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SHORT REVIEW

Current Clinical Practice of Wound Management through *Ayurveda*: A Scoping Review

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Abstract

Wound healing has been practised since the evolution of mankind in different forms, through different medical and life sciences. This study is about analysing published scientific documentation on wound healing from *Ayurveda* fraternity till now in public domain and understanding different angles of wound managements in clinical practice of *Ayurveda*. Published literature before November 2022 on wound management through *Ayurveda* was accessed through different search engines like, Dhara, Ayush Portal, Google Scholar, J-gate *etc*. with 'wound management in *Ayurveda*', 'wound healing property' key words. Received data was classified on the basis of journal indexing systems, study types and diagnosis. Total 93 scientific articles with different study designs, *i.e.*, Case reports (38), Review studies (28), Clinical studies (17), Experimental works (10) and different indexing systems PubMed (27), Scopus (2), Index Copernicus (61), others (3) were found on Venous Leg Ulcer (VLU) (8), Diabetic foot Ulcer (DFU) (26), Non-Healing Ulcers (NHU) (43) *etc*., with principles applied and their success rates. Obtained data was depicting roles of *Shodhana* (wound cleaning) and *Ropana* (wound healing). Current scoping review provides sufficient evidence on potential role of wound care principles of *Ayurveda* in *Vrana Shodhana* (tissue debridement), and *Vrana Ropana* (tissue healing) purpose.

Major Findings: The study provides consolidated data of published research works on classical medicaments and their utilization in the management of ulcers with a healing purpose. *Ayurvedic* principles of healing and wide range of indications and applications have been proven on modern as well as classical parameters with scientific evidences and assurance.

Keywords: *Ayurveda*, Research Studies, Wound Healing

1. Introduction

Historical background of wound management shows stage wise updates in wound care. *Vedic* literature advocates for scientific use of basics of *Pancha Mahabhuta* principles by using water therapies, earthen packs and herbal pastes. Sage Sushruta (between 1000 to 800 BC), narrated 60 principles of wound management including local and systemic interventions[1]. Use of decoctions, cotton wigs, honey, oils, medicated fumes, tissue reconstruction principles and wound closures have been documented in detail by Sushruta[2]. In modern ages after 17th century, along with war strategies, use of alcohol-based solution came in practice for wound cleaning purpose[3]. Today in 21st century, moisture gauze dressing, disinfection, antiseptics, tulle, paraffin gauze and gel, foam dressing, synthetic wound patch, tissue reconstruction, grafts and flaps, negative pressure wound therapies *etc*., are in current clinical practice of wound care. Antibiosis, anti-inflammatory and nutraceuticals have been common supportive management in wound care.

Starting from *Vedic* era to contemporary age, many natural compounds have been administered with a view to enhance tissue rejuvenation and healing. *Ayurveda*, the science of life, have rich treasure of solutions to deal with contemporary declining health statistics. On the contrary, India being a global capital of diabetes holds

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significant risk of becoming capital for diabetic foot complications too[4]. Lack of tissue perfusion, venous insufficiency, neuropathy, and infection are major causes delayed tissue healing.

To overcome these factors, multiple aspects of wound healing has been studies on scientific base including pharmacology of medicaments, nutritional support, surgical and para-surgical procedures, supplementary medicines and agents, mechanical supports *etc*. Present study is about analysis of the published literature on current practices of wound care in *Ayurveda* in public domain. The study objective was to study the existing scientific literature in public domain on wound management research through Ayurveda till date. To produce an analytical report on the basis of obtained data about research gaps and concepts behind studies conducted.

2. Materials and Methods

The review was conducted in several steps by developing research questions, conducting a systematic review, selecting studies based on our inclusion and exclusion criteria, recording key findings of each study, qualitatively summarizing findings, and providing a conclusion on the extent of research evidence and the need for future research. The systematic review process was followed the guidelines of the Prisma checklist extension for scoping reviews.

2.1 Study Design

The review was designed as a scoping review by retrospective analysis of scientific publications till November 2022 on practices of wound care through *Ayurveda*.

2.2 Data Mining

Primary data mining was done by searching PubMed, Scopus, Index Copernicus, Google scholar indexed articles on wound healing through *Ayurveda* through search engines like Ayush portal, Dhara, NCBI, Google Scholar, Research Gate and J-gate.

2.3 Registration

This review study has been registered with PROSPERO and the receipt acknowledgement number for registration (November 2020) is: CRD42020216417.

