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PHYTOCHEMICAL AND CHROMATOGRAPHIC EVALUATION OF DASHAMOOLA RASAYANA: A PRELIMINARY ANALYTICAL STUDY

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ABSTRACT

Background: Dashamoola Rasayana is a classical Ayurvedic polyherbal *Avaleha* described for respiratory and *Vata-Kapha* predominant disorders. Analytical characterization is important for documenting the quality and consistency of the formulation used in clinical research. **Objective:** To document the organoleptic, physicochemical, chromatographic, microbiological and preliminary phytochemical profile of Dashamoola Rasayana. **Methods:** A prepared batch of Dashamoola Rasayana was evaluated at the Drug Testing Laboratory, Rajiv Gandhi Education Society's Ayurvedic Medical College, Hospital & PG Research Centre, Gadag. The assessment included organoleptic examination, loss on drying, ash values, pH, total fat, total sugar, reducing sugar, thin-layer chromatographic (TLC) examination, microbiological testing and preliminary qualitative phytochemical screening. **Results**: The formulation was black, semisolid and mildly aromatic. Loss on drying was 4.8%, total ash 1.5%, acid-insoluble ash 0.5%, pH of the 1% solution 5.1%, total fat 0.4%, total sugar 85.446% and reducing sugar 80.483%. TLC showed no distinct spot under visible light, one spot at Rf 0.11 at 254 nm, and spots at Rf 0.11 and 0.28 at 366 nm. The total bacterial count was 7.08 CFU/mL and the fungal count was 0 CFU/mL. Flavonoids, tannins, steroids, starch, proteins and amino acids, phenolic compounds, carbohydrates and terpenoids were present,

while alkaloids and saponins were absent. **Conclusion:** The findings provide a preliminary quality-control and phytochemical profile of the tested Dashamoola Rasayana batch. The chromatographic profile may serve as a reference fingerprint for subsequent batch comparison. The phytochemical findings are qualitative and should not be interpreted as direct evidence of clinical efficacy.

KEYWORDS: Dashamoola Rasayana; *Avaleha*; Phytochemical Screening; TLC; Chromatographic Fingerprint.

1. INTRODUCTION

Dashamoola Rasayana is a compound Ayurvedic formulation prepared in *Avaleha* dosage form and described for *Kasa*, *Shwasa*, *Pratishyaya* and other *Vata-Kapha* predominant conditions. In the source formulation review, it is described as possessing *Rasayana*, *Balya*, *Shothahara*, *Deepana*, *Pachana* and *Vata-Kapha Shamaka* properties. The formulation contains a large number of herbal ingredients and includes sugar and honey as important base materials. Because a polyherbal formulation contains multiple plant-derived constituents together with processing materials, analytical characterization is essential to establish its identity, physicochemical consistency and preliminary phytochemical profile.[1,2]

The present analytical assessment was undertaken for the Dashamoola Rasayana batch used in the clinical research work. The laboratory report dated 21 July 2026 characterized the submitted sample as a compound herbal drug in *Avaleha* form and reported organoleptic, physicochemical, chromatographic, microbiological and preliminary phytochemical findings. These data are particularly useful for documenting the quality of the investigational formulation and for providing a reference profile for future batch-to-batch comparison.[7]

2. MATERIALS AND METHODS

2.1. Test Sample

The test sample was Dashamoola Rasayana, a polyherbal formulation prepared in *Avaleha* (confection) form. The formulation was procured from Vaidyaratnam Oushadashala Pvt.Ltd. and used as the test drug in the present study. The laboratory report identified the sample as a compound herbal drug. The manufacturing date was November 2024, with an expiry date of October 2027. The quality-control report was issued on 21 July 2026 by the Drug Testing Laboratory, Rajiv Gandhi Education Society's Ayurvedic Medical College, Hospital & PG

Research Centre, Gadag. The formulation contained the prescribed Dashamoola group along with other classical herbal ingredients as detailed in Table 1.

2.2. Method of Preparation of Dashamoola Rasayana

The preparation of Dashamoola Rasayana was carried out according to the classical method of Avaleha Kalpana, following the method described in Sahasrayoga.[5] The prescribed Kwatha dravya were cleaned, dried and coarsely powdered. The coarse powders were transferred to a suitable decoction vessel and boiled with water in a ratio of 1:16. The mixture was maintained over mild heat and reduced to one-eighth of the initial volume. The resulting decoction was filtered to obtain the Kwatha.

