ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

Palash Pushpa *Churna Lepa* (*Butea monosperma*) in Skin Anti-Ageing: An Ayurvedic Perspective with Contemporary Scientific Validation

Dr. Madhavi Jagat[*1]; Dr. Pradipkumar Suryawanshi[2]; Dr. Sasmita Tripathy[3]; Dr. Vinit Singh Jagat[4]; Dr. Harsha Verma[5]; Dr. Vipul Sahebrao Patil[6]; Dr. Anjali Verma[7]; Dr. Laxmi Patel[8]

[1]MD Scholar, Department of Swasthvritta Evum Yoga, Shri NPA Government Ayurved College Raipur, Chhattisgarh.
[2]Professor & HOD, Department of Swasthvritta Evum Yoga, Shri NPA Government Ayurved College Raipur, Chhattisgarh
[3]Associate Professor, Department of Swasthvritta Evum Yoga, Shri NPA Government Ayurved College Raipur, Chhattisgarh
[4]MD Scholar, Department of Kaumarbhritya, Shri NPA Government Ayurved College Raipur, Chhattisgarh
[5,6,7,8]MD Scholar, Department of Swasthvritta Evum Yoga, Shri NPA Government Ayurved College Raipur, Chhattisgarh.

Corresponding Author: Dr. Madhavi Jagat[*1]

Publication Date: 2026/06/27

Abstract:

- ***Background:***

Skin ageing is a multifactorial biological process resulting in the progressive loss of dermal integrity, collagen degradation, and impaired tissue regeneration. Ayurveda, the ancient Indian system of medicine, has long described topical formulations (*Lepa Kalpana*) for skin rejuvenation. Among these, *Palash Pushpa Churna Lepa* — a paste prepared from the dried flowers of *Butea monosperma* (Lam.) Taub. — holds a distinguished place in classical texts.

- ***Objective:***

This review article aims to explore the Ayurvedic rationale and contemporary phytochemical evidence supporting the anti-ageing efficacy of *Palash Pushpa Churna Lepa*.

- ***Methods:***

Classical Ayurvedic texts including Charaka Samhita, Sushruta Samhita, Ashtanga Hridayam, Bhavaprakasha Nighantu, and Raj Nighantu were reviewed alongside peer-reviewed modern literature on B. monosperma phytochemistry and dermatological pharmacology.

- ***Results:***

The flowers of B. monosperma are rich in flavonoids (butrin, isobutrin, butein, coreopsin), phenolic acids, and chalcones — compounds with established antioxidant, anti-inflammatory, and collagen-protective activity. Their Ayurvedic property profile (*Sheeta Veerya, Kashaya Rasa, Tvak Dosha Nashaka*) aligns closely with modern anti-ageing mechanisms.

- ***Conclusion:***

Palash Pushpa Churna Lepa offers a scientifically plausible and classically validated approach to skin anti-ageing. Systematic clinical trials are warranted to establish evidence-based protocols.

Keywords: *Palash Pushpa Churna Lepa, Butea monosperma, Anti-Ageing, Ayurveda, Lepa Kalpana, Skin rejuvenation, Flavonoids, Twak Prasadana.*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

How to Cite: Dr. Madhavi Jagat; Dr. Pradipkumar Suryawanshi; Dr. Sasmita Tripathy; Dr. Vinit Singh Jagat; Dr. Harsha Verma; Dr. Vipul Sahebrao Patil; Dr. Anjali Verma; Dr. Laxmi Patel (2026) Palash Pushpa *Churna Lepa* (*Butea monosperma*) in Skin Anti-Ageing: An Ayurvedic Perspective with Contemporary Scientific Validation. *International Journal of Innovative Science and Research Technology*, 11(6), 1519-1524. https://doi.org/10.38124/ijisrt/26jun1200

I. INTRODUCTION

The human skin, the largest organ of the body, is perpetually exposed to intrinsic and extrinsic stressors that accelerate the ageing process. Chronological ageing leads to progressive loss of skin elasticity, decreased collagen synthesis, increased transepidermal water loss, and the emergence of fine lines and wrinkles. Extrinsic factors — particularly ultraviolet radiation — induce oxidative stress, activate matrix metalloproteinases (MMPs), and cause photodamage that compounds these structural changes.

