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Keshakrishneekarana Lepa of *Arkaprakasha*: A Literary Review with Therapeutic Relevance

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ABSTRACT

The present review explored the classical formulation *Keshakrishneekarana Lepa* from *Arka Prakasha*, which addresses *Palithya*, a condition classified under *Kshudra Roga* in *Ayurveda*. This condition, often linked to an imbalance in *Pitta Dosha* and commonly observed in individuals with *Pitta Prakriti*, has become more widespread in recent times due to factors such as stress, pollution, inadequate nutrition, and genetics. There are growing concerns regarding the adverse effects of conventional synthetic hair dyes and the need for safer, plant-based alternatives. *Keshakrishneekarana Lepa* is a unique formulation comprising *Triphala, Nili Patra, Bhringaraja, Ayomala*, and *Avimutra Arka*, which together provide *Keshya, Palithyahara* and *Rasayana* benefits. Each ingredient was analysed in terms of its traditional use and modern pharmacological properties, including antioxidant, anti-inflammatory, melanocyte-stimulating, and scalp-nourishing effects. Similar *Kesharanjaka Lepas* have also been catalogued through comparative classical references. The scientific basis for the potential of each component to restore pigmentation, rejuvenate follicles, and promote healthy hair growth were highlighted. Notably, the inclusion of *Avimutra Arka* as a delivery medium enhances transdermal absorption due to its *Teekshna* and *Vyavayi* properties, while *Mandura* contributes to improved follicular blood flow and melanogenesis. The incorporation of synergistic herbs and minerals in the formulation is consistent with *Ayurvedic* principles and contemporary scientific findings, indicating the potential reversibility of greying hair through stress reduction and enhanced follicular health. The study concluded that *Keshakrishneekarana Lepa* holds significant promise as a safe and effective natural hair pigmentation therapy, warranting further pharmacological and clinical validation.

Key Words *Arka Prakasha, Hair dye, Kesha, Lepa, Palithya*

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INTRODUCTION

Palithya, or greying of hair, is a condition described in *Ayurveda* as *Kshudra Roga* (minor ailments) and is attributed primarily to an imbalance of *Pitta Dosha*[1]. *Acharya Sharangadhara* identifies *Akaala Palitha* (premature greying) as a typical feature of individuals with *Pitta Prakruthi*[2], reflecting a constitutional predisposition. In the present era, the incidence of hair greying has notably increased, influenced by genetic factors, chronic stress, environmental pollution, and nutritional deficiencies. To manage this condition, many people turn to synthetic hair dyes, which, although effective in covering grey strands, contain harsh chemicals such as para-phenylenediamine (PPD), ammonia, and hydrogen peroxide. These agents may result in adverse effects, including scalp

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irritation, allergic reactions, dryness, breakage, and, in some cases, long-term toxicity. Consequently, there is a growing demand for safer and plant-based alternatives. Although herbal hair dyes are commercially available, most are in the form of powders or pastes and may lack efficient delivery mechanisms or sustained results. *Ayurveda*, with its vast pharmacopoeia, offers unique solutions, among which *Arka* preparations stand out. As described in *Arka Prakasha*, *Arka* is considered *Doṣharahitha* (free of harmful properties) and *Gunasangha Prakasham* (bearing a synergy of beneficial properties)[3]. *Keshakrishneekarana Lepa*[4] is a formulation described in this text that offers a novel approach to natural hair darkening. Despite the popularity of herbal dyes, the integration of *Arka* into such formulations remains unexplored. Interestingly, modern research has begun to challenge the notion that hair greying is irreversible. A study analysing hair pigmentation patterns along individual shafts revealed that some grey hairs can regain their original colour, particularly in response to reduced stress[5], which parallels *Ayurveda's* emphasis on *Doshic* balance in maintaining hair pigmentation and overall health.

MATERIALS AND METHODS

The primary source of this review is from *Arka Prakasha*, along with comparative references from texts like *Bhaishajya Ratnavali*, *Chakradatta*, *Gadanigraha*, *Charaka Samhitha*, *Ashtanga Hridaya*, *Yoga Ratnakara and Sharangadhara Samhitha*. Secondary sources included research papers and other studies. The review is structured thematically to evaluate the classical foundation and explore modern scientific rationale.

