INTERNATIONAL JOURNAL IN PHARMACEUTICAL SCIENCES

Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

A Review On Multipurpose Therapeutic Use Of Herbal Gel

Shinde Smruti[1], Shinde Soham[2], Shinde Vaishnavi[3], Shirfule Pragati[4], Shrungare Aishwarya[5], Chintale Ashwini*

[1,2,3,4,5] B. Pharm Final Year, Saraswati Institute of Pharmacy Kurtadi, Hingoli.

Associate Professor, Department. Head of Pharmaceutics, Saraswati Institute of Pharmacy Kurtadi, Hingoli-431701

ARTICLE INFO

Received: 15 Dec 2023
Accepted: 19 Dec 2023
Published: 23 Dec 2023

Keywords:
cyonodon dactylon, vitex neugondo, extraction, anti-inflammatory activity.

DOI:
10.5281/zenodo.10408739

ABSTRACT

In this review the study of traditional plants which are using to prepare herbal gels for multipurpose. Herbal medicines is still the mainstay of about 75-80% of the world's population, mainly in developing countries, for primary health care because of better cultural acceptability, better compatibility with human body and lesser side effects. Herbal medicines consist of plant or its part to treat injuries, disease or illnesses and are used to prevent and treat diseases and ailments or to promote health and healing. Herbal medicines are the oldest form of healthcare known to mankind. From that the Herbal Gel are used topically for treating many disorders. By the extraction of plant herb formulate the herbal gel with adding some components such as Carbopol 934, HPMC K 100 Mand Xanthan gum showed good homogeneity, no skin irritation, good stability and anti-inflammatory activity. The extract shows best and promising activity. Now a day's topical agents are widely used to treat skin conditions.

INTRODUCTION

India has rich tradition of plant based on knowledge of healthcare. The use of the plant-based medication is gradually becoming popular throughout the world.[1] Topical gel preparations are intended for skin application or to certain mucosal surfaces for local action or percutaneous penetration of medicament. Gels are typically semi-solid formulations having a liquid phase that has been thickened with other components. Herbal remedies are getting increasing patient compliance as they avoid of typical side effects of allopathic medicines.[1] Traditional medicines play an important role in health services around the globe. About three quarters of the world population relies on plants and plant extracts for health care. A large number of Indian medicinal plants are attributed with various pharmacological activities as they contain diversified classes of photochemical. The opoids or non-steroidal anti-inflammatory drugs,

***Corresponding Author:** Ashwini Chintale

Address: *Associate Professor, Department. Head of Pharmaceutics, Saraswati Institute of Pharmacy Kurtadi, Hingoli-431701*

Email ✉: ashu6728@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

widely used to reduce the inflammation of various types, suffer from severe side effects like redness, itching etc. As a result, a search for other alternatives seems to be necessary which would be more beneficial. Gel formulations are used to deliver the drug topically because of easy application, increase contact time and minimum side effects as compare to other topical preparation and oral administration. [2] Medicinal plants are rich in several potential drugs and it holds healthier and harmless alternate to synthetic drugs. Different parts such as leaf, root, stem, fruit, seed, and park are used to obtain several phytochemical constituents. In addition, medicinal plants are rich in biologically active compounds and play an important role in drug discovery. Extracts of medicinal plants are useful in the treatment of several health problems such as bacterial infections, ulcers, arthritis [3] and inflammatory [4]. For the obtaining of these drugs used various types of extraction methods such as maceration method, Soxhlet apparatus methods, percolation method, distillation etc. Herbal gel is a solid, jelly-like substance that can have properties ranging from soft and weak to hard and tough preparation. It is used topically for a variety of purposes, such as protectants, antiseptics, and antimicrobials. The herbal gel was made by using various traditional plants which are applicable for treatment of different disorders like anti-inflammatory activity, anti-ulcer activity, anti-diabetic activities, allergies, arthritis, anticonvulsants, wound healing etc. The plants including Cynodon Dactylon linn, Punica Ganatum, thymus vulgaris, vitex neugondo etc.The plant cynodon dactylon is a medicinal plant having family poaecae is used in clinical practice and having anti-inflammatory activity, wound healing, anti-diabetic and many others. By the using Soxhlet extraction formulate herbal gel.Other drugs are mentioned in below.

