REVIEW ARTICLE

REVISTA ENFERMAGEM ATUAL IN DERME

USE OF VASELINE IN THE PREVENTION AND TREATMENT OF SKIN LESIONS: AN INTEGRATIVE REVIEW

USO DE VASELINA EN LA PREVENCIÓN Y TRATAMIENTO DE LESIONES EN LA PIEL: UNA REVISIÓN INTEGRATIVA

USO DE VASELINA NA PREVENÇÃO E TRATAMENTO DE LESÕES DE PELE: UMA REVISÃO INTEGRATIVA

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ABSTRACT
Objective: To summarize the scientific evidence on the use of petroleum jelly in the treatment and prevention of skin lesions. **Method:** This is an integrative literature review, searching the virtual health library (VHL) and the PubMed and Cochrane Library databases. The guiding question was "What is the scientific evidence on the use of petrolatum and its derivatives for skin and wound care?" including articles published between 2012 and 2023. **Results:** The search resulted in a total of 2,041 publications, which when evaluated taking into account their relevance to the topic, thus filtering 19 articles for this review. **Conclusion:** Studies indicate that the use of Vaseline is effective and safe, resulting in a reduction in infectious conditions, a reduction in the appearance of new lesions, prevention of dermatitis and an increase in emollient therapy, in addition to being a low-cost treatment, accessible to the population.
Keywords: Vaseline; Emollients; Wounds and Injuries; Nursing; Revision.

RESUMEN
Objetivo: Resumir la evidencia científica sobre el uso de vaselina en el tratamiento y prevención de lesiones cutáneas. **Método:** Se trata de una revisión integradora de la literatura, buscando en la Biblioteca Virtual en Salud (BVS) y en las bases de datos PubMed y Cochrane Library. La pregunta orientadora fue "¿Cuál es la evidencia científica sobre el uso de vaselina y sus derivados para el cuidado de la piel y las heridas?" incluyendo artículos publicados entre 2012 y 2023. **Resultados:** La búsqueda arrojó un total de 2,041 publicaciones, las cuales al ser evaluadas teniendo en cuenta su relevancia para el tema, filtrando así 19 artículos para esta revisión. **Conclusión:** Los estudios indican que el uso de vaselina es efectivo y seguro, resultando en una reducción de condiciones infecciosas, una reducción en la aparición de nuevas lesiones, prevención de dermatitis y un aumento de la terapia emoliente, además de ser un tratamiento de bajo costo, accesible a la población.
Palabras clave: Vaselina; Emolientes; Heridas y Traumatismos; Enfermería; Revisión.

RESUMO
Objetivo: Sintetizar as evidências cientificas sobre o uso da vaselina no tratamento e na prevenção de lesões de pele. **Método:** Esta é uma revisão integrativa da literatura, com busca na biblioteca virtual em saúde (BVS) e nos bancos de dados PubMed e Cochrane Library. Utilizou-se como pergunta norteadora "Quais as evidências científicas sobre o uso do petrolato e seus derivados para o cuidado com a pele e feridas?" sendo incluídos artigos publicados entre 2012 e 2023. **Resultados:** A busca resultou em um total de 2.041 publicações, que ao serem avaliadas levando em consideração sua relevância ao tema, filtrando-se assim para esta revisão 19 artigos. **Conclusão:** Os estudos indicam que o uso da vaselina é eficaz e seguro, resultou na diminuição de quadros infecciosos, diminuição no aparecimento de novas lesões, prevenção de dermatites e aumento da terapia emoliente, além de ser um tratamento de baixo custo, acessível à população.
Palavras-chave: Vaselina; Emolientes; Ferimentos e Lesões; Enfermagem; Revisão.