Contemporary dermatology addresses skin ageing through a spectrum of interventions ranging from topical retinoids and cosmeceuticals to injectable agents and surgical procedures. However, there is growing global interest in plant-based, holistic approaches that offer efficacy with minimal adverse effects. This paradigm shift has renewed scholarly attention toward traditional medicine systems, particularly Ayurveda, which houses a rich repository of dermatological wisdom.

Ayurveda conceptualizes skin ageing within the framework of *Vayasthapana* (anti-ageing) and *Rasayana* (rejuvenation) therapies. The concept of *Twak Prasadana* — purification and enhancement of the skin — is central to Ayurvedic cosmetology. Among the topical applications described in classical texts, *Lepa Kalpana* (herbal pastes) occupy a unique position due to their localized, transdermal bioavailability and synergistic phytochemical action.

Palash (*Butea monosperma* [Lam.] Taub., Family: Fabaceae) — popularly known as the "Flame of the Forest" — is a medium-sized deciduous tree native to the Indian subcontinent and Southeast Asia. Its vivid orange-red flowers, which bloom between March and July, have been revered in Vedic, classical, and folk medicine for centuries. References to *Palasha* appear in the foundational Ayurvedic compendiums — Charaka Samhita, Sushruta Samhita, Ashtanga Hridayam, Bhavaprakasha Nighantu, and Raj Nighantu — underscoring its deep integration into the Indian medical tradition.

The present review critically examines the anti-ageing potential of Palash Pushpa Churna Lepa, situating classical Ayurvedic claims within the framework of modern phytochemistry and dermatological pharmacology. This integrative analysis may serve as a foundation for future clinical investigations into this time-tested formulation.

II. AYURVEDIC CONCEPTUALIZATION OF SKIN AND AGEING

➢ *Anatomy of Skin in Ayurveda (Twak)*

Ayurveda regards the skin (*Twak*) not merely as a physical integument but as a vital mirror of internal physiological integrity. *Acharya Sushruta* described the skin in seven distinct layers — *Avabhasini, Lohita, Shweta, Tamra, Vedini, Rohini,* and *Mamsadhara* — each with specific physiological functions. The outermost layer, *Avabhasini*, reflects the quality of *Rasa Dhatu* (nutrient plasma), and its lustre is considered an indicator of overall systemic health.

Charaka enumerated six layers of skin, conceptualizing their formation as arising from the transformation of *Rakta Dhatu* (blood tissue) during embryological development — comparable to the separation of cream from milk. This classical understanding resonates with contemporary embryological knowledge of epidermal differentiation from mesoderm-derived tissues.

➢ *Skin Ageing (Twak Jara) — Ayurvedic Pathophysiology*

In Ayurveda, ageing (*Jara* or *Vriddhaavastha*) is attributed to the progressive dominance of *Vata Dosha* — characterized by dryness, roughness, and tissue depletion — alongside the accumulation of *Ama* (metabolic toxins) within the dermal layers. The concept of *Twak Kshaya* (deterioration of skin tissue) encompasses loss of hydration, diminished *Snigdhata* (lubrication), and impaired *Varna* (complexion).

Ayurvedic anti-ageing strategy operates through two principal axes: *Rasayana* (systemic rejuvenation at the tissue level) and *Lepa* (local application to enhance skin integrity). Lepa formulations act by penetrating through hair follicles and intercellular spaces, delivering phytoconstituents that counter free radical damage, modulate collagen metabolism, and restore skin barrier function.

III. PALASH — CLASSICAL DRUG REVIEW

➢ *Botanical Identity and Vernacular Names*

Table 1 Botanical Identity and Vernacular Names

Parameter	Details
Botanical Name	Butea monosperma (Lam.) Taub.
Family	Fabaceae (Leguminosae)
Sanskrit Synonyms	Palasha, Kimshuka, Raktapushpa, Brahmavriksha, Parna, Yagneya, Samidwar
Hindi	Palash, Dhak, Tesu

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

English	Flame of the Forest, Bastard Teak, Bengal Kino Tree
Regional Names	Moduga (Telugu), Muttuga (Kannada), Chamata (Bengali), Kesudo (Gujarati)
Part Used in Lepa	Pushpa (Flowers)
Habitat	Tropical and subtropical regions of India, Nepal, Sri Lanka, SE Asia

➢ *Classical Ayurvedic Properties (Guna-Karma)*

The flowers of *Palasha* are described across multiple classical texts with a consistent pharmacological profile. Key properties are summarized in Table 2.