The filtered decoction was transferred to a suitable vessel, and the prescribed quantities of *Guda* and sugar were added. The mixture was heated over moderate flame with continuous stirring until the desired *Avaleha paka lakshana* were attained. The vessel was then removed from the fire, and the finely powdered *Prakshepa dravya* were gradually added with thorough mixing to obtain a homogeneous preparation.

After cooling to room temperature, the prescribed quantity of honey was added and mixed uniformly. The finished product was stored in an airtight container. The prepared Dashamoola Rasayana was a blackish semisolid confection with characteristic *Madhura, Amla* and *Kashaya rasa* and characteristic *paka gandha*.

2.3.Composition and Ayurvedic Properties

The formulation comprised 42 herbal ingredients, including the ten drugs of Dashamoola and additional Prakshepa and supportive ingredients. Their botanical identity, part used, Rasa, Guna, Virya, Vipaka, Doshagnata and therapeutic actions are presented in Table 1.

Table: 1. Major Ingredients and Therapeutic Relevance of Brihat Panchamoola.

Sl. No.	Drug group / ingredients	Major components	Principal therapeutic relevance
1	***Brihat Panchamoola***	*Bilva, Agnimantha, Shyonaka, Gambhari* and *Patala*	*Vata-Kapha shamana, Shothahara, Shvasahara, Balya*
2	***Laghu Panchamoola***	*Shalaparni, Prishniparni, Brihati, Kantakari* and *Gokshura*	*Vata-Kapha shamana, Shvasahara, Kasahara, Balya*
3	**Balya and Rasayana drugs**	*Bala, Amalaki, Haritaki, Vibhitaki*	*Balya, Rasayana, Vayasthapana,*

			Vyadhikshamatva
4	***Shvasahara–Kasahara* drugs**	*Bharangi, Vasa, Pushkaramoola, Pippali, Shringi, Aguru*	*Shvasahara, Kasahara, Kaphachhedana*
5	***Deepana–Pachana* and *Anulomana* drugs**	*Chavya, Chitraka, Pippalimoola, Shunti, Maricha, Jeeraka, Krishna Jeeraka, Yavani, Dhanyaka*	*Deepana, Pachana, Anulomana, Amapachana*
6	***Shothahara* and *Vatahara* drugs**	*Eranda, Rasna, Devadaru, Saireyaka*	*Vatahara, Shothahara, Angamardaprasamana*
7	***Prakshepa* and aromatic drugs**	*Tvak, Ela, Patra, Kesara, Shathi* and *Musta*	*Rochana, Shvasahara, Kasahara; improves palatability and formulation characteristics*
8	**Supportive therapeutic drugs**	*Bhumyamalaki, Ashmabheda, Moolaka* and others	Supportive *Shvasahara, Kasahara* and systemic actions

2.4. Therapeutic Applications of Dashamoola Rasayana

Dashamoola Rasayana is traditionally indicated in *Vata-Kapha* predominant disorders, particularly disorders of the *Pranavaha Srotas*. Dashamoola possesses *Shothahara* (anti-inflammatory), *Shwasahara* (alleviating dyspnoea), *Kasa-hara* (relieving cough) and *Vata-shamaka* properties and is traditionally employed in conditions such as *Shwasa* (dyspnoea), *Kasa* (cough), *Jwara* (fever), *Shotha* (inflammation), *Shirashoola* (headache), *Anaha* and *Parshvashoola.* Its *Rasayana* application further supports its traditional use in chronic respiratory disorders and for promoting strength and resistance to disease.[6]

