International Journal of Pharmaceutical Chemistry and Analysis 2023;10(3):140–143

Content available at: https://www.ipinnovative.com/open-access-journals

International Journal of Pharmaceutical Chemistry and Analysis

Journal homepage: https://www.ijpca.org/

Review Article

An overview on topicl gels and camphor and eucalyptus

Vishal Raj[1], **Rajni Yadav**[1,*], **Sandip Prasad Tiwari**[1]

[1]*Dept. of Pharmacy, Kalinga University, Faculty of Pharmacy, Chhattisgarh, India*

ARTICLE INFO

Article history:
Received 05-06-2023
Accepted 14-07-2023
Available online 15-09-2023

Keywords:
Topical gels
Pharmaceuticals
Eucalyptus

ABSTRACT

Across all over the world, the science of pharmacy and pharmaceuticals lead to an evolution in a very large aspect. The pharmaceutical industries of many countries with good economical background produces and develops really good medicinal products originating from both natural and artificial sources and one of the product which is highly used by the pharmaceuticals as well as by the cosmetic industries is topical gels. These products along with some other preparations have up lifted the pharmaceutical industries to a new level in the last 2-3 decades.

As we know that these gels are applied on the upper most layer of skin so that it can get absorb to the down most layer to reach the systemic circulation by penetrating and crossing the by lipid layer. These gels come with various functionalities like to alter the appearance, for healing factor as well as for making the skin hydrated and filled with collagen again many pharmaceutical industries nowadays create these gels mostly with natural substances so that they can get more positive and beneficial effects and the least amount of adverse effects and almost no toxicological effects.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

One of the medicinal preparations that is used the most frequently worldwide is topical gel. Because topical gels have a higher demand across all age groups and in both sexes, as well as multiple functionalities like pain relief, rehydrating action, anti-wrinkle action, and healing factors, many different pharmaceutical industries, including medicinal and cosmetic factories, produce and develop these gel as their primary preparations. Both types of bases—oil in water and water in oil—are available for these gels. Numerous variables are assessed as these gels are being made, and the preformulation consideration process is also being watched before the gels are manufactured. The gels constitutes the specific API (active pharmaceutical ingredient) along with different excipients and additives like preservative, fragrance, glidant and some other binders. During the manufacturing of gels, they undergo various types of chemical and physical changes which are some times irreversible. During the evaluation, some physical and chemical parameters like pH, viscosity, surface tension, absorption rate etc are the primary concern which need to be looked out carefully because they are the primary aspect and comes before the evalution of biological parameter.[1]

To create topical gels, they are some specific guideline, rules and regulation that are meant to followed by every industries nd these guidelines are issued by various governing authorities. The need to issue these gudielines is because it contains some specific information regarding the safety of human health, efficacy and potency of the drug which is used, and also some information about its overdose and toxilogical effects. The biggest advantage of using topical gels is that it is user friendly and can be used by any person at any time and at any place because it doesn't

* *Corresponding author*.
E-mail address: rajniyadav@kalingauniversity.ac.in (R. Yadav).

https://doi.org/10.18231/j.ijpca.2023.025
2394-2789/© 2023 Innovative Publication, All rights reserved.

require any medical expert and supervision.[2]

The two natural ingredients utilized in many pharmaceutical preparations are camphor and eucalyptus because of their wide range of therapeutic benefits in treating a wide range of diseases. The use of camphor outside of medicine occasionally also has a cooling effect. The production of tropical gels from these sources can occasionally be delayed by a lack of resources, and the use of these herbal medicines can also cause production delays. In some cases, it can also be laborious to evaluate both of these substances using various criteria. Because they have greater positive effects and nearly no negative consequences, gels with ayurvedic compositions are in higher demand in many nations. The International Association for the Study of Pain claims that pain is an intricate phenomenon that involves nociception, afferents to the central nervous system, modulation, emotional responses, endogenous analgesia, behavioural adjustments, and changes in social roles. As long as the pain triggers are endured, the pain degenerates into an independent reaction and persists even when the main stimulus is eliminated.[3]

Chronic pain continues to confound medical professionals despite technological advancements and thorough established treatments.1 This is in part due to the three factors that contribute to the pathogenesis of pain: nociception (pain sensation and topography), emotional (fear and depression), and behavioral factors (catastrophism, vigilance, and somatic awareness). The limited efficacy of analgesics, systemic side effects, and cognitive impairment caused by medications owing to central effects are only a few of the challenges that pain management encounters and limit the success of therapeutic interventions.