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INTRODUCTION

The skin is the largest organ in the human body and indispensable for life. It is responsible for covering and protecting internal structures, isolating them from the external environment, and is divided into epidermis, dermis and subcutaneous tissue.[1] When the skin is unable to perform its function when undergoing changes, whether nutritional or perfusional, due to the appearance of comorbidities or changes in temperature and humidity[2], in addition to the expected and natural skin aging that is expressed through the fragility of the dermis and epidermis[37], the tissue becomes prone to the appearance of injuries.[2]

Skin lesions, or wounds, are defined as ruptures of the integumentary, structural and physiological segments of any part of the body, resulting from the action of physical, chemical or biological agents.[3] Skin lesions can be acute, caused by trauma, falls, weapons and burns, and can be chronic or hard to heal, related to a disease that needs to be identified and controlled.[4]

Wounds that do not respond to treatment as expected, based on scientific evidence, are called difficult-to-heal wounds. In addition, all hard-to-heal wounds are believed to contain biofilm. These wounds are considered a public health problem worldwide and are costly for health systems, as they require complex treatments, home care, long hospital stays in some cases, and have a high risk of recurrence.[5] Moreover, as a consequence of this hardness in terms of healing, there is a reduction in the quality of life of these individuals, resulting in low adherence to treatment and, consequently, other health problems.[6]

Many coverings in the form of sheets, foams, etc., as well as ointments, emollients and other substances are used in an attempt to prevent lesions and promote healing. Among the emollients and humectants, it is worth noting the role of vaseline, which has these two properties, is obtained from oils from petroleum refinement, mixed with paraffin and other additives to achieve a solid consistency.[7]

Also known as petrolatum, vaseline is hydrophobic and is used in the pharmaceutical and cosmetics industries because it is a powerful moisturizer that penetrates deep into the stratum corneum, reducing transepidermal water loss, as well as being easy to apply and remove, extremely accessible and inexpensive. It is worth mentioning that petrolatum is rarely associated with allergic reactions, but the molecular changes resulting from its use are still unknown.[7] This hypoallergenic characteristic is due to the fact that petrolatum is inert, as it does not change chemically when in contact with the skin and does not bind to proteins.[8]

Given its wide use, it is necessary to review the studies already published to confirm the safe use of Vaseline in the prevention and topical treatment of skin lesions.

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METHODS

Search strategy

This is an integrative review of the literature on the use of vaseline in skin care for the prevention and treatment of wounds, which was carried out following the guidelines for PRISMA reviews (*Preferred Reporting Items for Systematic Review and Meta-analysis Protocols*) and elaborated through the following steps: elaboration of the guiding question, literature search, data collection, analysis of the studies included and discussion of the results. For this review, two experienced researchers searched for studies on the topic in the PubMed, Cochrane Library and LILACS databases using the DeCS/MeSH descriptors: *petrolatum* AND *skin*, *skin care*, *wounds* AND *injuries*, *wound healing* and *emollients*. The search included studies published in the period from 2012 to 2023 and these were imported through EndNote Basic references to the online platform Rayyan (*Qatar Computing Research Institute*).

Inclusion and exclusion criteria

The first step of searching the databases and virtual library using the descriptors resulted in a total of 2,041 publications corresponding to the topic. Articles were included if their abstracts contained at least one of the following words: vaseline, petrolatum or emollient and if they were published between January 2012 and March 2023. These articles were then assessed through their abstracts to see if there was a link with the guiding question: what is the scientific evidence on the use of petrolatum and its derivatives for skin and wound care?

Duplicate articles and systematic reviews were excluded. After the inclusion and exclusion steps, the researchers read and assessed the articles in full to confirm eligibility. At the end of the screening process, 19 articles were chosen for this integrative review.

Assessment of the level of evidence

The GRADE quality system was used to classify the articles according to their level of evidence. The articles were defined as having a high (n=3), moderate (n=9), low (n=7) and very low (n=0) level of evidence. The results of the assessment were included in the table detailing the articles (Table 1).

RESULTS

The first step of searching the databases and virtual library using the descriptors resulted in a total of 2,041 publications corresponding to the topic. After screening the abstracts, looking at those that answered the guiding question and had the *words vaseline, petrolatum* and *emollient*, 20 publications remained, displayed below by the PRISMA flowchart.