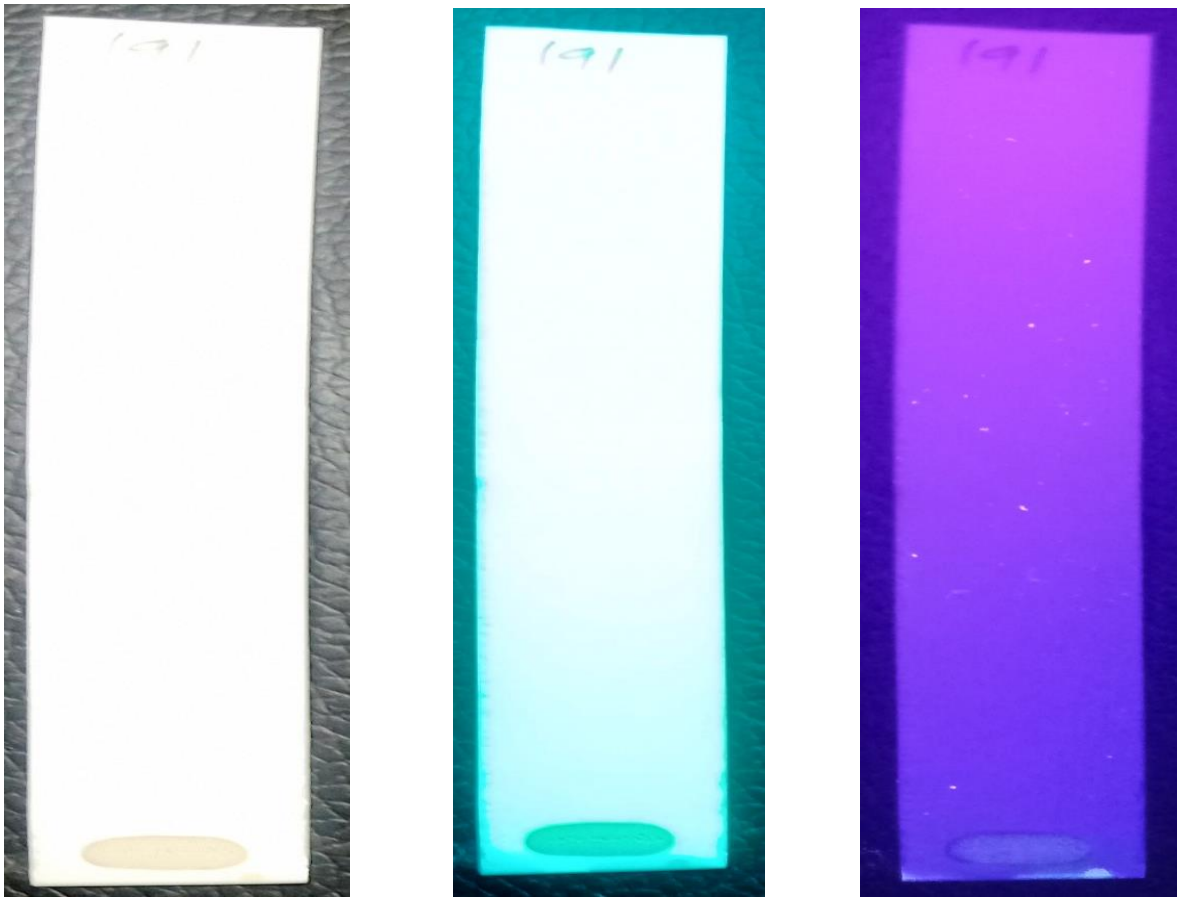
2.5. Organoleptic and physicochemical evaluation

The formulation was examined for colour, consistency, taste and odour. Physicochemical evaluation included loss on drying at 105°C, total ash, acid-insoluble ash, pH of a 1% solution, total fat content, total sugar content and total reducing sugar content.[3,4]

2.6. Chromatographic evaluation

Chromatographic examination was performed using ethanol as the extraction solvent and toluene:ethyl acetate (9:1) as the mobile phase. According to the laboratory report, the study was recorded as TLC. The chromatographic plate was observed under visible light, short-wave ultraviolet light at 254 nm and long-wave ultraviolet light at 366 nm. No distinct spot was reported under visible light; an Rf value of 0.11 was observed at 254 nm, while Rf values of 0.11 and 0.28 were observed at 366 nm.[3,4]

Note: The supplied plate photographs are presented in this article as visual documentation of the chromatographic examination. The laboratory report itself specifies the test as TLC and does not report HPTLC-specific parameters such as densitometric scanning, peak-area data or validated marker quantification. Therefore, the present article describes the findings as a TLC/chromatographic fingerprint rather than claiming quantitative HPTLC standardization.



Visible light. **Short-wave UV light (254 nm).** **long-wave UV light (366 nm).**

Figure: 1. **Dashamoola Rasayana *Chromatographic Plate Under.***

2.7.Microbiological evaluation

Microbiological quality was assessed by total bacterial count and total fungal count. The reported acceptance limit was less than 10 CFU/mL for each parameter.[3,4]

2.8. Preliminary phytochemical screening

Qualitative screening was carried out for alkaloids, flavonoids, tannins, saponins, steroids, starch, proteins and amino acids, phenolic compounds, carbohydrates and terpenoids. The results were recorded as present or absent.