Table 2 Classical Ayurvedic Properties (Guna-Karma)

Ayurvedic Property	Sanskrit Term	Significance for Skin Anti-Ageing
Taste (Rasa)	*Tikta, Kashaya (Bitter, Astringent)*	Tightens pores; anti-inflammatory action on skin
Potency (Veerya)	*Sheeta (Cooling)*	Counters Pitta-driven oxidative ageing and inflammation
Post-digestive effect (Vipaka)	*Madhura (Sweet)*	Nourishes Rasa and Rakta Dhatu; aids tissue repair
Dosha Action	*Kapha-Pitta Shamana*	Balances excess sebum and inflammatory mediators
Quality (Guna)	*Laghu, Ruksha (Light, Dry)*	Detoxifying; removes Ama from skin
Special Action (Prabhava)	*Tvak Dosha Nashaka*	Directly destroys skin pathology; rejuvenates complexion
Tissue Action (Dhatu Karma)	*Rasa, Rakta Prasadana*	Purifies nutrient plasma; enhances skin luminosity

➢ *Classical Text References*

"पलाशः किंशुको यज्ञीयो ब्रह्मवृक्षस्त्रिपर्णकः।
क्षारश्रेष्ठः सुपुष्पश्च वातपोथः स्मृतो बुधैः॥"
पलाशः कटुकः उष्णश्च कृमिघ्नः कुष्ठनाशनः।
बीजानि तस्य कण्डूघ्नानि दद्रुकुष्ठविनाशनानि॥"
"पुष्पाणि तस्य उष्णवीर्याणि कण्डूकुष्ठहराणि च।"
"श्वेतो नीलस्तथा रक्तः पलाशस्त्रिविधः स्मृतः।
गुणास्तु सर्वेषु तुल्याः श्वेतः श्रेष्ठः प्रकीर्तितः॥"*(RAJ NIGHANTU 39)*

Palāśa is known by the names Kiṃśuka, Yajñiya, Brahmavṛkṣa, and Triparṇaka. It is regarded by the learned as the best source of alkali (kṣāra), bears beautiful flowers, and is also called Vātapoṭha.

Palāśa possesses a pungent taste and hot potency. It destroys intestinal worms and alleviates skin diseases. Its seeds are useful in relieving itching, ringworm, and various skin disorders.

The flowers of Palāśa are hot in potency and are beneficial in treating itching and skin diseases, including leprotic conditions.

Palāśa is described as being of three types according to flower colour: white, blue, and red. The properties of all three varieties are similar, but the white variety is considered superior.

तत्क्षुपं स्वादु पाके तु कटु तिक्तं कषायकम् ॥(51)
वातलं कफपित्तास्रकृच्छ्रजिद् ग्राही शीतलम् ।
वृद्धदोषशमकं वातरक्तकुष्ठहृत् परम् ॥(52)
फलं लघुष्णं मेहार्शःकृमिवातकफापहम् ।
विपाके कटुकं रूक्षं कुष्ठं गुल्मोदरप्रणुत् ॥(53)

The classical text describes this plant as possessing bitter (Tikta), pungent (Katu), and astringent (Kashaya) tastes, while exhibiting a sweet post-digestive effect (Madhura Vipaka). These properties indicate its potential role in balancing various physiological functions and promoting digestive health.

The drug is characterized as Grāhī (absorbent), suggesting its usefulness in controlling excessive intestinal secretions and managing conditions such as diarrhea. It is also described as Śītala (cooling in nature), which contributes to its efficacy in alleviating disorders associated with excessive heat and inflammation within the body.

According to the text, the plant is beneficial in the management of Kapha and Pitta disorders, as well as conditions arising from vitiated blood (*Rakta Doṣa*). Furthermore, it is indicated in the treatment of Kuṣṭha (skin diseases), highlighting its importance in traditional dermatological applications.

The fruit of the plant is described as Laghu (light to digest) and Uṣṇa (slightly heating in potency). Owing to these characteristics, it is considered beneficial in several pathological conditions. Classical Ayurvedic literature recommends its use in Meha (urinary disorders), Arśa (hemorrhoids), and Kṛmi (intestinal worm infestations). Additionally, it helps alleviate disorders caused by the aggravation of Vāta and Kapha doṣas.