2.4 Inclusion Criteria

Studies claiming healing potentials through *Ayurveda* interventions like herbal medicaments, para-surgical, systemic and local therapies especially in the management of non-healing ulcers like diabetic wounds, venous leg ulcer, burn wounds, arterial ulcers, burger disease, *etc*., in humans and experimental models were included for this review process.

2.5 Exclusion Criteria

Studies with ulcers or wounds associated with malignancy, positive virology markers of human immune deficiency virus, Hepatitis B (Australia antigen test), Hepatitis C virus and venereal disease related test markers. (Reactive conditions of S. HIV, HBsAg, VDRL, HCV) and studies with only textual reviews were excluded from the study.

3. Result

Total 93 published articles were studied critically and segregated in different classification with a view to understand and relocate the mechanism of applied therapy and quality of documentation both at one place. Among which (93), total 27 articles (29.03%) have been published in PubMed, 2 articles (2.15%) have been published in Scopus, 61(65.59%) articles have been published in Copernicus indexed journals and 3 articles (3.22%) are published in the journals which are indexed with other indexing systems. Among 93, 38 (40.36%) were case reports, 17 (18.27%) were original clinical studies, 10 (10.75%) were original experimental studies, 28 (30.10%) were literary review studies (Figure 1).

Among all 93 articles, total 26 (27.95%) were on Diabetic Foot Ulcers (DFU), 43 (46.23%) were

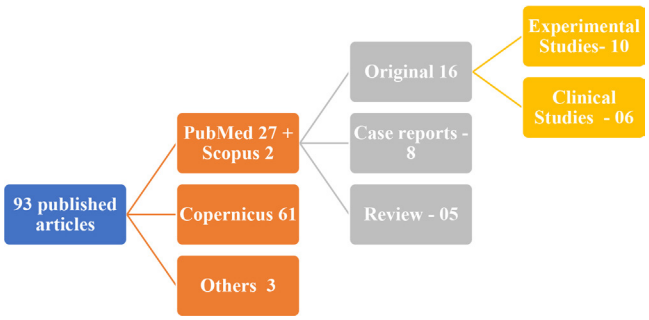


Figure 1. Data extraction from published researches on wound management throgh *Ayurveda* (N=93).

documented on Non-Healing Ulcers (NHU), 12 (12.90%) articles were focusing on medicaments used in experimental, literary and clinical documentations. 8 (8.60%) articles were describing role of *Ayurvedic* management in treating Venous Leg Ulcers (VLU) and 4 (4.3%) were exploring therapeutic role of *Ayurveda* in managing burns, arterial wounds and other non-healing wounds (Figure 2).

93 Articles	Diagnosis wise (93)	DFU - 26
		NHU- 43
		VLU- 08
		AU/BURN- 04
		Drug/Diet- 12
	Study Design (93)	Case study- 38
		Clinical study - 17
		Experimental Study- 10
		Lit. Review study-28

Figure 2. Diagnosis wise and study design wise data of publications.

Among all 29 published studies in PubMed and Scopus indexed journals on wound management, total 34.48% (10) articles were experimental studies, 27.58% (8) articles were case studies, 20.68% (6) articles were clinical studies and 17.24% (5) articles were review studies including literary reviews and conceptual studies (Figure 3).

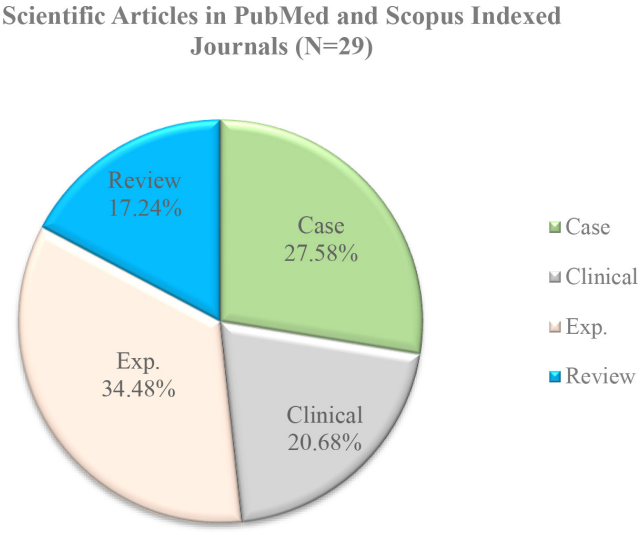


Figure 3. Wound management through *Ayurveda* in public domain in open access PubMed and Scopus indexed journals.