Table 1 Ingredients of *Keshakrishneekarana Lepa*

S.NO	INGREDIENTS	BOTANICAL / CHEMICAL NAME	PART USED	QUANTITY
1	*Amalaki*	*Emblica officinalis* Gaertn.	Dried Fruit rind	1 Part
2	*Hareetaki*	*Terminalia chebula* Retz.	Dried Fruit rind	1 Part
3	*Vibhitaki*	*Terminalia belerica* Roxb.	Dried Fruit rind	1 Part
4	*Nili patra*	*Indigofera tinctoria* Linn.	Leaves	1 Part
5	*Bhringaraja*	*Wedalia calendulaceae* Less.	Whole plant	1 Part
6	*Ayomala*	Red iron oxide	Powder	1 Part
7	*Avimutra Arka*	Sheep urine distillate	Urine	Q.S

Table 2 Other *Kesharanjaka Lepa* in different ayurvedic texts

S.NO	FORMULATION	HERBAL INGREDIENTS	MINERAL/ METAL INGREDIENTS	LIQUID MEDIUM	METHOD OF USAGE
	Dugdhikadi yoga[6,7]	*Dugdhika and Karavira*	-	*Ksheera*	After removal of grey hair, this paste has to be applied
	Priyaladhi Lepa[8,9]	*Priyala, Yastimadhu, Jivaka, Rishabaka, Meda, Mahameda, Kakoli, Ksheerakakoli, Mudgaparni, Mashaparni, Jivanti, Madhuka, Tila and Pippali*	-	*Ksheera and Madhu*	Application of this paste on face
	Tiladhi Lepa[10,11]	*Tila, Amalaki,*	-	*Madhu*	Application of the paste.

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	Kinjalka, Madhuka			
Lauhadhi Lepa[12]	*Tandula, Triphala*	*Ayachurna, Saindava*	*Sukthamla*	*Ayachurna* should be cooked with *Saindhava, Suktamla* and *Tandula*. On clean scalp this paste has to be applied and kept overnight. The next day, the scalp is washed with *Triphala kwatha.*
Mamsiyadhi Lepa[13]	*Mamsi, Kushta, Krishna, Sariva, Nilotpala*	-	*Ksheera and Madhu*	Applied as a paste.
Ayorajadhi Lepa[14,15,16,17]	*Bhringaraja, Triphala,*	*Ayoraja, Krishamrittika*	*Ikshu rasa*	Drugs are powdered and kept in *Ikshurasa* for 1 month. Applied as paste.
Loha Lepa[18]	-	*Loha*	*Yavagu of Maha,kodarava and dhanyamala fermented* for 3 days	Applied as paste.
Dhatriyadhi Lepa[19,20]	*Dhathri, Pathya, Vibeetaki, Amramajja*	*Loha*	-	Kept in a *Loha patra* overnight and applied as a paste.
Triphaladhi Lepa[21,22,23,24,25]	*Triphala, Nilipatra, Bhringaraja*	*Ayoraja*	*Avimutra*	Paste in applied on scalp.
Kapalaranjana Lepa[26,27,28]	*Ardhapakwa narikela phala, Triphala, Bhringaraja*	*Lohachurna*	-	The powder in kept in *Narikelaphala* and buried for 1 month. Then the scalp is shaved and this paste is applied and kept for 7 days. On the 8th day, the scalp is washed with *Triphala Kwatha.*
Utpaladhi Lepa[29,30]	*Utpala*	-	*Ksheera*	The paste is kept buried in an iron vessel for 15 days. Then it is applied on the scalp.
Bhringapushpadhi Lepa[31,32]	*Bhringapushpa, Japapushpa*	-	*Meshidugdha, Bhringarajarasa*	The paste is buried for 1 month in an iron vessel. It is then taken and *Bhringarajarasa* is mixed. This paste is applied and kept overnight.
Naradhi Lepa[33,34]	*Naravriksha*	*Sankha bhasma, Sisa, Parada*	*Kanji*	The powders are titurated with *Kanji* and applied, covered with *Arkapatra*.
Lohamalakyadhi Lepa[35,36]	*Amalaki, Japapushpa*	*Loha*	-	Apply the paste overnight.
Indravarunika Bijadhi Lepa[37]	*Indravrunika Bija*	-	*Taila*	Paste is applied.
Palita nasana Lepa[38]	*Triphala, Dadima tvak, bias*	*Loha churna*	*Bhringarajarasa, Chagadugdha*	The powders are mixed with *Bhringaraja rasa* and kept in an iron vessel buried for 1 month. The paste is taken mixed with goat's milk and applied, covered with *Eranda* leaves overnight.
Bhringarajadhi Lepa[39]	*Bhringaraja, Nili, Triphala,*	*Ayorajah*	*Aranala*	Applied as paste.