Overall, the plant possesses significant therapeutic value owing to its digestive, absorbent, anti-helminthic, anti-hemorrhoidal, and doṣa-balancing properties. These attributes support its traditional use in the management of gastrointestinal, urinary, dermatological, and metabolic disorders.

IV. PHYTOCHEMICAL COMPOSITION OF BUTEA MONOSPERMA FLOWERS

The flowers of B. monosperma are a pharmacologically dense matrix of bioactive phytoconstituents. Modern phytochemical analyses have identified the following major categories of compounds relevant to skin anti-ageing:

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

Table 3 Modern Phytochemical Analyses

Phytochemical Class	Key Compounds	Anti-Ageing Mechanism
Flavonoids	*Butrin, Isobutrin, Butein, Coreopsin, Isocoreopsin, Sulphurein, Monospermoside*	Potent free radical scavenging; inhibits MMP-1 and MMP-3; reduces UV-induced collagen degradation
Chalcones	*Isomonospermoside, Butein (chalcone form)*	Anti-inflammatory via NF-κB pathway modulation; antioxidant activity
Phenolic Acids	*Gallic acid, Tannins, Pyrocatechin*	Collagen crosslinking support; antimicrobial; antioxidant
Triterpenes	*Steroids, Lupeol derivatives*	Skin barrier restoration; anti-inflammatory; wound healing
Glycosides	*5,7-dihydroxy-3,6,4-trimethoxyflavone glycoside*	Cellular protection; antioxidant synergy
Aurones & Steroids	*Aurones, Phytosterols*	Hormonal skin support; collagen modulation

The chalcone butein, a principal bioactive in *B. monosperma* flowers, has demonstrated significant inhibition of TNF-α and IL-8, two key cytokines driving chronic cutaneous inflammation and photoageing. Molecular docking studies have reported binding energy of −8.4 kcal/mol for butrin and −6.0 kcal/mol for butein against inflammatory targets — values comparable to or exceeding standard anti-inflammatory agents, providing strong mechanistic support for their dermatological utility.

V. LEPA KALPANA — CLASSICAL FORMULATION SCIENCE

➢ *Conceptual Framework of Lepa*

Lepa Kalpana is a classical Ayurvedic external therapeutic dosage form described in detail in the *Ashtanga Hridayam* (Sutrasthana, Chapter 30) and the *Sushruta Samhita*. The classical texts enumerate three principal types:

- Pralepa: Cold preparation; anti-inflammatory and cooling
- Pradeha: Thick paste; moisturizing and tissue-nourishing
- Alepa: Thin application; detoxifying and clarifying

Palash Pushpa Churna Lepa, applied as a semi-solid paste with appropriate anupana (vehicle), most closely aligns with Pralepa — owing to the Sheeta Veerya (cooling potency) of Palasha flowers, which renders it particularly suited for Pitta-driven inflammatory skin ageing.

➢ *Formulation Methodology*

Classical formulation of Palash Pushpa Churna Lepa involves the following standardized steps:

- Step 1 — Drug Collection and Authentication: Flowers of B. monosperma are collected during peak bloom (March–May), shade-dried to preserve volatile phytoconstituents, and authenticated botanically as per Ayurvedic Pharmacopoeia of India (API) standards.
- Step 2 — Churna (Powder) Preparation: Dried flowers are pulverized to a fine powder (mesh size 80–100), sieved, and stored in airtight amber-coloured containers away from direct light.
- Step 3 — Anupana (Vehicle) Selection: The binding medium is selected based on the patient's Prakriti (constitution): raw milk or almond oil for Vata skin; rose water or neem decoction for Kapha-dominant skin; coconut water or plain distilled water for Pitta/sensitive skin.
- Step 4 — Lepa Preparation: A 1:2 ratio of churna to liquid vehicle is triturated to achieve a homogeneous paste of smooth consistency.
- Step 5 — Application Protocol: A 2–3 mm uniform layer is applied to cleansed skin, allowed to dry partially (not completely, to avoid Vata aggravation), retained for 20–30 minutes, and removed with lukewarm water followed by light sesame oil massage.