4. Discussion

Global data on wound researches reveals scientific validation of *Ayurveda* clinical principles of wound management in different clinical design and their acceptance in contemporary clinical practice.

4.1 Case Studies

8 single case studies in PubMed indexed journals reflected wound healing potential of treatment protocols and medicaments in *Ayurveda*. *Vrana Shodhana* and *Vrana Ropana* properties of *Madhu* (Honey) and *Neem* (*Azadiracta indica* Linn.) were documented in *Ayurvedic* classics. Dudhamal TS *et.al.*, reported successful use of local application of honey in non-healing ulcer management[5]. He also validated wound cleaning role of *Kashaya Rasa* of both the medicaments. *Kashaya Rasa* dominant medicines contain tannin which are reported having tissue healing effect by removing reactive species oxygen[6]. Meena RK *et al.*, concluded utility of *Panchavalkal* (formulation made up of the bark of five trees *viz. Vaṭa* (*Ficus bengalensis* Linn), *Udumbara* (*Ficus glomerata* Roxb.), *Ashvattha* (*Ficus religiosa* Linn.), *Parisha* (*Thespesia populena* L.) and *Plaksha* (*Ficus lacor* Buch-Ham.), ointment in the management of post fistulectomy wound[7]. *Jatyaditailam* with the *Vimlapana Karma* (gentle rubbing) led to local vasodilatation and thereby the necessary nutrients, oxygen, insulin *etc.*, are carried to the wound site that helps for early wound healing. Tissue regeneration followed by normal blood perfusion helped in healing the DFU[8]. Integration of therapies like *Marma Chikitsa,* honey application, *Triphala Kwatha,* neem and turmeric powder for wound healing purpose have shown positive outcome in short treatment period[9]. *Katupila* (*Securinega leucopyrus* Willd. and Meull.) was proven with wound scavenging activity especially in diabetic wound management[10]. *Panchakarma* procedures and *Ayurvedic* medication were found helpful in managing medium size vessels vasculitis and its superficial skin ulcerations[11,12].

4.2 Clinical Studies

Katupila (*Securinega leucopyrus* Willd. and Meul.) was found significantly effective in managing diabetic wounds in comparison to conventional povidone iodine in 23 diabetic wounds as randomized control trial[13].

Combined effects of Ghee and honey were observed in wound healing for different cases like diabetic wounds, post-operative wounds and chronic non healing wounds. Enhanced tissue healing activity was found in equally proportionate use of honey and ghee. It maintained its viscosity at body temperature and stayed in longer and stronger contact with the wound surface, which ultimately augmented tissue healing activity. Moreover, while honey was used with ghee, it provided anti-microbial, and analgesic effects along with inducing tissue proliferation[14]. Local application of *Madhu* (Honey) possesses antibacterial, wound cleansing, wound healing properties and showed beneficiary effects in chronic wound healing[15]. A polyherbal cream (AHPL/AYTOP/0113 cream) in compare to control drug Framycetin sulphate cream found beneficial in healing acute and chronic wounds in human subjects[16]. Integrative therapy for DFU management including human insulin subcutaneously, tropical herbal dressing and orally *Triphala Guggulu, Asanadi Kashayam* (decoction of *Asanadi Gana* medicines) reported better effect in compare to conventional allopathic management of DFU *i.e*. human insulin sub cutaneous and tropical antiseptic dressing. Treatment satisfaction of both the group cases were recorded and revealed encouraging response of integrated management[17]. *Panchavalkala* cream proven for decreasing the microbial load and is recommended in the management of chronic non healing wounds. The flavonoids rich barks of *Panchavalkala plants* have proven to possess good antioxidant property which helped in tissue healing by anti-inflammatory action and maintaining ROS (Reactive Oxygen Species) mechanism. Tannins and phytosterols promote wound contraction by improving angiogenesis and collagen content[18].