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	Amrasthi			
Markavadhi Lepa[40]	*Bhringaraja, Musta, Danthi, Sahadeva*	*Loha, Tuttha, Kasisa*	*Taila, Kurmapitta*	Applied as paste.
Lohamaladhi Lepa[41]	*Amalaki*	*Lohamala(Mandura), Yavakshara*	-	Apply the paste.

RESULTS

***Keshakrishneekarana Lepa*[4]:** This formulation is found in *Arka Prakasha – Saptama Satakam* Verse 1. The ingredients in the formulation are *Triphala (Amalaki, Haritaki, and Vibhitaki), Nilipatra, and Bhringaraja (Wedalia calendulaceae* Less.*), Ayomala (Mandura), and Avimutra Arka*. The first six ingredients are to be powdered and mixed with *Avimutra Arka*. This formulation must be applied as a *Lepa* to obtain *the Krishna varna* of the hair. The descriptions of the ingredients are presented in Table 1.

Table 2 presents a comparative analysis of the various *Kesharanjaka Lepas* documented in classical *Ayurvedic* texts. The table illustrates the diversity and complexity of traditional hair pigmentation techniques, emphasising the unique combinations and principles employed in these formulations.

DISCUSSION

Keshakrishneekarana Lepa, a classical *Ayurvedic* external application for reversing greying and promoting healthy hair growth, comprises a synergistic blend of herbs and minerals with well-established *Keshya, Rasayana,* and *Palithaghna* properties. Each ingredient contributes a unique pharmacological action while complementing the efficacy of the others, making the formulation a comprehensive treatment option.

Amalaki, a significant *Rasayana* herb, is integral to this formulation and is renowned for its antioxidant properties, capacity to nourish the scalp, and rejuvenating effects. Although not a primary dyeing agent, *Amalaki* contains high levels of tannins, such as gallic and ellagic acids, which enhance colour fixation when used alongside other natural dyes. Scientific studies have shown that *Amalaki* improves hair strength and elasticity, forms a protective coating over damaged cuticles, and stimulates hair follicles by upregulating growth-related genes such as VEGF, IGF-1, and HGF[42]. This makes it a vital ingredient for both strengthening hair and restoring pigmentation. *Hareetaki* is known for its *Tridoshaghna* and *Yogavahi*[43] properties. It balances *Vata*, *Pitta*, and *Kapha*, thereby addressing the internal imbalances that contribute to *Palithya*. The antioxidant, antifungal, and anti-inflammatory actions of *Haritaki* have been clinically proven to reduce scalp conditions such as *Darunaka* (dandruff), *Rukshata* (dryness), *Kesha Chyuthi* (hairfall) and *Kandu* (itching) while promoting hair root nourishment and detoxification[44]. This supports a healthy scalp environment that fosters melanocyte function and promotes pigment restoration. *Vibhitaki* is especially noted for its *Kapha*-pacifying, *Keshya*, and *Palithaghna* activities[45]. It helps remove follicular blockages, promotes blood flow, and enhances nutrient absorption at the follicular level. Clinical studies on its topical use in *Indralupta* (alopecia) have shown significant follicular stimulation and hair regrowth[46]. Its phytochemical profile, rich in gallic, ellagic, and chebulagic acids and tannins, offers antioxidant, antimicrobial, and immunomodulatory benefits,

further supporting scalp health and hair pigmentation[47].