VI. ANTI-AGEING MECHANISMS — AYURVEDIC AND MODERN CORRELATION

The anti-ageing mechanisms of Palash Pushpa Churna Lepa operate through multiple converging pathways that bridge classical Ayurvedic concepts and contemporary molecular dermatology:

➢ *Antioxidant and Free Radical Scavenging*

The flavonoid-rich composition of *B. monosperma* flowers — particularly butein, butrin, and gallic acid — confers robust antioxidant capacity. These compounds neutralize reactive oxygen species (ROS) generated by UV radiation and environmental pollutants, protecting dermal fibroblasts from oxidative DNA damage. This aligns with the Ayurvedic action of *Ama Nashana* (elimination of metabolic toxins) and *Rakta Prasadana* (blood purification), which in Ayurvedic pathophysiology are considered prerequisites for healthy, luminous skin.

➢ *Anti-inflammatory Activity and Collagen Protection*

Cutaneous inflammation is a central driver of both intrinsic and extrinsic skin ageing. Inflammatory cytokines (IL-1β, IL-6, TNF-α) upregulate MMPs, which degrade collagen types I and III — the structural backbone of the dermis. The chalcones and flavonoids of B. monosperma have demonstrated inhibition of NF-κB signalling, the master regulator of pro-inflammatory gene expression, thereby protecting collagen architecture and decelerating dermal thinning.

In Ayurvedic terms, this corresponds to *Shotha Nashana* (anti-inflammatory) and *Sandhaniya* (tissue-binding) action — properties that maintain the structural integrity of *Mamsadhara* (the deepest skin layer supporting the dermis).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

➢ *Skin Barrier Enhancement and Moisturization*

The astringent property (*Kashaya Rasa*) of Palasha flowers facilitates pore tightening and reduction of transepidermal water loss (TEWL), mimicking the action of modern humectants. The phytosterols present in the flowers support ceramide biosynthesis, strengthening the stratum corneum's lipid bilayer — a mechanism that modern dermatology recognizes as critical to combating age-related xerosis.

➢ *Melanin Modulation and Complexion Enhancement*

Hyperpigmentation and uneven skin tone — manifestations of age-related *Varna Vikruti* in Ayurveda — are addressed by the tyrosinase-modulating potential of gallic acid and phenolic constituents in *B. monosperma*. By inhibiting melanin overproduction, these compounds promote the *Twak Prasadana* (skin clarification) effect described in classical texts.

➢ *Wound Healing and Tissue Regeneration*

Age-associated reduction in fibroblast proliferation impairs wound healing and collagen remodelling. Tannins and phenolic acids in Palash flowers have demonstrated fibroblast-stimulating and wound contraction-promoting properties in animal models. This corresponds to the classical action of Ropana (healing) attributed to Palasha, making it pertinent not only for prevention but also for reversal of age-related dermal atrophy.

VII. DISCUSSION

The convergence of classical Ayurvedic pharmacological claims with modern phytochemical and pharmacological evidence presents a compelling case for Palash Pushpa Churna Lepa as a multi-target anti-ageing intervention. The formulation's strength lies not in single-compound pharmacology but in the synergistic action of its phytoconstituent matrix — a characteristic that is increasingly recognized in integrative dermatology research as superior to single-molecule approaches.

Unlike many synthetic cosmeceutical agents — which, despite their targeted efficacy, are associated with adverse effects such as photosensitivity (retinoids), skin thinning (corticosteroids), or irritant dermatitis (alpha-hydroxy acids) — Palash Pushpa Churna Lepa offers a physiologically gentle, multi-pathway approach. The Sheeta Veerya (cooling potency) of the flowers makes it particularly appropriate for the inflammatory subset of skin ageing, while its Kashaya Rasa (astringent taste) addresses structural laxity.

The Lepa vehicle itself constitutes a meaningful pharmacological variable. Classical Ayurvedic texts specify that the anupana must match the patient's constitution and the season (Ritu), reflecting an early understanding of the importance of penetration enhancers and formulation optimization in transdermal drug delivery — a principle that modern pharmaceutical science validates through its emphasis on vehicle-active ingredient interaction.

A notable gap in the current literature is the absence of rigorous, standardized clinical trials specifically investigating Palash Pushpa Churna Lepa for skin anti-ageing outcomes. Most available evidence is confined to in vitro antioxidant assays, animal wound-healing models, and individual phytochemical studies. There is an urgent need for double-blind, randomized controlled trials using standardized churna preparations, validated outcome instruments (Cutometer for skin elasticity, Mexameter for melanin index, TEWL measurements), and robust sample sizes, to generate high-quality evidence suitable for international publication.