4.3 Experimental Studies

A study with polyherbal formulation was conducted for wound healing activity in comparison to Framycetin Sulphate on Alloxan induced diabetic rat models. The study concluded polyherbal formulation (cream prepared from *Jatyadi* oil, *Yashada Bhasma* and extracts of 7 herbal medicines) was found significantly better in achieving tissue tensile strength and faster wound healing in compare to Framycetin Sulphate[19]. 5 different herbal formulations were analysed for their wound healing activity in excision and incision wound model of Wistar rats. The study concluded wound contraction activity and tensile strength improving role of a combination of Flax seed oil, *Shorea robusta* Roth. resin and *Yashada Bhasma*[20]. Plant extracts of *Vintex negundo L.*, bark of *Emblica officinalis* Gaertn. and whole plant of *Tridax procumbens* L., were analysed for their wound healing activity and found having potential role in tissue proliferation and mobilization of fibroblast and keratinocytes at the site of injury, angiogenesis at the site of healing and reduction in oxidative stress. The formulation was found to contain high number of flavonoids, tannins and phenols which facilitate wound healing[21]. Plant extracts of *Glycyrrhiza glabra* Linn. and *Nerium oleander* L. were studied for their biomedical, chemical, histological and molecular study and were found having rapid epithelization, scar tissue remodelling activity, faster anti-inflammatory changes and an adequate myofibroblast activity at the wound site of animal models[22].

The *Kshatantak Malam* (KM) (an herbal ointment with the plants like *Achyranthes aspera* Linn., *Allium cepa* L., and *Canabis sativa* L.) was studied for its pharmaceutico-analytical parameters. Significant results ($P < 0.05$) were found in experimental study on punch wounds of Wistar rats, in physical parameters like wound contraction size (mm^2), wound index, healing period (days) and tensile strength (g). Biochemical parameters like tissue DNA (mg/g), RNA (mg/g), total protein (mg/g), hydroxyproline (mg/g), PAGE study, and histopathological observations were also revealed significant ($P<0.05$) effect of KM Ointment[23]. Five groups of Wistar rats with diabetic control, non-diabetic, positive control, negative control and non-control were studied for wound contraction rates by application of *Jatyadi Ghrita* in excision models. It revealed anti-inflammatory effect and enhanced the crust formation. Histopathological analysis observations revealed re-epithelialization from 5^{th} day. It also indicated faster maturation of granulation tissue, lesser inflammatory cells and early angiogenesis. The study concluded equivalent wound healing effect of *Jatyadi Ghrita* and mupirocin hydrochloride[24]. Ethanolic extract of *Laghu-Panchamula* containing *Gokshura* and Ethanolic (LPGE) extract of *Laghu-Panchamula* containing *Eranda* (LPEE) reflected with antimicrobial action against skin pathogens and enhanced WBS (Wound Breaking Strength). Rate of wound contraction, skin collagen tissue formation and early epithelization period were reported

with this study. Enhanced tissue healing with histological evidence of increased collagen formation in skin tissues were observed in this study with LPGE and LPEE[25].

Pharmaceutical standardization of *Manthan Tailam* which is beneficial for diabetic ulcer management, revealed presence of alkaloid, saponin, coumarin, steroid, triterpenoid, quinine and furan in aqueous methanolic extract of it. The oil also exerts anti-fungal and anti-bacterial activity[26]. In a comparative study of FDA approved *Manuka* (*Leptospermum scoparium* Forst.) Honey and *Jamun* (*Syzygium cumini* L. Skeels) Honey tropical application in diabetic wounds, *Jamun* Honey promoted sequential stages of wound healing in diabetic mice model. The results of the study established equivalent effect of *Jamun* honey and *Manuka* honey in terms of wound closure, re-epithelialization, collagen deposition and pro-angiogenic potential[27].

4.4 Study Limitations

Practice of wound management requires wholistic approach along with managing wide range of primary and secondary systemic disorders, local wound care, nutrition and other supportive treatment. Protocols from the *Ayurveda* field are yet to be set for the management of Diabetic Foot Ulcer (DFU), Venous Leg Ulcers (VLU), Arterial Ulcers (AU), and other Non-Healing Ulcers (NHUs). *Ayurveda* speaks about *Chikitsa Chatushpada* (Four pillars of therapeutics). Wholistic approach in wound care will be justified by developing clinicians (*Vaidhya*), wound care pharmacists (*Paricharaka*), medicaments protocols of wound care, systemic and local as well (*Dravya*), and patient awareness (*Atura*).

5. Conclusion

Current published literature in public domain on wound care through *Ayurveda* supports the validation of classically documented healing tools, medicines, devices and therapeutic procedures. Remaining aspects of wound care should be developed with a view of prevention and cure as well.

6. Author Contribution

Authors have made extensive efforts in forming scientific manuscript. Study of all fundamental research published in public domain on the concern topic, literature search for supportive data, data extraction and analysis. Writing and drafting of original manuscript have been done by Dr Foram P Joshi. Original draft reviewing, editing, formatting and supervision of the project were done by Prof Dr TS Dudhamal. All authors have read and agreed to the published version of the manuscript.