ADVANTAGES OF GEL FORMULATIONS: [5,6]

The gel formulation has several key benefits over conventional semisolid dose formulations

1. Compared to other formulations, gels are simple to manufacture.
2. Gel is a sophisticated, non-greasy composition.
3. Gels offer fantastic adhesion to the application region.
4. Gels are eco-friendly and biocompatible.
5. Be incredibly resilient to stressful situations.

DISADVANTAGES OF GEL FORMULATION: [7,8]

Despite having a number of benefits. Gel formulations can come with certain drawbacks.

1. Gels have a more gradual and persistent effect.
2. The additives or gelators could irritate people.
3. The risk of microbial or fungal assault on gel is increased by the presence of water.
4. The formulation's solvent loss dries to gel.
5. In some gels, flocculation results in an unstable gel.

Ideal properties of topical gel: [9]

1. The gel taught to be uniform and transparent.
2. When shear or force is applied during the container's shaking, the gel should break easily.
3. The gel should have an inert composition.
4. The gel must not be sticky.
5. The gel shouldn't ever contact with another component in the formulation.
6. The gel must be reliable.
7. The skin or any area where the gel is placed shouldn't be irritated.
8. The gel should be inert in nature.
9. The gel should be non-sticky.
10. The gel should not interact with any other formulation component.
11. The gel should be stable.

12. It should be non-irritate to the skin or any part where the gel is applied.
13. The viscosity is should be optimum.
14. It should have anti- microbial activity.

CLASSIFICATION OF GELS [10]

Gels can be classified based on colloidal phases, nature of solvent used, physical nature and rheological properties

Based on colloidal phases

They are classified into:

a Inorganic (Two phase system)
b Organic (Single phase system)

Inorganic (Two-Phase System)

The system consist of floccules of tiny particles rather than larger molecules and the gel structure will be unstable if the dispersed phase partition size is especially large and develops a three-dimensional structure throughout the gel. They must be thixotropic, which means that when disturbed, they transform from a semisolid to a liquid. Gel made of aluminium hydroxide and bentonite magma is two examples.

Organic (Single Phase System)

On the twisted threads, there are large organic molecules that are continuously dissolved. The majority of organic gels are single-phase solutions made up of organic liquids such Plastic base and gelling agents like carbomer and tragacanthin.

Based on Nature of the Solvent

Hydrogels: (water based):

A hydrogel is three-dimensional networks of hydrophilic polymers that can grows in water and contain a significant quantity of water while maintaining their structural integrity due to the chemical or physical cross-linking of individual polymer chains. Hydrophilic colloids like silica, bentonite, tragacanth, pectin, sodium alginate, etc. provide an example. The hydrogel may be utilised as an ECG medical electrode, rectal medication delivery system, and sustained release drug delivery system.

Organogel: (With a non-aqueous solvent):

A liquid organic phase is contained within a three-dimensional, cross-linked network in an organogel, a type of gel. The addition of a polar solvent causes the organo gelling or gelation of lecithin solution in organic solvents.

Xerogels:

Xerogels are solid-formed gels created by allowing materials to gently dry at room temperature while experiencing unrestricted shrinking. Viscous sintering takes place when a xerogel is heated over a certain point, thereby turning the porous gel into a thick glass. Examples include polystyrene, dry cellulose, and tragacanth ribbons. Gels are occasionally categorized as plastic gels, pseudo-plastic gels, and thixotropic gels because they display non- Newtonian flow.

Based on Physical Nature

Elastic gels:

Agar, pectin, Guar gum, and alginates gels have an elastic property. At the point of junction, the fibrous molecules are joined by comparably weak connections such as hydrogen bonds and dipole attraction. If the molecule has a free -COOH group, a salt bridge of the type -COO-X-COO forms an extra bond between two adjacent strand networks.

e.g.: Alginate and Carbopol

Rigid gels:

This can be made from macromolecules with primary valence bonds connecting the framework. e.g. Silic acid molecules are kept together in a silica gel by the Si-O-Si-O link, resulting in a polymer structure with a network of pores.