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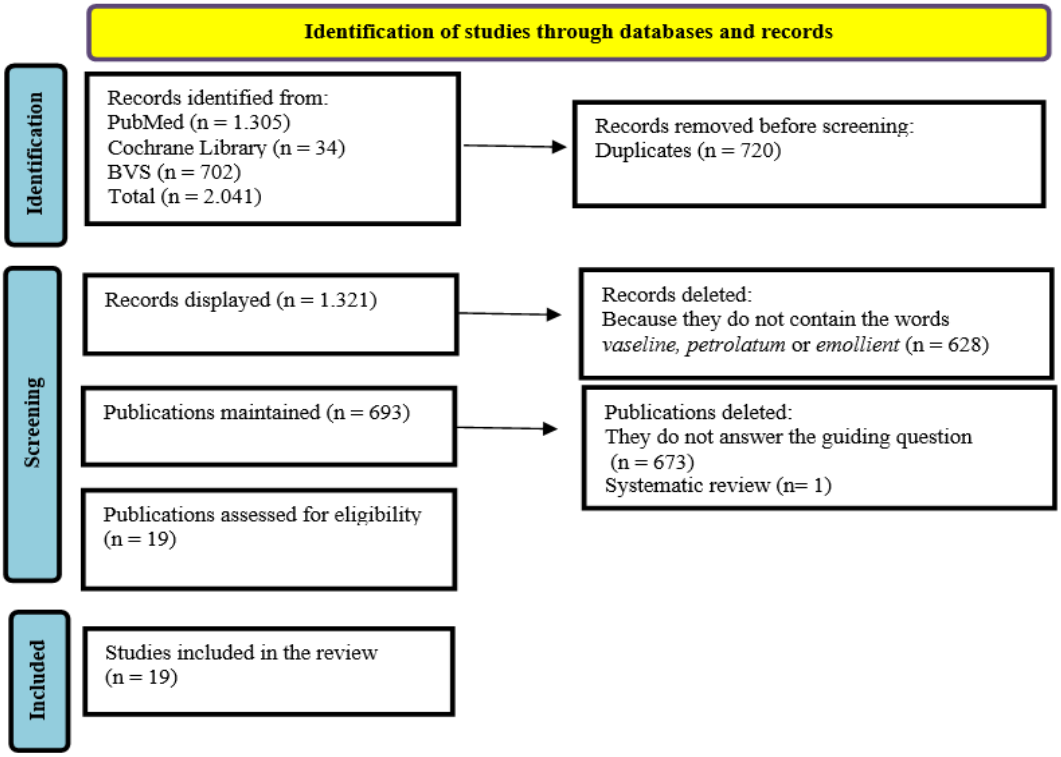
Figure 1 - Flowchart for identifying and selecting studies, based on the PRISMA recommendation, 2020. Vitória, 2023.



Source: Authors, 2023.

Table 1 shows a brief detailing of each publication selected, and these publications have been separated into categories: treatment (T), prevention (P), prevention and treatment (PT).

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Table 1 – Details of the studies selected. Vitória, 2023.

ID	Author/year	Method/sample	Intervention	Aim	Findings	Level of evidence
P1	Ordoñez-Toro, et al[9] 2022	Randomized controlled study N = 60	● Vaseline ● Foam ● Beeler base ● Water in oil (W/O) ● Oil in water (O/W) ● Control	To assess changes in skin homeostasis following the application of five vehicles to the skin of healthy individuals.	After the vaseline vehicle was applied to the skin, there was a significant reduction in transepidermal water loss, erythema, an increase in melanin, hydration of the stratum corneum and elasticity. Temperature and pH showed no significant difference.	High
P2	Karakoç, et al[10] 2022	Randomized clinical trial N = 90	● Sunflower seed oil ● Vaseline	To test the efficacy of sunflower seed oil and liquid vaseline in maintaining the integrity of the skin of term and pre-term neonates in the neonatal ICU.	The group of neonates that received liquid vaseline during the 16 days showed significant hydration, as did the group that received sunflower seed oil.	High
P3	Genedy-Kalyoncu, et al[11] 2021	Randomized clinical trial N = 12	● Vaseline ● Control	To investigate the existence of an association between a basic skin care intervention and the adhesion strength of the dermoepidermal junction in elderly people.	During the eight weeks of the study, the intervention group (vaseline) showed greater hydration than the control group (no product). There was no significant change in epidermal thickness in either group. There was a prolongation of blister formation time in the intervention group, suggesting an increase in dermoepidermal adhesion.	Moderate
P4	Meng, et al[12] 2021	Randomized clinical trial N = 06	● Vaseline ● Bionics Vernix Caseosa Cream (BVC)	To investigate the penetration and effect on the skin of BVC cream moisturizers and vaseline.	The penetration depth of vaseline is greater than that of BVC cream. As for hydration, BVC cream can increase water content and aid in repair for skin protection, while vaseline only prevents water loss.	Moderate