7. References

1. Acharya YT. Commentary *Nibandha Samgraha* of Dalhana on *sushruta samhita* of *sushruta*, *chikitsa sthana*. Dwivraniya Chikitsit. Chapter 1; Verse 8. 2017. p. 397.
2. Acharya YT (editor), (Reprint ed.), Commentary *Nibandha Samgraha* of Dalhana on Sushruta Samhita of Sushruta, Chikitsa Sthana; *Dwivraniya Chikitsit*: Chapter 1; Verse 11. Varanasi: Chowkhambha Orientalia, 2017; p. 398.
3. Manring MM, Hawk A, Calhoun JH, Andersen RC. Treatment of war wounds: A historical review. Clin Orthop Relat Res. 2009; 467(8):2168-2191. Epub 2009 Feb 14. PMID: 19219516. PMCID: PMC2706344. https://doi.org/10.1007/s11999-009-0738-5
4. Joshi SR, Parikh RM. India- Diabetes capital of the world: Now heading towards hypertension. J Assoc Physicians India. 2007; 55:323-324. PMID: 17844690.
5. Dudhamal TS, Gupta SK, Bhuyan C. Role of honey (*Madhu*) in the management of wounds (*Dushta Vrana*). Int J Ayurveda Res. 2010; 1(4):271-273. PMID: 21455457. PMCID: PMC3059452. https://doi.org/10.4103/0974-7788.76793
6. Chokotho L, Van Hasselt E. The use of tannins in the local treatment of burn wounds - A pilot study. Malawi Med J. 2005; 17(1):19-20. PMID: 27528993. PMCID: PMC3346037. https://doi.org/10.4314/mmj. v17i1.10866
7. Meena RK, Dudhamal T, Gupta SK, Mahanta V. Wound healing potential of *Pancavalkala* formulations in a postfistulectomy wound. Anc Sci Life. 2015; 35(2):118-121. PMID: 26865745. PMCID: PMC4728863. https://doi.org/10.4103/0257-7941.171673
8. Kulkarni YS, Emmi SV, Dongargaon TN, Wali AA. Wound healing effect of *Vimlapanakarma* with *Jatyadi tailam* in diabetic foot. Anc Sci Life. 2015; 34(3):171-174. PMID: 26120233. PMCID: PMC4458909. https://doi.org/10.4103/0257-7941.157164
9. Kizhakkeveettil A, Smirl C, Parla J. Integration of ayurveda and conventional medicine for chronic wound healing. Anc Sci Life. 2018; 37(3):168-172. https://doi.org/10.4103/asl.ASL_108_18
10. Ajmeer AS, Dudhamal TS, Gupta SK, Mahanta V. *Katupila* (*Securinega leucopyrus*) as a potential option for diabetic wound management. J Ayurveda Integr Med. 2014;

5(1):60-63. PMID: 24812478. PMCID: PMC4012365. https://doi.org/10.4103/0975-9476.128872