VIII. CONCLUSION

Palash Pushpa Churna Lepa, derived from the flowers of Butea monosperma, represents a scientifically plausible and classically validated Ayurvedic intervention for skin anti-ageing. Its pharmacological profile — rich in flavonoids, chalcones, phenolic acids, and triterpenes — aligns with multiple molecular targets of the skin ageing cascade, including oxidative stress, chronic inflammation, MMP-mediated collagen degradation, and impaired barrier function. The classical texts of Ayurveda, spanning Charaka Samhita through Bhavaprakasha Nighantu, provide a consistent and detailed rationale for its dermatological application as a Lepa formulation.

The convergence of this traditional wisdom with emerging phytochemical evidence positions Palash Pushpa Churna Lepa as a promising candidate for integrative dermatological research. Systematic clinical investigations employing standardized formulations, objective biophysical measurements, and appropriate control arms are now essential to translate this ancient knowledge into evidence-based practice — and to introduce this remarkable formulation to the global scientific community.

➢ *Conflict of Interest*

The authors declare no conflict of interest.

➢ *Funding*

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

➢ *Ethical Approval*

Not applicable (review article).

REFERENCES

[1]. Kumari A, Yadav SK, et al. Butea monosperma (PALASH): Plant Review with Their Phytoconstituents and Pharmacological Applications. Journal of Ethnopharmacology. 2025;318:116934.
[2]. Singh G, Kumar P. Phytochemical and pharmacological review on Butea monosperma (Palash). International Journal of Pharmaceutical Sciences and Research. 2012;3(2):467–476.
[3]. Murlidhar A, Babu KS, Sankar TR, et al. Anti-inflammatory activity of flavonoid fraction isolated from stem bark of Butea monosperma (Lam): a

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jun1200

mechanism-based study. International Journal of Phytopharmacy. 2010;1(2):124–132.
[4]. Arefin SM, Islam MA, Rashid ST, et al. Analgesic, anti-inflammatory, anticonvulsant and CNS effects of ethanolic extract of Butea monosperma roots. Asian Pacific Journal of Tropical Biomedicine. 2020;10(3):103–111.
[5]. Bhavamishra. Bhavaprakasha Nighantu (Haritakyadi Varga). Varanasi: Chaukhamba Bharati Academy; 2010.
[6]. Narahari. Raj Nighantu with Dravyaguna Vicharana. Varanasi: Krishnadas Academy; 2012.
[7]. Datta HS, Mitra SK, Patwardhan B. Wound Healing Activity of Topical Application Forms Based on Ayurveda. Evidence-Based Complementary and Alternative Medicine. 2011;2011:134378.
[8]. Tiwari P, Kumar B, Kaur M, Kaur G, Kaur H. Phytochemical screening and extraction: a review. Internationale Pharmaceutica Sciencia. 2011;1(1):98–106.
[9]. Gupta M, Mazumder UK, Haldar PK, et al. Antitumor activity and antioxidant status of Caesalpinia bonducella against Ehrlich ascites carcinoma in Swiss albino mice. Journal of Pharmacological Sciences. 2004;94(2):177–184.
[10]. Acharya JT. Sushruta Samhita (Uttara Tantra). Varanasi: Chaukhamba Surbharati Prakashan; 2019.
[11]. Das G, Patra JK, Debnath T, et al. Investigation of antioxidant, antibacterial, antidiabetic and cytotoxic properties of bark of Butea monosperma (Lam.) Taub: A comparative study. PLOS ONE. 2019;14(6):e0219432.
[12]. Pandey G. Dravyaguna Vijnana (Vol. II). Varanasi: Krishnadas Academy; 2016.
[13]. Mukherjee PK. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. New Delhi: Business Horizons Pharmaceutical Publishers; 2002.
[14]. Bhatt DL, Bhavnani M. Clinical and experimental evaluation of Butea monosperma flower paste (Lepa) in skin conditions: a preliminary observational study. Ancient Science of Life. 2021;40(3):112–118.
[15]. Pharmacopoeia Commission for Indian Medicine & Homoeopathy. Ayurvedic Pharmacopoeia of India (Part I, Vol. IV). New Delhi: Ministry of AYUSH, Government of India; 2020.