Nili is traditionally used in *Ayurveda* to blacken hair and promote scalp hygiene. It exhibits a broad spectrum of biological activities, including anti-inflammatory, antifungal, and hair growth stimulation, owing to its high content of phenolic and flavonoid compounds. Modern research confirms its strong antioxidant capacity, which protects hair follicles from oxidative damage and supports melanocyte activity, which is key to melanin synthesis[48]. GC-MS analysis of *Nili* revealed over 26 bioactive phytochemicals with therapeutic relevance, making it an essential component for natural hair colouring and restoration[49]. *Peeta Bhringaraja*, the yellow-flowered variant, is considered superior in managing *Palithya* due to its potent *Keshya* property[50]. Scientific differentiation between *Peeta* and *Krishna Bhringaraja* using advanced methods such as UV-Vis, FT-IR, NMR, and HPTLC confirmed that *Peeta Bhringaraja* had higher total phenolic content[51]. Its antioxidant, cytoprotective, and melanocyte-stimulating properties support its traditional role in enhancing pigmentation and promoting hair regeneration. *Mandura Bhasma* adds value to the formulation as a *Pittashamana* and *Rakthavriddikara*[52]. When used externally, it promotes local blood circulation, enhances oxygen delivery to the hair follicles, and aids melanogenesis. The mild abrasive and penetrative nature of *Mandura* allows better absorption of the components of the *Lepa*, amplifying the effectiveness of the herbs. *Avimutra Arka* offers a unique advantage in formulation due to its *Snigdha*, *Pitta-avirodhi* properties[53] and rich nitrogenous composition[54].These nitrogenous constituents help open blocked follicular pores, creating pathways for deeper herbal penetration. The *Arka* form ensures rapid transdermal delivery, and its *Teekshna*, *Sookshma*, and *Vyavayi* properties act as natural enhancers, making it a powerful *Yogavahi*. It not only assists in the effective transport of other Lepa ingredients to the follicular bed but also stimulates local circulation, detoxifies the scalp, and supports melanocyte function, thereby contributing to both hair regrowth and pigmentation

CONCLUSION

Keshakrishneekarana Lepa, as described in *Arka Prakasha*, is a unique *Ayurvedic* formulation targeting *Palithya*. The components of this *Lepa* have *Keshya*, *Rasayana*, and *Pitta*-balancing properties. The synergistic action of this integrative formulation promotes scalp cleansing and revitalisation, enhances microcirculation and nutrient delivery, stimulates melanogenesis, and restores the natural colour and health of hair, thereby offering greater effectiveness and safety compared to conventional herbal or chemical dyes. Despite its traditional value, scientific exploration of *Lepa* remains limited. Further pharmacological and clinical studies are essential to validate its potential efficacy.

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REFERENCES

1. Sharma P. V. (Ed.). (2013), Sushrutha Samhita Volume II. Chaukhambha Visvabharati Varanasi; Su.Ni.13, p. 90.

2. Rao, P. (Ed.). (2016). Sharangadhara Samhita. Chaukambha Publications, Varanasi; Sha.Sam.P.6/22, p. 32.

3. Pandey, G. (Ed.). (2018). Arka Prakashah. Chowkhamba Sanskrit Series Office, Varanasi; Ar.Pra.1/49, p. 15.

4. Pandey, G. (Ed.). (2018). Arka Prakashah. Chowkhamba Sanskrit Series Office, Varanasi; Ar.Pra.7/1, p. 170.

5. Rosenberg, A. M., Rausser, S., Ren, J., Mosharov, E. V., Sturm, G., Ogden, R. T., Patel, P., Kumar Soni, R., Lacefield, C., Tobin, D. J., Paus, R., & Picard, M. (2021). Quantitative mapping of human hair greying and reversal in relation to life stress. *eLife*, *10*, e67437. https://doi.org/10.7554/eLife.67437

6. Sharma, R. K., & Dash, B. (Eds.). (2018). Charaka Samhita Volume IV. Chowkhamba Sanskrit Series Office, Varanasi; Cha.Chi.26/266½ – ½267, p. 541.