11. Singh SK, Rajoria K, Sharma S. An *Ayurvedic* approach in the management of *Siragatavata* complicated with *Dusta Vrana*. J Ayurveda Integr Med. 2021; 12(1):151-155. PMID: 32165016. PMCID: PMC8039341. https://doi.org/10.1016/j.jaim.2019.10.006
12. Neelambika GB, Balu V, Rego MR, Kesari C. Integrative approach for diabetic foot management- A case report. J Ayurveda Integr Med. 2018; 9(4):298-301. PMID: 30545739. PMCID: PMC6314231. https://doi.org/10.1016/j.jaim.2018.06.009
13. Ajmeer AS, Dudhamal TS, Gupta SK. Management of *Madhumehajanya Vrana* (diabetic wound) with *Katupila* (*Securinega leucopyrus* [Willd] Muell.) Kalka. AYU. 2015; 36(3):351-355. PMID: 27313426. PMCID: PMC4895766. https://doi.org/10.4103/0974-8520.182744
14. Udwadia TE. Ghee and honey dressing for infected wounds. Indian J Surg. 2011; 73(4):278-283. PMID: 22851841. PMCID: PMC3144338. https://doi.org/10.1007/s12262-011-0240-7
15. Vijaya KK, Nishteswar K. Wound healing activity of honey: A pilot study. AYU. 2012; 33(3):374-377. PMID: 23723644. PMCID: PMC3665090. https://doi.org/10.4103/0974-8520.108827
16. Nipanikar SU, Gajare KV, Vaidya VG, Kamthe AB, Upasani SA, Kumbhar VS. An open label, randomized, comparative, parallel group, multicenter, prospective, interventional, clinical study to evaluate efficacy and safety of "AHPL/AYTOP/0113" in comparison with "Framycetin sulphate cream" in acute wounds. Anc Sci Life. 2017; 36(3):117-128. PMID: 28867855. PMCID: PMC5566822. https://doi.org/10.4103/asl.ASL_52_16
17. Debnath P, Prakash A, Banerjee S, Rao PN, Tripathy TB, Adhikari A, Shivakumar. Quality of life and treatment satisfaction observed among Indians with diabetes foot ulcers undergoing *ayurvedic* adjunct therapy. J Evid Based Complementary Altern Med. 2015; 20(1):13-19. PMID: 25348958. https://doi.org/10.1177/2156587214553304
18. Bhat KS, Vishwesh BN, Sahu M, Shukla VK. A clinical study on the efficacy of *Panchavalkala* cream in *Vrana Shodhana* w.s.r to its action on microbial load and wound infection. AYU (An International Quarterly Journal of Research in Ayurveda). 2014; 35(2):135-140. PMID: 25558157. PMCID: PMC4279318. https://doi.org/10.4103/0974-8520.146216
19. Nehete MN, Nipanikar S, Kanjilal AS, Kanjilal S, Tatke PA. Comparative efficacy of two polyherbal creams with framycetin sulfate on diabetic wound model in rats. J Ayurveda Integr Med. 2016; 7(2):83-87. PMID: 27449205. PMCID: PMC4969312. https://doi.org/10.1016/j.jaim.2015.09.004
20. Datta HS, Mitra SK, Patwardhan B. Wound healing activity of topical application forms based on *ayurveda*. Evid Based Complement Alternat Med. 2011:134378. PMID: 19252191. PMCID: PMC3136177. https://doi.org/10.1093/ecam/nep015
21. Talekar YP, Apte KG, Paygude SV, Tondare PR, Parab PB. Studies on wound healing potential of polyherbal formulation using *in vitro* and *in vivo* assays. J Ayurveda Integr Med. 2017; 8(2):73-81. PMID: 28601354. PMCID: PMC5497006. https://doi.org/10.1016/j.jaim.2016.11.007
22. Kotian S, Bhat K, Pai S, Nayak J, Souza A, Gourisheti K, Padma D. The role of natural medicines on wound healing: A biomechanical, histological, biochemical and molecular study. Ethiop J Health Sci. 2018; 28(6):759-770. PMID: 30607093. PMCID: PMC6308760. https://doi.org/10.4314/ejhs.v28i6.11
23. Gangopadhyay KS, Khan M, Pandit S, Chakrabarti S, Mondal TK, Biswas TK. Pharmacological evaluation and chemical standardization of an *ayurvedic* formulation for wound healing activity. Int J Low Extrem Wounds. 2014; 13(1):41-49. PMID: 24659625. https://doi.org/10.1177/1534734614520705
24. Jamadagni PS, Jamadagni S, Mukherjee K, Upadhyay S, Gaidhani S, Hazra J. Experimental and histopathological observation scoring methods for evaluation of wound healing properties of *Jatyadi Ghrita*. AYU. 2016; 37(3-4):222-229. PMID: 29491675. PMCID: PMC5822989. https://doi.org/10.4103/ayu.AYU_51_17
25. Ghildiyal S, Gautam MK, Joshi VK, Goel RK. Wound healing and antimicrobial activity of two classical formulations of *Laghupanchamula* in rats. J Ayurveda Integr Med. 2015; 6(4):241-247. PMID: 26834423. PMCID: PMC4719484. https://doi.org/10.4103/0975-9476.157952
26. Arunadevi R, Susila R, Murugammal S, Divya S. Preparation and standardization of *Mathan Tailam*: A classical *Siddha* formulation for diabetic ulcerative wound healing. J Ayurveda Integr Med. 2020; 11(1):10-15. PMID: 29555256. PMCID: PMC7125365. https://doi.org/10.1016/j.jaim.2017.08.011
27. Chaudhary A, Bag S, Banerjee P, Chatterjee J. Wound healing efficacy of Jamun honey in diabetic mice model through reepithelialisation, collagen deposition and angiogenesis. Journal of Traditional and Complimentary Medicine. 2020; 10(6):529-543. https://doi.org/10.1016/j.jtcme.2019.10.002