S., Subramanian, S., Selvaraj, S., Mari, K. R., and Kuppulingam, R. (2016). Phytochemical profile of Erythrina variegata by using high-performance liquid chromatography and gas chromatography-mass spectrometry analyses. 3 Biotech, 9(4), 207-212. https://doi.org/10.1016/j.jams.2016.06.001

Muzahid, A. A., Sharmin, S., Hossain, M. S., Ahamed, K. U., *Ahmed, N., Yeasmin, M. S., et al. (2022). Analysis* of bioactive compounds present in different crude extracts of Benincasa hispida and Cucurbita moschata seeds by gas chromatography-mass spectrometry. Heliyon, 9(1), e12702. https://doi.org/10.1016/j.heliyon.2022.e12702https://doi.org/10.1016/j.heliyon.2022.e12702

Nhawkar, S. V., *Mullani, A. K., Mag*dum, C. S., and D'Souza, J. I. (2014). Quality standardisation and toxicity study of Ayurvedic formulation. International Journal of Bioassays, 3(9), 3244-3253. https://doi.org/10.21746/I*JBIO.201*4.09.007

Salisu, T. F., Fowora, M. A., Yahaya, T. O., F*agbayi, T. A.,* Sam*son, O. J., and* Audu-Ohida, H. (2025). Molecular quantif*ication* of g*bp*A1 gene expression in Vibrio cholerae exposed to Hunteria umbellata methanol leaf extract. Notulae Scientia Biologicae, 17(2), Article 12187. https://doi.org/10.15835/nsb17212187

Sener, A., Scruel, O., Louchami, K., Jijakli, H., and Ma*laisse,* W. *J. (199*9*). Inhibition of glucos*e-ind*uced insulin rel*ease by 3-O-methyl-D-glucose: Enzymatic, metabolic and cationic determinants. Molecular and Cellular Biochemistry, 194(1-2), 133-145. https://doi.org/10.1023/a:1006955617718

Singh, P., and Singh, R. (2019). Analysis of quorum quenching potential of Euphorbia trigona Mill. International Journal of Pharmaceutical Sciences and Research, 10(3), 1372-1386. https://doi.org/10.13040/IJPSR.0975-8232.10(3).1372-86

Taru, P. P., Say*ed,* S., Kute, P., *Shikalgar,* M., Kad, *D., and Gadakh*, A. (2022). Dashmoo*la: A systematic overview.* GIS *S*cience Journal, 9(4), 1334. https://www.researchgate.net/publication/360354715_DASHAMOOLA_A_SYSTEMATIC_OVERVIEW

Velmani, S., Sholkamy, E. N., Ruba, P., Kanaga, S., Balamurugan, V., Tarighat, *M. A., and Abdi,* G. (2025). Eco-friendly synthesis and biomedic*al potent*ial of *silver* nanoparticles using Pandanus dubius extract.Scientific reports,15(1), 39940. https://doi.org/10.1038/s41598-025-23717-1

Cite this article: Sanapeti RV, Nikam SB, Koralli A, Gengane SS, Anuse SD. GC-MS Analysis and Quality Evaluation of Dashmoola Kashaya. Pharmacog Res. 2027;19(1):146-53.