7. Murthy, K. R. S (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/38 ½ – ½ 39, p. 231.

8. Sharma, R.K., & Dash, B. (Eds.). (2018). Charaka Samhita Volume IV. Chowkhamba Sanskrit Series Office, Varanasi; Cha.Chi.26/278 ½ – ½ 279, p. 543.

9. Murthy, K. R. S. (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/39 ½– ½ 40, p. 231.

10. Sharma, R. K., & Dash, B. (Eds.). (2018). Charaka Samhita Volume IV. Chowkhamba Sanskrit Series Office, Varanasi; Cha.Chi.26/279 ½ – ½ 280, p. 543.

11. Murthy, K. R. S. (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/40 ½ – ½ 41, p. 231.

12. Sharma, R. K., & Dash, B. (Eds.). (2018). Charaka Samhita Volume IV. Chowkhambha Sanskrit Series Office, Varanasi; Cha.Chi.26/ 279 ½ - ½ 280, p. 544.

13. Murthy K. R. S. (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/ 41 ½ – ½ 42, p. 231.

14. Murthy K. R. S. (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/ 42 ½ – ½ 43, p. 231.

15. Kumari, A., & Tewari, P. (Eds.). (2019). Yogaratnakara Volume II. Chowkambha Visvabharati, Varanasi; Y.R.62/ 114, p. 992.

16. Rao, P. (Ed.). (2016). Saranghadhara Samhita. Chaukhambha Publications, New Delhi; Sha.Sam.U.11/ 27 ½ – ½ 28, p. 310.

17. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda.1/ 99, p. 29.

18. Murthy, K. R. S. (Ed.). (2009). Astanga Hrdayam (5th ed.). Chowkhambha Krishnadas Academy, Varanasi; A.H.U.24/ 43 ½ – ½ 44, p. 231.

19. Asha Kumari, A., & Tewari, P. (Eds.). (2019). Yogaratnakara Volume II. Chowkambha Visvabharati, Varanasi; Y.R.62/ 114–116, pp. 992–993.

20. Rao, P. (Ed.). (2016). Saranghadhara Samhita. Chaukhambha Publications, New Delhi; Sha.Sam.U.11/ 28 ½ – ½ 30, p. 310.

21. Kumari, A., & Tewari, P. (Eds.). (2019). Yogaratnakara Volume II. Chowkambha Visvabharati, Varanasi; Y.R.62/ 119, p. 993.

22. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 69, p. 938.

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23. Rao, P. (Ed.). (2016). Saranghadhara Samhita. Chaukhambha Publications, New Delhi; Sha.Sam.U.11/ 30 ½ – ½ 31, p. 310.

24. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda1/ 108, p. 31.

25. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 112, p. 433.

26. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 71-72, p. 939.

27. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda1/ 109-111, p. 31.

28. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 113-116, p. 433.

29. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 74, p. 939.

30. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 117, p. 434.

31. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 75-77, p. 939.

32. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 118-120, p. 434.

33. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 78, p. 939.

34. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 121, p. 434.

35. Mishra, S. (Ed.). Bhaisajyaratnavali. Chaukambha Surbharati Prakashan, Varanasi; B.R.60/ 78, p. 939.

36. Tripathi, JV. (Ed.). Chakradatta. Chaukhamba Sanskrit Series Office, Varanasi; C.D.55/ 122, p. 434.

37. Rao, P. (Ed.). (2016). Saranghadhara Samhita. Chaukhambha Publications, New Delhi; Sha.Sam.U.11/ 26 ½ – ½ 27, p. 310.

38. Rao, P. (Ed.). (2016). Saranghadhara Samhita. Chaukhambha Publications, New Delhi; Sha.Sam.U.11/ 31 ½ – ½ 35, p. 310-311.

39. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda1/ 97, p. 29.

40. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda1/ 98, p. 29.

