BG Pulse Journal USA
ISSN:1947-2536 http://www.bgpulseusa.com/index.php/bg

THE SIGNIFICANCE OF VEGETABLE OILS IN IMPROVING TREATMENT AND THERAPEUTIC MEASURES FOR SKIN BURNS OF VARIOUS ETIOLOGIES

Umarkhodjaeva Gulnorakhon Mukhammadkhon qizi, Solijonov Okhunjon Olimjon òğli Ziyodakhon Toirova, Mukhammadyusuf Muzaffarov, Mamurboeva Muborak Jakhongir qizi Jovid Akhmadali, Muslima Abdujalilova, Shakhzoda Yusupova
Department of the pharmacology of the Tashkent state medical university
Lecturer at the Department of Surgical Sciences, Namangan State University, e-mail: ohun2242@gmail.com
Traumatologist at the Namangan branch of the Republican Specialized Scientific and Practical Medical Center of Traumatology
Student of group 302A of the international education Faculty Tashkent state medical university
Student of group 302B of the 3rd Faculty General Medicine of Tashkent State Medical University
Student of group 302B of the 3rd Faculty General Medicine of Tashkent State Medical University

Abstract. Although the chemical makeup of vegetable butters and oils has been thoroughly examined, little is known about how they work once applied to the skin. This study analyzed 27 clinical papers assessing 17 vegetable oils (almond, argan, avocado, borage, coconut, evening primrose, kukui, marula, mustard, neem, olive, rapeseed, sacha inchi, safflower, shea butter, soybean, and sunflower oils) in order to better understand their cutaneous effects. Psoriasis, xerosis, UVB-induced erythema, atopic dermatitis, molluscum contagiosum, tungiasis, scars, striae, and striae gravidarum were the main topics of the examined papers. Due to their antimicrobial, anti-inflammatory, and antioxidative properties, as well as their ability to stimulate dermal reconstruction, increase collagen synthesis, promote cell proliferation, and repair the skin's lipid barrier function, vegetable butters and oils have shown promising results in the treatment of skin wounds. Argan (*Argania spinosa*), avocado (*Persea americana*), black cumin (*Nigella sativa*), calophyllum (*Calophyllum inophyllum*), coconut (*Cocos nucifera*), cranberry (*Vaccinium macrocarpon*), grape (*Vitis vinifera*), green coffee (*Coffea arabica*), lentisk (*Pistacia lentiscus*), linseed (*Linum usitatissimum*), lucuma (*Pouteria lucuma*), olive (*Olea europaea*), pomegranate (*Punica granatum*), pumpkin (*Cucurbita pepo*), rapeseed (*Brassica napus*), sea buckthorn (*Hippo*). We conclude that while oils high in linoleic acid and saturated fatty acids may have beneficial effects, vegetable oils with a high oleic acid content combined with a low or nonexistent linoleic acid content may further harm the stratum corneum's structure in inflammatory skin. On the other hand, skin that is unaffected could not respond adversely to oleic acid-rich oils. The frequency and duration of an oil's usage, however, must be taken into account as a significant element that may hasten or intensify the detrimental effects on the structural integrity of the skin.

Keywords. Vegetable butters and oils, fatty acids, xerosis, psoriasis, atopic dermatitis, skin barrier, baby skin.

Introduction. The biggest organ in the body, the skin serves as the essential conduit between the internal and external environments. As a result, it constantly shields the body from harmful stimuli like bacteria, ultraviolet (UV) radiation, allergies, and irritants. Its structure and composition, especially that of its most surface component, the epidermis, directly contribute to its special role and function. Keratinocytes make up the majority of the epidermis' cells, however there are also melanocytes, Merkel cells, gamma delta T-lymphocytes, and Langerhans cells. The ability