There are various types of herbal gel are formulated by using different plant herbs are as follows:

Sr No	Plant Name	Used Part of Plant	Extraction Method	Chemical Constituents	Medicinal Use	Image of Plant
1.	Cynodon Dactylon [11]	Whole Plant	Soxhlet Apparatus Method	• Terpenoids, • Vitamin • C,Flavonoids • Luteolin, • Orientin, • Neoxanthin, • Saponins, • Volatile Oils.	• Anti-Inflammatory • Wound Healing, • Anti-Diabetic	
2.	Caradios porium halicaca bum [11,12]	Leaves	Soxhlet Extractor	• 1,2,4-trioxolane-2-octanic acid, • 5-octyl methyl ester, ethanol 2 [9-octadecenyloxy] • 1,2,4-Trioxolane-2-octanic acid, • 5octyl methyl ester	• Antibacterial • Antifungal • Antiparasitic • Antidiaarrhoeal.	
3.	Anticard ium occident ale linn [13,14]	Leaf	Soxhlet Extractor	• Ascorbic Acid, • Thiamine • Riboflavin • Niacin	• Antibacterial, • Antifungal, • Antiprotozoal, • Antihelminthic Antiviral activities	
4.	Lantana Camara [15,16/ 17]	Leaves	Microwave	• L. Camara Are Germacrene D • Ecaryophyllene • Bicyclogermacren • A-Humulene	• Ulcers, • Wounds, • Tumours, • Eczema	
5.	Piper betle and Thymus vulgaris[18]	Leaves	Soxhlet Extractor	• Thymol (23%–60%), • Γ-Terpinene (18%–50%), • P-Cymene (8%–44%), • Carvacrol (2%–8%)	• Anti-Bacterial, • Immunomodulatory, • Antioxidant • Anti-Inflammatory	

6.	Andrographis Paniculata[19,20]	Leaves	Maceration Method	• Diterpenoids, • Flavonoids • Polyphenols	Anti-bacterial property	
7.	Trigonella foenum Greacum [21,22,23	Seed	Soxhlet Extractor	• Carbohydrates • Proteins, • Lipids, • Alkaloids, • Flavonoids, • Fibers, • Saponins, • Steroidal • Saponins, • Vitamins, • Minerals, Nitrogen	Anti-inflammatory properties	
8.	Vitex negundo [24,25]	Leaves	Hot Extraction Method using Soxhlet Apparatus & Methanol By Cold Maceration Process	• Terpenoids, • Lignans, • Flavonoids, • Alkaloids • Glycosides	Anti-Inflammatory Analgesics Activities	
9	Tridax Procumbens[26,27]	Leaves	Soxhlet Apparatus	• Terpenoids, • Lignans, • Flavonoids, • Alkaloids • Glycosides	• Anti-Inflammatory • Analgesics Activities	
10	Fagonia schweinfurthii [28,29]	Plant	Soxhlet Apparatus	alkaloids, starch, protein, tannin, flavonoid, terpenoid, carbohydrates, lignin and phenols	Inflammation, open wounds, boils, skin eruptions, allergies	
11	Turmeric [30,31]	Rhizome	Steam Distillation	• Curcumin, • Demethoxycurcumin, • Bisdemethoxycurcumin	• Skin Cancer, • Small Pox, • Chicken Pox, • Wound Healing, • Urinary tract Infections	