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P5	Wei, et al[13] 2020	Randomized controlled study N = 45	• Lipid product without rinsing • Regular body soap • High deposit body soap with petrolatum	To quantify the treatment effects of body wash products.	Treatment with the lipid product and the high-deposit product with petrolatum reduced dryness and transepidermal water loss and increased hydration. Treatment with a regular product decreased hydration and increased transepidermal water loss.	Moderate
P6	Murakami, et al[14] 2020	Randomized clinical trial N = 29	• Petrolatum-based ointment (NOV®II Moisture Balm) • White vaseline (control)	To compare the efficacy and usability of a newly developed petrolatum-based ointment and white vaseline in individuals with atopic dermatitis and xeroderma.	There was no significant difference in the hydration resulting from the two products, but NOV®II ointment promoted greater application comfort. Both products increased the water content in the stratum corneum and the amount of free amino acids and reduced transepidermal water loss.	Moderate
P7	Vaiillant, et al[15] 2020	Randomized study N = 49	• V0034CR emollient • Vehicle • Vehicle + glycerol • Vehicle + petrolatum	To assess the effect of emollient V0034CR (vehicle + glycerol + petrolatum) compared to vehicle, vehicle + glycerol and vehicle + petrolatum.	The V0034CR emollient and the vehicle + petrolatum product showed an improvement in the skin barrier function by reducing transepidermal water loss and increasing the skin moisture content, indicating that the formulation with the petrolatum adjuvant improves the skin barrier function, unlike the glycerol component.	High
P8	Brooks, et al[16] 2016	Pilot study N = 10	• Control • Wet gauze + soap • Wet gauze • Vaseline • Wet gauze + soap + vaseline • Wet gauze + soap + glycerine + vaseline	To assess the effect of low-cost emollient and hygiene regimes on the barrier function of the skin of elderly people with leg xerosis.	The group that received the regimen consisting of soap + glycerin + vaseline showed an improvement in skin barrier function and a significant reduction in transepidermal water loss.	Low
P9	Alonso, et al[17] 2013	Randomized clinical trial N = 229	• Vaseline • Control	To assess the effectiveness of Vaseline in preventing rashes.	There was a lower incidence of diaper rash in the vaseline experimental group (17.1%) than in the control group (22.2%), but the difference was not statistically significant.	Moderate

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T1	Fang, et al[18] 2020	Clinical trial N = 16	• Sterile gauze with chitosan • Sterile gauze with vaseline • Dressing with vaseline and chitosan (CVG)	Development of a dressing (CVG) with antibacterial and healing properties.	The dressing with CVG showed a significant increase in skin moisture. It also inhibited *E. coli* and *S. aureus*. The dressing significantly facilitated wound healing. There were no allergic reactions.	Moderate
T2	Farage, et al[19] 2018	Experimental laboratory research N = 04	• Petrolatum-based emollient • Control	To investigate whether there is a change in skin pH after using the emollient product.	Petrolatum-based emollients created a protective barrier and helped to maintain the skin healthy acidity.	Low
T3	Genuino, et al[20] 2014	Randomized clinical trial N = 38	• Vaseline • Control	To establish whether the treatment of partial burns with vaseline is as effective as conventional treatment with silver sulphadiazine.	There was no significant difference in re-epithelialization time between the groups. The dressing with vaseline proved to be less adherent to the wound bed and easy to remove and with fewer traumas to the wound. The dressing with silver sulphadiazine required more changes and was more painful and traumatic for the wound. In terms of cost, vaseline is more affordable.	Low
T4	Morales-Burgos, et al[21] 2013	Prospective comparative study N = 76	• Aquaphor Healing Ointment (AHO) • Vaseline • Control	To compare the reaction of primarily closed wounds to the application of AHO, white vaseline and no ointment.	The application of AHO resulted in significantly more erythema and edema than white vaseline. It also resulted in the appearance of more scabs than the other groups.	Low