New medication delivery methods are being developed as our understanding of pain aetiology and treatment expands with the aim of aiming to block pain at peripheral locations with the greatest amount of active medicine and the fewest possible systemic side effects. Such investigation leads to topical preparations.[4]

1.1. Classification and categories of gels

As we know, that these Pharmaceutical topical gels are used for various purposes but sometimes the question arises that there are how many types of jails which are made and manufactured in the industries and are used for what kind of works? Show the continuous hard work and high throughput screening of research and development sectors classified these gels mainly into two.

Categories: organogel and hydrogel. An organogel is a category of gel which is made up of a liquid organic phase within a 3D structure and the nature around the 3D structure is cross linking network. Ahydrogel if somewhat similar to organogel but the primary difference is that they contains very large amount of water as compared to organogel.

Fig. 1: Topical gel constituting eucalyptus and camphor

The primary difference between these two types of gels is that organogel mainly uses a solvent which is completely organic in nature and doesn't require water but in case of hydrogel water is the primary solvent.[5]

1.2. Mechanism of action

Gels are typically thicker than liquids, and as a result, they are also thought of as more semi-solid dose topical treatments. Alcohol is typically used as the major solvent in gels. The gels are more frequently self-drying agents, making them simpler to use.

These jewels primarily have a straightforward mechanism of action because, when applied to the outermost layer of skin, which also contains body hair, and gently massaged throughout the area to be treated, they primarily pass through the skin because they are able to enter the skin pores and cross all of the layers of skin, which primarily include the epidermis, dermis, and hypodermis. Since they were created specifically for them, they primarily cross the bilipid layer. As was already noted, these gels contain different formulations that must be taken into account. When the active pharmaceutical ingredient interacts with the precise targeted receptors, a confirmation change that affects both structure and function occurs. When camphor is applied to the skin, it activates the nerve endings, providing pain, itching, and irritation alleviation. Camphor also has a straightforward method of action. Camphor is frequently used in practically every home and is typically a volatile material. Camphor leaves a cooling sensation after being applied to the skin and then feels somewhat heated. By stimulating TRP vainloidsubtype1 (TRPV1) and TRPV3 receptors, which are essentially heat sensitive in nature, camphor stimulates and desensitises sensory nerves.[6]

2. Treatment

The topical gel made up of eucalyptus and camphor when applied on the skin, gives proper relief from pain because they both belongs to the analgesic category of drugs which reduces the pain. Apart from the pain, they both are used to make the person relieve from itching and sometimes also reduces inflammation. Both of these substances also helps to reduce bacterial contamination and fungal infections

because they have got antibacterial and antifungal properties as well. These topical gels are often used by elder persons, athletes and sometimes by adults because it is generally seen that many of them are more involved in physical activities. The biggest advantage of using eucalyptus and camphor as an active pharmaceutical ingredient in topical gels is that they have almost no side effects as both of them are natural substances and the second biggest advantage is that everyone can get the benefits of these two substances as when they are available in the form of tropical gels than anyone can apply it without any supervision of medical expert. The small disadvantages of these gels are that they are more time consuming to give the pharmacological effect and to get the desired effect the patients have to apply them multiple Times unlike an intravenous injection which gives instant results.[7]

The degree to which a patient follows the recommended regimen for taking their medications is known as adherence. Among chronic conditions, nonadherence might have a modest or considerable influence. Poor adherence to drug use and medical guidance compromises the effectiveness of treatment in many disorders.[8]

Recently, a number of classes of correlates of long-term medication adherence have been identified and can be categorised into the following groups: patient (history of depression and substance abuse), contextual (social support and socioeconomic status), clinician communication skills (patient-clinician relationship), disease (chronicity and symptom burden), health care delivery (wait for appointment and medications), and treatment regimen factors. Due to the significant methodological heterogeneity of measurement, analysis of treatment adherence among chronic illnesses fails and produces contradictory results. Although this is a barrier, it is still possible to identify the key therapeutic regimen components that directly affect patient adherence.[9]

Several studies point to the benefit of reducing the complexity of the regimen, typically by reducing the number of pills and dosage, while a few come to the conclusion that there is no systematic distinction between the effects of changing doses and those of other behavioural interventions. While some drugs' half-lives help with management and lessen the effects of taking multiple doses per day, according to the research, they do not always guarantee patient compliance. High dose and adverse effects, according to the World Health Organisation, are the biggest obstacles to adherence when it comes to regimen variables.[10]

3. Applications

As we know that there are many users of these type of gels but specifically they are applied in some industries like food industry, in the field of biotechnology, pharmaceutical industry, cosmetic technologies etc.