	Acalypha indica [32]	Leaves ,Stem, Flowers,Used Rootsand, Seed	Soxhlet Apparatus	• Steroids And Triterpenoid, • Ethanolic Showed The Presence Steroids • Triterpenoids • Glycosides, • Carbohydrate • Alkaloids, • Flavonoids, • Tannins	• Anthelmintic • Anti-Inflammation, • Anti-Bacterial, • Anti-Cancer, • Anti-Obesity, • Hepatoprotective • Hypoxia, • Wound Healing Medicine	
	Bael leaf [33,34]	Leaves	Soxhlet Apparatus	• βcaryophilene, • viridifloral 4-terpeniol	• Anti-inflammatory • Arthritic Disorders	
	Azadirachta Indica [35,36]	Leaves	Soxhlet Apparatus	• isomeldenin, • Nimbin, • Nimbinene, 6- • Desacetyllnim • Binene, • Nimbandiol, • Immobile, • Nimocinol, • Quercetin,	• Antibacterial, • Anthelmintic, • Antiviral, • Anticancer	
	Aloe [30]	Leaves	Soxhlet Apparatus	• Nataloins, • Picric Acid, • Oxalic Acids, • Nitric Acid	• Gastrointestinal Disorder, • Atherosclerosis • Coronary Heart Diseases	
	Carica papaya[37]	Leaf	Cold Maceration Process	• Ascorbic Acid, • Carpine, • Calcium, • Sodium, • Chymopapin, • Papain.	• Anti-Inflammatory • Antifungal, • Wound Healing.	
	Solanum lycopersicum [38]	Fruit	Supercritical Fluid Extraction	• Lycopena, • Vitamin, • Protein, • Essential Amino Acids.	• Skin Inflammation • Dark Spots, • Acneand • Blackheads	

	Fragaria X ananassa [39]	Fruit	maceration process	• Ascorbic Acid, • Phenolic Compounds • Anthocyanins, • Protosianidin • Flavonoids	• Antiallergic, • Anti Mutagenic, • Antimicrobial, • Anti tumergenic, • Wound Healing.	
	Daucus carota [40]	Fruit	Soxhlet apparatus	• Moisture • Protein • Fat (0.2%) • Carbohydrate (10.6%), • Rude Fiber • Total Ash • Ca • Fe • P (53 Mg/100 G)	• Relaxes and Soothes Blood Vessels	
	Citrus sinesis [41]	Fruit	Soxhlet apparatus	• Limonene, • Ethyl Butanoate, • Octanal, • Decanal, • Hexanal, (S)- • Linalool, • Hydrocarbons, • Alcohols, • Aldehydes, • Esters	• Acidity, • Stomach Ulcer, • Heartburn	
	Ananas comosus [42]	Fruit	Soxhlet apparatus	• Gallic Acid, • Syringic Acid, • Vanillin, • Ferulic Acid, • Sinapic Acid, • Coumaric Acid, • Chlorogenic	• Bacterial infection • Viral infections • Antioxidants • Absorbs ions • Vitamin C deficiency	

CONCLUSION

The use of Herbal gel getting more popular nowadays because they are more stable and also provide control release than other semisolid dosages forms. The topical gel improves the skin's capacity to absorb medication, increasing bioavailability. A topical administration system's main advantage is that it avoids first-pass metabolism. Additionally, it offers high patient acceptance. The majority of the time, when another method of medication administration has a lower bioavailability, topical distribution is preferred. Topical gel is a safe and effective therapy option for use in the management of skin-related illnesses, according to the clinical data.[36]

ACKNOWLEDGEMENT:

The authors are thankful to Management and Principal Ashok Muchandi, Saraswati Institute of Pharmacy, Kurtadi, Kalamnuri for his assistance and providing the valuable suggestion.