3. RESULTS

3.1. Table 2. Organoleptic and Physicochemical findings.

Parameter	Observed result
Dosage form	*Avaleha*
Colour	Black
Consistency	Semisolid paste
Taste	Characteristic
Odour	Mild aromatic
Loss on drying at 105°C	4.8%
Total ash	1.5%
Acid-insoluble ash	0.5%
pH (1% solution)	5.1
Total fat content	0.4%
Total sugar content	85.446%
Total reducing sugar	80.483%

3.2. Table: 3. Chromatographic findings.

Observation condition	Reported finding
Visible light	No distinct spot reported
254 nm (short-wave UV)	Rf 0.11
366 nm (long-wave UV)	Rf 0.11 and 0.28
Extraction solvent	Ethanol
Mobile phase	Toluene:ethyl acetate (9:1)

3.3 Microbiological findings

The total bacterial count was 7.08 CFU/mL, reported within the specified limit of <10 CFU/mL. The total fungal count was 0 CFU/mL and was also within the stated limit.

Table: 4. Preliminary Phytochemical profile.

Phytochemical constituent	Result
Alkaloids	Absent
Flavonoids	Present
Tannins	Present
Saponins	Absent
Steroids	Present
Starch	Present
Proteins and amino acids	Present
Phenolic compounds	Present
Carbohydrates	Present
Terpenoids	Present

4. DISCUSSION

The analytical profile demonstrated that the tested Dashamoola Rasayana batch possessed defined organoleptic characteristics and measurable physicochemical parameters. The black

colour and semisolid consistency were compatible with the *Avaleha* dosage form. The relatively high total and reducing sugar contents were expected because sugar and honey form part of the pharmaceutical base. These findings provide useful formulation-level quality information; however, values from a single batch should not be considered universal specifications without validated standardisation procedures.

The TLC examination provided a preliminary fingerprint of the formulation. No distinct spot was observed under visible light, whereas spots appeared at 254 and 366 nm. The band at Rf 0.11 was observed at both wavelengths, while an additional band at Rf 0.28 was observed at 366 nm. This profile may be useful for comparative identification and quality control of subsequent batches under identical analytical conditions.

Preliminary phytochemical screening demonstrated the presence of flavonoids, tannins, steroids, starch, proteins and amino acids, phenolic compounds, carbohydrates and terpenoids, while alkaloids and saponins were not detected. The diversity of detected constituents is consistent with the polyherbal nature of Dashamoola Rasayana and may contribute to its broad pharmacological profile.

4.1 Flavonoids

Flavonoids possess antioxidant, anti-inflammatory, antimicrobial and immunomodulatory properties. They can scavenge reactive oxygen species and modulate pathways such as Nrf2, NF-κB and MAPK. These actions may protect tissues against oxidative injury and excessive inflammation. In respiratory disorders, flavonoids have been investigated for potential effects on airway inflammation, epithelial injury, mucus production and airway hyper-responsiveness.[8,9] Their antioxidant and anti-inflammatory actions may therefore contribute to maintaining airway integrity and supporting pulmonary function.

4.2 Phenolic compounds

Phenolic compounds are important antioxidants with additional anti-inflammatory, antimicrobial and cytoprotective properties. They may enhance endogenous antioxidant defence and modulate inflammatory pathways including Nrf2 and NF-κB. These activities may be relevant to COPD as well as asthma, pulmonary fibrosis and other inflammatory respiratory disorders.[9,10] Their presence may therefore contribute to protection against oxidative and inflammatory tissue injury, although individual phenolic compounds were not identified or quantified in the present analysis.

4.3 Tannins

Tannins exhibit antioxidant, anti-inflammatory, antimicrobial and astringent properties. Plant-derived tannins have been investigated in respiratory conditions including asthma, COPD, pulmonary fibrosis and acute lung injury.[11] Their potential antioxidant and tissue-protective actions may help limit oxidative damage and inflammatory responses, while their astringent properties may support regulation of excessive secretions. However, a direct mucolytic effect cannot be inferred from their presence alone.

4.4 Steroidal constituents

The qualitative detection of steroids indicates the presence of steroidal constituents; however, the present test does not establish specific phytosterols. Plant steroidal/phytosterol-type compounds are reported to possess antioxidant, anti-inflammatory and immunomodulatory activities. These effects may be relevant to inflammatory and oxidative tissue injury, including respiratory disorders. They should not, however, be equated with the action of corticosteroid drugs. Confirmation of specific phytosterols would require targeted analytical methods.