41. Tripathi, I. (Ed.). (1999). Gadanigraha. Chaukhamba Sanskrit Santhan, Varanasi; G.N.Kayachikitsakhanda1/ 112, p. 32.

42. Wongrakpanich, A., Leanpolchareanchai, J., Morakul, B., Parichatikanond, W., & Teeranachaideekul, V. (2022). Phyllanthus emblica extract-loaded transfersomes for hair follicle targeting: Phytoconstituents, characterization, and hair growth promotion. Journal of Oleo Science, 71(7), 1085–1096. https://pubmed.ncbi.nlm.nih.gov/35781257/

43. Sankhyadhar, S. C., & Sankhyadhar, D. (Eds.). (2012). Rajanighantu. Chaukhambha Orientalia, Varanasi; R.N. 11/216, p.622.

44. Sreelekshmi, M., Vimala, K. S., & Paul, R. P. (2018). Effect of Haritaki (Terminalia chebula Retz.) with Takra in dandruff. Journal of Ayurveda and Integrated Medical Sciences, 3(3), 34–39. https://jaims.in/jaims/article/view/398

45. Sankhyadhar, S. C., & Sankhyadhar, D. (Eds.). (2012). Rajanighantu. Chaukhambha Orientalia, Varanasi; R.N. 11/232, p.626.

46. Kathad, D., Bariya, S. K., & Varsakiya, J. (2019). Role of Pracchana Karma followed by Bibhitaki Lepa in Indralupta (alopecia areata). AYUHOM, 6(2), 69–

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73.https://journals.lww.com/ayuh/fulltext/2019/06020/role_of_pracchana_karma_followed_by_bibhitaki_lepa.5.aspx

47. Sharma, P., Verma, K. K., Raj, H., & Thakur, N. (2021). A review on ethnobotany, phytochemistry and pharmacology on Terminalia belerica (Bibhitaki). Journal of Drug Delivery and Therapeutics, 11(1-s), 173–181. https://jddtonline.info/index.php/jddt/article/view/4739

48. Anusuya, N., & Manian, S. (2013). Antioxidant and free radical scavenging potential of different solvent extracts of Indigofera tinctoria L. leaves. International Journal of Pharmacy and Pharmaceutical Sciences, 5(1), 142–147. https://www.researchgate.net/publication/288070727_Antioxidant_and_free_radical_scavenging_potential_of_different_solvent_extracts_of_Indigofera_Tinctoria_L_leaves

49. N, M. D., S, G. K., & V, S. S. (2020). GC-MS Analysis and Phytochemical Screening of Indigofera tinctoria (Linn.) Leaf Extract Characterizing its Medicinal Use. *International Journal of Ayurvedic Medicine*, *11*(2), 289–299. https://doi.org/10.47552/ijam.v11i2.1540

50. Murthy, S. (Ed.). (2004). Bhavaprakasha. Chowkhambha Krishnadas Academy, Varanasi; B.P.P.6(IV)/ 240-241, p.266.

51. Vadivel, V., Anand, P., Monajkumar, S., Nagalingam, V., & Brindha, P. (2017). Development of chemical fingerprints to differentiate the controversial Indian herbal drugs Eclipta prostrata and Wedelia calendulacea (Bhringraja). Bulletin of Pharmaceutical Research, 7(2), 147. https://doi.org/10.21276/bpr.2017.7.2.5

52. Angadi, R. (Commentator). (2020). Rasatarangini Sarma with Transcendence descriptive English commentary. Chaukhamba Surbharati Prakashan, Varanasi; R.T.20/132, p.338.

53. Shashirekha, H. K., & Sukumar, B. S. (Eds.). (2017). Charaka Samhitha. Chaukhambha Publications, New Delhi; Cha.Su.1/ ½ 100, p.32.

54. Bristow, A. W., Cockburn, J. E., & Whitehead, D. C. (1992). Nitrogenous constituents in the urine of cattle, sheep, and goats. Journal of the Science of Food and Agriculture, 59(3), 387–394. https://doi.org/10.1002/jsfa.2740590316