REFERENCES

1. Sudipta D, Haldar P: Formulation and evaluation of herbal gel containing clerodendron infortunatum leaves extract. International Journal of PharmTech Research 2010;.3:140-143.
2. Johnson AW, Snook ME, Wiseman BR:Green leaf chemistry of various turfgrasses: differentiation and resistance to fall armyworm. Crop science 2002; 1-6.
3. Patwardhan S, Bodas KS, Gundewar S: Coping with arthritis using safer herbal options. Int. J. Pharm. Pharmcol. Sci 2010 ;2 (1):1-11.
4. Shah BN, Seth AK, Maheshwari KM : A review on medicinal plants as sources of anti-inflammatory agents. Res. J. Med. Plant.2011; 5:101-115.
5. Florence AT, Attwood D. Physicochemical Principles of Pharmacy. Pharmaceutical Press, London, UK, 2011.
6. Loyd VA, Nicholas G. Popovich, Howard C. Ansel. "Ansel's pharmaceutical dosage forms and drug delivery systems. 9th ed. Philadelphia: Lippincott Williams & Williams; (2011).
7. Muhammad Ali Sheraz, Iqbal Ahmad:Pharmaceutical Gels: A Review.RADS-JPPS 2016 4 (1), 40-46
8. Suchithra. A. B, S. Jeganath, E. Jeevitha: Pharmaceutical Gels and Recent Trends –A Review.Research J. Pharm. And Tech.2019; 12(12): 6181-6186.
9. Karande P,Mitragotri S:Enhancement of transdermal drug delivery via synergistic action of chemicals,Biochemical etc. Biophysical Actas 2009; 17:2362-2373.
10. Zatz JL. Pharmaceutical dosage form: Disperse system. 2nded. New York: Marcel Dekker. 2005;399- 421.
11. Babu, K.C.V, Krishnakumari S: Cardiospermum halicacabum suppresses the production of TNF-α and NO by human peripheral blood mononuclear cells. Afr. J. Biomed. Res 2006; 9:95-99.
12. Aishwarya V, Abdulla SS, Dheeba B, Renuka R: In vitro antioxidant and anticancer activity of Cardiospermum halicacabum L. against EAC cell line. Int J Pharm Pharm Sci 2014;6(8):263-268.
13. Ajileye O.O, Obuotor E.M, Akinkunmi E.O, Aderogba M.A. Isolation and characterization of antioxidant and antimicrobial compounds from Anacardium occidentale L. (Anacardiacea) leaf extract. Journal of King Saud University – Science, 27, 2015, 244–252.
14. Yogini Jaiswal, Vinayak Naik, Pratima Tatke, Satish Gabhe and Ashok Vaidya. Pharmacognostic and preliminary Phytochemical investigations of Anacardium occidentale (Linn.) Leaves. International Journal of Pharmacy and Pharmaceutical Sciences,4 (3), 2016, 625-631.
15. Bairagi S, Pathan I, Nema N. Analgesic and Anti-Inflammatory Activity of Crude Leaf and Bark Extract of Lantana Camara. Marmara Pharm J. 2017; 21(4): 810-817.
16. Yadav A, Mohite S. A Brief review: Microwave chemistry and its applications. Res. J. Pharma. Dosage Forms and Tech. 2020; 12(3): 191-197.
17. Chitruk A, Yadav A Rode P, Mohite S, Magdum C. Synthesis and toxicological evaluation using brine shrimp lethality assay of Novel 1,2,4-triazole derivatives with anticancer activity. Int. J. Curr. Adv. Res. 2020; 09(08)(A): 22877-22881.
18. Hashemi SA., Madani SA., Abediankenari S. The review on properties of Aloe vera in healing of cutaneous wounds. Biomed. Res. Int, 2015, 714216.
19. Dahlan A. Formulation and characterization of Anti-bacterial gel using Tenggek Burung

(Milicope ptelefolia). Department of Pharmaceutics, Faculty of pharmacy, Cyberjaya University college of medical science, Lot 3410 jalan Teknokrat