4.5 Terpenoids

Terpenoids possess diverse antioxidant, anti-inflammatory, antimicrobial, analgesic and antispasmodic activities. Selected terpenoids such as 1, 8-cineole have demonstrated anti-inflammatory and mucoregulatory effects in airway disorders.[13] Depending on their individual structures, terpenoids may support airway patency, mucus clearance and modulation of inflammatory responses. Their broader activities may also include hepatoprotective and tissue-protective effects.

4.6 Carbohydrates, starch, proteins and amino acids

Carbohydrates and starch mainly contribute to the physical characteristics, palatability and energy value of the *Avaleha*. Certain plant polysaccharides may additionally exhibit immunomodulatory and antioxidant activity, although their specific contribution cannot be determined from the present screening.[14]

Proteins and amino acids represent primary metabolites involved in cellular metabolism, tissue maintenance and antioxidant defence. Some amino acids contribute to glutathione synthesis and redox homeostasis. Their detection therefore reflects the nutritional and

biochemical composition of the formulation rather than establishing a specific respiratory pharmacological action.[15]

4.7 Integrated pharmacological relevance

The detected phytochemicals indicate a multi-component pharmacological profile. Flavonoids and phenolics may primarily provide antioxidant and anti-inflammatory effects; tannins may contribute antioxidant, antimicrobial and tissue-protective actions; terpenoids may provide anti-inflammatory, antimicrobial, antispasmodic and mucoregulatory effects; and steroidal constituents may contribute additional inflammation- and redox-modulating activity. These complementary actions may collectively help regulate oxidative stress, inflammation and tissue injury.[8-15]

Such activities are relevant to respiratory conditions including COPD, asthma, chronic bronchitis and other inflammatory airway disorders, where oxidative stress and inflammation contribute to airway dysfunction. By potentially reducing oxidative injury, inflammatory activity and excessive secretions, these constituents may indirectly support airway function, oxygenation, exercise tolerance and respiratory symptom control.[8-15]

The possible relationship with pulmonary function is therefore likely to be multifactorial rather than compound-specific. Preservation of airway epithelial integrity, modulation of inflammation, regulation of mucus and possible effects on airway smooth muscle may collectively support ventilatory function and exercise capacity. However, the present phytochemical analysis was qualitative and cannot establish that any individual constituent directly improved FEV1, FVC or FEV1/FVC.

Overall, the findings provide supportive evidence that Dashamoola Rasayana contains diverse phytochemical classes with potential antioxidant, anti-inflammatory, antimicrobial, tissue-protective and respiratory-supportive activities. These findings provide pharmacological plausibility rather than direct mechanistic proof of the clinical response. Further quantitative HPTLC/HPLC or LC-MS-based profiling and correlation with inflammatory, oxidative-stress and pulmonary-function parameters would strengthen this interpretation.

5. CONCLUSION

Dashamoola Rasayana demonstrated characteristic organoleptic features of an *Avaleha*, including black colour, semisolid consistency and mild aromatic odour, along with defined physicochemical and microbiological characteristics. Preliminary phytochemical screening revealed flavonoids, tannins, steroids, starch, proteins and amino acids, phenolic compounds, carbohydrates and terpenoids, while alkaloids and saponins were not detected. The TLC profile showed an Rf value of 0.11 at 254 nm and Rf values of 0.11 and 0.28 at 366 nm under the reported chromatographic conditions. These findings provide useful baseline quality-characterisation data for the batch used in the clinical study and may facilitate comparative assessment of future batches. Further validated chromatographic and quantitative marker studies are required for definitive standardisation of individual phytoconstituents.[3,4]

6. Analytical Significance in the Clinical Study

The physicochemical, chromatographic, microbiological and preliminary phytochemical evaluation provides methodological support for the clinical investigation by documenting the quality characteristics of the Dashamoola Rasayana batch used in the study. The findings establish a preliminary analytical profile that can assist in identification and future batch comparison. The detected phytochemical classes also provide a plausible basis for the formulation's reported antioxidant, anti-inflammatory, tissue-protective and respiratory-supportive potential. However, these analytical findings complement and do not replace clinical outcome assessment and should not be interpreted independently as evidence of therapeutic efficacy.[3,4]

6.1. Source of Analytical Data

Drug Testing Laboratory, Rajiv Gandhi Education Society's Ayurvedic Medical College, Hospital & PG Research Centre, Gadag. Drug Testing Laboratory Report, Ref. No. DTLRC/26/0191, dated 21 July 2026. The report states that the analytical standards were based on the Ayurvedic Pharmacopoeia of India (API) and PSAF, and concluded that the submitted sample was of standard quality.