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T5	Wiegand, et al[22] 2019	Randomized clinical trial N = 12	• Cotton with vaseline • Gauze with TLC • Gauze with vaseline + carboxymethylcellulose • Gauze with vaseline + hydrocolloid • Gauze with glycerin • Tulle with vaseline + carboxymethylcellulose • Non-adherent dressing + cellulose acetate + silicone • Transparent dressing with silicone • Double-sided dressing with silicone	Comparison of non-adherent dressings in wound healing.	Dressings with vaseline, lipid-colloid technology (LCT), hydrocolloid (HC) and silicones prevent damage to the newly formed tissue during dressing changes, positively influencing healing.	Moderate
T6	Vaheb, et al[23] 2020	Randomized study N = 35	• Amniotic membrane allograft (AM) • Gauze with vaseline	To investigate whether AM treatment is superior to the use of gauze with vaseline in areas of partial-thickness skin grafting.	The group treated with AM showed a significant improvement in epithelialization after 10 days. There were no significant differences in the rate of wound healing, pigmentation and vascularization of the site, suggesting that AM is not superior to Vaseline gauze.	Low
PT1	Hong, et al[24] 2023	Clinical trial 3D human skin N = 03	• Biotin • Glycerol + petrolatum • Control	To assess and validate the occlusive and moisturizing properties of moisturizers with glycerol and petrolatum.	Moisturizers that include occlusive and humectant ingredients physically prevent transepidermal water loss and replenish the water molecules of the inner layers in order to maintain the physiological condition of the stratum corneum.	Low
PT2	Czarnowicki, et al[25] 2016	Cohort study N = 49	• Petrolatum • Control	To define the molecular and structural skin effects induced by petrolatum in atopic dermatitis.	Occlusion of the skin with petrolatum induced an increase in antimicrobial peptides and innate immunity. There was also a significant increase in the thickening of the stratum corneum.	Low

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PT3	Saco, et al[26] 2014	Systematic review and meta-analysis Four studies N = 3.120		To analyze the efficacy of topical antibiotics in preventing infections of dermatological post-surgical wounds compared to petrolatum.	Petrolatum should be used as a prophylactic measure for post-surgical wound infections from outpatient dermatological procedures, as it provides a moist environment that promotes healing, rather than bactericidal actions that can lead to adverse events and increase bacterial resistance.	Moderate
PT4	Lee, et al[27] 2015	Retrospective study N = 414	• Fusidic acid • Petrolatum	To compare the efficacy and safety of fusidic acid and petrolatum after clean dermatological procedures.	Both groups showed comparable efficacy in the healing process and there was no appearance of secretion, pain, edema or dehiscence. The rate of adverse events was 1.4 in the fusidic acid group (3) and 0.5% in the petrolatum group (1).	Moderate

Caption: P – prevention; T – treatment; PT – prevention and treatment.

Source: Authors, 2023.

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All the studies were published in international journals, in English, and 2020 stands out as having the highest number of publications (n=6). The treatment category has the lowest number of articles (n=6), compared to the prevention category (n=9), reflecting the need for more studies on the topic, given the potential of this product in terms of wound treatment. The publications included clinical studies with human beings and research with a variety of in vitro models.

The intervention groups in each study have been highlighted to make it easier to understand the data displayed in the table. It can be seen that nine studies did not use control groups – without the use of products.

In terms of origin, we have five studies from the USA, two studies from Germany, two studies from China and two studies from the UK, and we have Switzerland, Turkey, Iran, Japan, France, South Korea, the Philippines and Spain, with one study each.

DISCUSSION

Regarding the prevention of wounds, the hyperkeratosis consensus highlights the undeniable importance of using emollients and humectants, especially in individuals with more vulnerable skin conditions, such as the elderly patients.[28] The daily use of vaseline helps to cleanse the skin, especially in individuals with xerosis and hyperkeratosis, as it facilitates the removal of scales without causing bleeding or epidermal trauma. This importance is reaffirmed by the studies P5, P6, P7 and P8.