20. Pawar. D, Formulation and evaluation of herbal gel containing Lanata Camara leaves extract, Asian j pharm clin Res vol 6 issue 3, 2013, 122-124
21. Schmolka IR. Preparation and properties of Pluronic PF-127 gels for the treatment of burns. J Biomed Mater Res 1972; 6:571–82.
22. Rababah TM, Hettiarachchy NS, Horax R. Total phenolics and antioxidant activities of fenugreek, green tea, black tea, grape seed, ginger, rosemary, gotu kola, and ginkgo extracts, vitamin E, and tertbutyl hydroquinone. J Agric Food Chem 2004; 52:5183-6.
23. Dixit P, Ghaskadbi S, Mohan H, Devasagayam TPA. Antioxidant properties of germinated fenugreek seed. Phytother Res 2005; 19:977-83.
24. S. Sosa, M. Balick, R. Arvigo, R. Esposito, C. Pizza, G. Altinier, A. Tubaro, J.of Ethnopharmacol., 2002, 81, 211-215.
25. C. N. Nair, N. Mohenan; Medicinal plants in India with special reference to Ayurveda. NAG Publisher, Delhi, India 1998.
26. K.R.Khandelwal, Vrunda Sethi, Practical Pharmacognosy, Nirali prakashan, 2013, pp. 25.1-25.7.
27. Mukherjee, P.K., Mukherjee. K., Pal, M., And Saha, B.P.,Wound Healing Potential Of Nelumbo nucifera (Nymphaceae) Rhizome Extract. Phytomedi., 7, 2000, pp. 66-73
28. Abdel-Khalik SM, Miyase T, Melek FR, el-Ashaal HA Further saponins from Fagonia cretica. Die. Pharmazie 2001 ;56(3): 247-250
29. Anjum MI, Ahmed E, Jabbar A, Malik A, Ashraf M, Moazzam M, Rasool MA: Antimicrobial constituents from Fagonia cretica. J. Chem. Soc. Pak.2007; 29(6): 634-639.
30. VD Nilima S. Dharkar, swamini Chavanke,: formulation and evaluation of haridra in gel form, volume9,issues 8, 2020.
31. Ajav Sai prasad, AJ V Ratna Manikyam Achant lakshmi, a research article on Analytical evaluation of aqueous extract of haridra
32. Carter Sj. Disperse System. In Cooper and Gunn's Tutorial Pharmacy. 6th Ed. New Delhi: Cbs Publishers and Distributors; 2000, 68-72
33. R. khullar,Formulation and evaluation of mefenamic acid emulgel for topical delivery,Saudi Pharmaceutical journal , vol. 20, pp. 63-67, 2012.
34. R.R.Kulkarni,Antioxidant and Anti-inflammatory Activity of VitexNegundo,International Journal of Pharmaceutical 2008;70:838–840,.
35. Alzohairy, M.A., 2016. Therapeutics role of Azadirachta indica (Neem) and their active constituents in diseases prevention and treatment. Evidence-Based Complementary and Alternative Medicine, 2016.
36. Https://www.dabur.com/amp/in/en-us/about/science-of-ayurveda/herbal-medicinal- plants/benefits-anduses-of-neem
37. Alabi OA, Haruna MT, Anokwuru CP, Jegede T,Abia H, Okegbe VU and Babatunde EE.[2012].Comparative studies on antumocrobial properties of extracts of fresh and leaves of carica papaya (L) on clinical bacterial and fungalisolates. Advances in Appied Science Research, 2[3], 347-351
38. Stahi W, Siese H. photoprotection by dietary carotenoids: concept, mechanisms, evidence and future development. Mol nutr food Res 2012; 56:287-95.

39. Tjokroprawiro, A (1996), diabetes mellitus, klasifikasi, diagnosis, dan dasar dasar terapi, Edisi . jakarta:PT. Gramedia pustaka utama.
40. Asha, V, Pushpangadan, P. Anti-pyretic activity of Cardiospermum halicacabum. Indian J. Exp. Biol. 1999; 37:411-414, Blois MS.antioxidant determinations by the use of a stable free radical. Nature, 1958;181:1199-1200.
41. GS. Sharma*, Lankala Anusha, R. Shireesh Kiran, K. Geetha, T. Rama Rao, A Review on Pharmaceutical Gels, YMER, V 21: 12(2022), Page No:1338-1351.

HOW TO CITE: Shinde Smruti, Shinde Soham, Shinde Vaishnavi, Shirfule Pragati, Shrungare Aishwarya, Chintale Ashwini*, A Review On Multipurpose Therapeutic Use Of Herbal Gel, Int. J. in Pharm. Sci., 2023, Vol 1, Issue 12,557-566.
https://doi.org/10.5281/zenodo.10408739