6.2. Classical Formulation Reference

The classical composition and therapeutic basis of Dashamoola should be cited from the relevant Ayurvedic classical source/formulary used for preparation, rather than attributing Dashamoola Rasayana itself to the Ayurvedic Formulary of India unless the specific formulation is confirmed in the applicable AFI volume. The AFI curriculum/reference

material identifies Dashamoola *Kwatha* in AFI Part I, p. 55, but this does not establish that Dashamoola Rasayana is an AFI-listed formulation.

7. REFERENCES

1. Dashamoola Leha. In: Sahasrayoga Prabhakara Vyakhyanam. Varanasi: Chaukhambha Sanskrit Sansthan; Avaleha Prakarana 21. p. 358.
2. Central Council for Research in Ayurvedic Sciences. Sahasrayogam: English Translation. New Delhi: CCRAS, Ministry of AYUSH.
3. Department of AYUSH, Ministry of Health and Family Welfare, Government of India. The Ayurvedic Pharmacopoeia of India. Part II (Formulations). 1st ed. Vol. 1. New Delhi: Government of India; 2007. p. 79-89.
4. Drug Testing Laboratory, Rajiv Gandhi Education Society's Ayurvedic Medical College, Hospital & PG Research Centre, Gadag. Drug Testing Laboratory Report for Dashamoola Rasayana. Ref. No. DTLRC/26/0191. 21 Jul 2026.
5. Krishnamurthy MS. Sahasrayoga with Dharakalpana. 1st ed. Varanasi: Chaukhamba Orientalia; 2021. Avaleha Kalpana. p. 798-801.
6. Pathak AK, Awasthi HH, Pandey AK. Use of Dashamoola in cervical spondylosis: past and present perspective. J AYUSH Ayurveda Yoga Unani Siddha Homeopath. 2015; 4(1): 10-16.
7. Abraham B, Reshmitha TR, Navami MM, George L, Venugopalan VV, Nisha P. Phytochemical rich extract from the spent material generated from industrial Dashamoola preparation (a medicinal Ayurvedic decoction) with antioxidant, antidiabetic and anti-inflammatory potential. Ind. Crops Prod., 2020; 151: 112451. doi: 10.1016/j.indcrop.2020.112451.
8. Al-Khayri JM, Sahana GR, Nagella P, Joseph BV, Alessa FM, Al-Mssallem MQ. Flavonoids as potential anti-inflammatory molecules: a review. Molecules. 2022; 27(9): 2901. doi: 10.3390/molecules27092901.
9. Fu YS, Kang N, Yu Y, Mi Y, Guo J, Wu J, Weng CF. Polyphenols, flavonoids and inflammasomes: the role of cigarette smoke in COPD. Eur. Respir. Rev., 2022; 31(164): 220028. doi:10.1183/16000617.0028-2022.
10. Zhang Y, Wang L, Zeng J, Shen W. Research advances in polyphenols from Chinese herbal medicine for the prevention and treatment of chronic obstructive pulmonary disease: a review. Naunyn Schmiedebergs Arch. Pharmacol., 2025; 398(8): 9451-9470. doi: 10.1007/s00210-025-03945-y.

11. Rajasekaran S, Rajasekar N, Sivanantham A. Therapeutic potential of plant-derived tannins in non-malignant respiratory diseases. J. Nutr. Biochem., 2021; 94: 108632. doi: 10.1016/j.jnutbio.2021.108632.
12. Nattagh-Eshtivani E, Barghchi H, Pahlavani N, Barati M, Amiri Y, Fadel A, et al. Biological and pharmacological effects and nutritional impact of phytosterols: a comprehensive review. Phytother. Res., 2022; 36(1): 299-322. doi: 10.1002/ptr.7312.
13. Juergens UR. Anti-inflammatory properties of the monoterpene 1,8-cineole: current evidence for co-medication in inflammatory airway diseases. Drug Res. (Stuttg)., 2014; 64(12): 638-646. doi: 10.1055/s-0034-1372609.
14. Yin M, Zhang Y, Li H. Advances in research on immunoregulation of macrophages by plant polysaccharides. Front Immunol., 2019; 10: 145. doi: 10.3389/fimmu.2019.00145.
15. Pastore A, Federici G, Bertini E, Piemonte F. Analysis of glutathione: implication in redox and detoxification. Clin. Chim. Acta., 2003; 333(1): 19-39. doi: 10.1016/S0009-8981(03)00200-6.