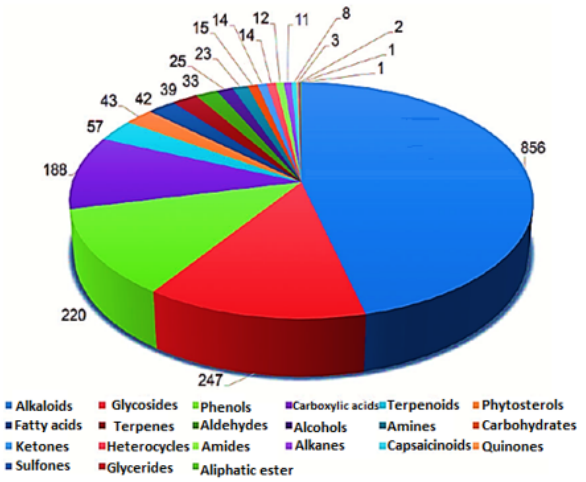

Fig. 2: Stratical data of phytoconstituent of natural substances

4. Summary

After reading this article, readers can conclude that topical gels are among the most significant pharmaceutical products because they can benefit any patient in a variety of ways, are simple to use, and don't require medical supervision. Both eucalyptus and camp are natural ingredients that are utilised in a variety of pharmaceutical products because they have a variety of beneficial effects, including analgesic, anti-itch, antibacterial, and antifungal characteristics. The pharmaceutical businesses must take into account numerous three formulation factors in order to produce these kinds of gels using natural ingredients. Afterward, a variety of assessment criteria must be used to determine the product's quality and quantity.

5. Conclusion

After reading this article the readers can conclude that eucalyptus and camphor when used individually or when used in a combination produces therapeutic and pharmacological effects which are really beneficial to mankind. The biggest advantage of using these natural substances is that they have almost no adverse toxicological effect and can be used by anyone when presscribed. Both eucalyptus and camp for contains different and various types of phytoconstituents which possesses their own separate functions and each of them when isolated and involved in any Pharmaceutical preparation leads to greater bioavailability buy simple mechanism of action.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Tyler VE, Brady LR, Robbers JE. Evaluation of Toxicological Profile of a Polyherbal Formulation. *Lee Febiger*. 1988;7(1):56–63.
2. Owlia P, Saderi H, Rasooli I, Sefidkon F. Antibacterial characteristics of some herbal oils on pseudomonas oeruginosa with special reference to their chemical compositions. *Iran J Pharm Res*. 2009;8(2):107–21.
3. Essien JP, Akpan EJ. Antifungal activity of ethanolic leaf extract of Eucalyptus camaldulensis Dehn. Against ringworm pathogens. *Global J Pure Appl Sci*. 2004;10:37–41.
4. Tavares M, Silva D, Rodrigues LB, Siqueira D, Bodjolle RA. Trends in insect repellent formulations: A review. *Int J Pharm*. 2018;539:190–209.
5. Sanderson JM, Ward AD. Analysis of liposomal membrane composition using Raman tweezers. *Chem Commun (Camb)*. 2004;9(9):1120–1.
6. Ortan A, Câmpeanu G. Studies concerning the entrapment of Anethum graveolens essential oil in liposomes. *Roum Biotechnol Lett*. 2009;14:4411–8.
7. Riaz M. Liposomes Preparation Methods. *Pakistan J Phar Sci*. 1996;19(1):65–77.
8. Sokolova AS, Yarovaya OI, Shernyukov AV, Gatilov YV, Razumova YV, Zarubaev VV. Discovery of a new class of antiviral compounds: Camphor imine derivatives. *Eur J Med Chem*. 2015;105:263–73. doi:10.1016/j.ejmech.2015.10.010.
9. Sanderson JM, Ward AD. Analysis of liposomal membrane composition using Raman tweezers. *Chem Commun (Camb)*. 2004;9(9):1120–1.
10. Owlia P, Saderi H, Rasooli I, Sefidkon F. Antibacterial characteristics of some herbal oils on pseudomonas oeruginosa with special reference to their chemical compositions. *Iran J Pharm Res*. 2009;8(2):107–21.

Author biography

Vishal Raj, Assistant Professor https://orcid.org/0000-0002-6754-2802

Rajni Yadav, Head

Sandip Prasad Tiwari, Research Scholar

Cite this article: Raj V, Yadav R, Tiwari SP. An overview on topicl gels and camphor and eucalyptus. *Int J Pharm Chem Anal* 2023;10(3):140-143.