As for cleansing vulnerable skin, the aforementioned consensus provides evidence that a cleansing regimen combining a soap substitute, a type of bath oil and an emollient product replaces aggressive detergents that can compromise the skin barrier and allow pathogens and allergens to enter, and this accurate substitution is demonstrated in the studies P5 and P7. This regimen is known as complete emollient therapy, which consists of the use of emollient creams and emollient wash products with or without rinsing.[29]

All aggressive soaps and detergents should be replaced by more emollient products, which provide an occlusive layer on the stratum corneum, causing the water that would otherwise be lost to return to the corneocytes, improving the integrity of the skin barrier. These emollients must be cosmetically acceptable, with a pleasant, effective and low-cost formulation, as demonstrated in the studies P1, P3, P4 and PT1.

Some studies also corroborate the emollient regimes indicated by the incontinence-associated dermatitis consensus, which show the effectiveness of petrolatum-based emollients in preventing diaper rash and perilesional dermatitis.[30]

The emollient soothes and softens the skin, reducing harmful infiltration, creates a protective film on the nerve endings of the epidermis and dermis, reducing itching and mild pain.[36] It also acts as an emollient by entering the skin desquamative spaces, restoring the smooth surface, maintaining the normal pH of the

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corneal surface and reducing allergic reactions, as demonstrated in the studies P2 and P9.

When it comes to treating wounds, emollients help to prepare the bed and the perilesional area. The use of vaseline in the preparation for instrumental wound debridement has been widespread in recent decades, especially in wounds with hyperkeratosis and dryness of the surrounding skin. The emollient should be used every day for hygiene and moisturizing preparation to facilitate the removal of non-viable tissue.[31]

When in the healing phase, appropriate dressings favor tissue regeneration. These are dressings that help to maintain tissue moisture and do not cause trauma to the bed during changes, aiding healing by second intention.[32] Non-adherent dressings impregnated with petrolatum have been used in this phase of healing, as they protect the granulation tissue and prevent adherence to the bed, resulting in non-painful changes, as demonstrated in the studies T1, T5 and T6.[33]

Vaseline has also been an adjuvant in minimizing wound infections, whether superficial or deep, reducing the need for topical antibiotics and replacing old treatment protocols, as seen in the studies T1, T3, PT3 and PT4. In addition, the use of petrolatum maintains skin pH and reduces skin irritation, which could lead to new lesions during treatment, as seen in the studies T2, T4 and PT2.

Vaseline is a semi-solid mixture of hydrocarbons obtained by dewaxing heavy mineral oils derived from petroleum. A study held in 2011 showed that there may be potential health risks linked to the use of petrolatum, due to the possibility of impurities in the compound even after dewaxing, but this same study also showed that if there is penetration, it is limited to the stratum corneum.[34] The risk of continued exposure to any cosmetic product is obvious, but current legislation allows a certain amount of harmful substances in all products on the market, and as seen in the studies found, the use of petrolatum did not result in contamination of any individual.[35]

It is well known that advances in the pharmaceutical industry have culminated in the development of several effective products for the prevention and treatment of skin lesions, but many of these are inaccessible to low-income populations and underdeveloped countries. In this sense, it should be emphasized that the cost of emollients and humectants plays an important role in the choice, since the product will be used for long periods, and that the best product is the one that the patient can afford to buy, use constantly, in the appropriate quantity and with the required safety.[28]

CONCLUSION

The aim of this review was to bring together studies that corroborate the safe use of vaseline, making its use based on scientific evidence, encouraging new studies on current formulations. Vaseline has been shown to facilitate the wound healing process and, if used as an emollient and moisturizer, to reduce hyperkeratosis when used as an adjuvant to the

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treatment of the underlying disease. It has also been shown to be effective in preventing dermatitis and an adjuvant in preventing infections, as well as being efficient in preventing skin lesions.

It must be stressed that vaseline has been the victim of cosmetic terrorism for a long time. This terrorism is caused by the dissemination of diffuse information, based on superstitions, beliefs and misguided studies. And, as seen in this review, the safety of vaseline has been gradually attested to, while reactions and ineffectiveness of the product are not reported by health bodies and medical skin societies.

However, there is a trend in society that rejects the use of products whose production chain harms the environment, such as products of mineral origin, including vaseline. And there is a strong call for the use of plant-based products, known as “clean beauty”. Even in the face of this clamor, more studies are needed to show whether vaseline has any potential as an endocrine disruptor or any other harm in its topical use, whether in the area of wounds or in the cosmetics industry.

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Declaration of conflict of interest

Nothing to declare.

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