of keratinocytes in the epidermis' basal layer to multiply upward to generate the granular and spinous layers is preserved. The keratinocytes eventually develop into corneocytes in the horny layer after passing through the granular layer. The intercellular lamellar compartment (lipids) and corneocytes (compact keratinocytes without nuclei) in the outermost layer of the epidermis contribute to the construction and function of the stratum corneum (SC) [1-5]. In addition to being widely employed in the pharmaceutical and cosmetic industries today, vegetable butters and oils have been used for centuries for their beneficial therapeutic and cosmetic benefits on skin health. For instance, they serve as extraction solvents, excipients, and active compounds. Chemically speaking, unsaponifiable matter (usually about 1%) and triglycerides (usually around 99%) make up vegetable butters and oils. Ester compounds of fatty acids and glycerol are called triglycerides. Fatty acids are categorized as saturated, mono-, and polyunsaturated based on the number of double bonds, which determines how susceptible they are to changes brought on by light, heat, or oxygen. Phytosterols, phenols, squalene, carotenoids, and vitamin E are the primary unsaponifiable substances. Vegetable butters and oils with the best native, complex composition are produced by cold pressing and CO2 extraction without further refining since they are not subjected to temperature or oxidation-dependent changes and do not contain solvent residuals [6-12]. Triglycerides, fatty acids, and unsaponifiable matter are the basis for the cutaneous effects of vegetable butters and oils. PubMed, Science Direct, and Google Scholar search engines were used to conduct a thorough search of literature published up until 2021. "Vegetable butter/oil," "plant butter/oil," "clinical study/trial," "dermal," and "skin" were important search terms. There were only 27 clinical investigations that assessed the effects of vegetable butters and oils on the skin. All other research, such as those involving chemicals extracted from vegetable butters or oils or those involving cosmetic or medicinal goods using vegetable butters or oils, were excluded. Additionally excluded were studies that were not classified as clinical, such as in vitro or in vivo investigations. There is currently little scientific data on the precise mechanisms of action and the degree of cutaneous effects. Nonetheless, significant advancements have been made recently in the field of clinical research, and an increasing amount of data supports the scientific justification for the application of vegetable butters and oils in disciplines like pharmacy, medicine, and cosmetic science [13-19]. The most recent assessment of clinical research assessing the use of vegetable butters and oils in the management of various skin diseases and disorders following dermal application is presented in this article. Plant oils and atopic dermatitis (AD), skin aging, skin barrier function, skin cancer, and wound healing (WH) were the terms used in a PubMed literature search. We selected plant oils that have been previously studied in human skin, animal skin (mostly murine models of skin illness), or in vitro studies utilizing keratinocytes in order to focus on the possible advantages of topically applied plant oils. Clinical applications of topical oil plants were included in the search, but more focused research on the biochemical extraction, purification, and modification of these plant oils and their byproducts was not [20-25].

The main purpose of the presented manuscript is to provide a brief analysis of the significance of vegetable oils in improving the treatment and therapeutic measures for skin burns of various etiologies based on the results of authoritative scientific works.

Structure and Function of the Stratum Corneum. The intercellular lipid lamellae, which function as the "mortar" to preserve both SC integrity and the skin permeability barrier, encircle the corneocytes, or "bricks," in the structure of SC, which resembles a brick wall. The integrity of the SC is crucial for the skin's barrier function. The unique cornified envelope (CE) of corneocytes replaces the plasma membrane of outer keratinocytes during development. Corneocytes are stiff due to the CE. The crosslinking of insoluble proteins (involucrin and loricrin) by transglutaminases

is responsible for the formation of the CE. While the remaining lipids are secreted onto the skin's surface by the sebaceous glands (sebum), some lipids—precursors of ceramides, free fatty acids (FFAs), and a portion of cholesterol—are produced in the keratinocytes at the stratum granulosum (SG) and subsequently released from the lamellar bodies (LBs) into the SG-SC interface. Ceramides, FFAs, and cholesterol make up the intercellular lipid-enriched matrix, which provides the permeability barrier. Intercellular lipids undergo enzymatic modification after LB secretion to form the highly hydrophobic and ordered lamellar structure [5-10]. Saturated FFAs with somewhat longer chains, ranging from C16 to C26, make up the majority of SC lamellar membranes. The SC serves as both an antibacterial and permeability barrier. The mild acidity of the skin's surface pH, free sphingoid bases produced by epidermal ceramides, and antimicrobial peptides in the intercellular compartment are all responsible for this antimicrobial barrier. Additionally, the integrity of the SC and the preservation of the homeostasis of the skin barrier depend on the SC being properly hydrated. The corneocytes' natural moisturizing factor (NMF) components help keep the SC hydrated. Free amino acids, pyrrolidone carboxylic acid, lactic acid, urocanic acid, organic acids, peptides, sugars, urea, citrate, glycerol, and more make up NMF. SC hydration is also aided by filaggrin, one of the epidermis' final differentiation markers. In the SC, filaggrin is broken down into free amino acids. These amino acids undergo further metabolism to produce hygroscopic derivatives such urocanic acid from histidine and pyrrolidone carboxylic acid from glutamine. This makes filaggrin one of the main variables affecting the SC's level of hydration [15-21].

Barrier Function and Atopic Dermatitis. Transepidermal water loss (TEWL) rises and the SC's hydration falls when dermatitis is present. The TEWL measure is a crucial indicator of skin barrier function in clinical practice. Furthermore, poor barrier function is frequently linked to skin dryness, whether or not there is clinical desquamation. Emollient usage for eczematous dermatitis, including AD, has been demonstrated to enhance barrier function by lowering TEWL and replenishing water at SC. AD is a prevalent long-term inflammatory skin condition. Both persistent Th2 inflammation in the skin and disruption of the epidermal barrier are implicated in the pathophysiology of AD. Regardless of the skin's clinical appearance, all AD patients unavoidably have impairments in skin barrier function everywhere on the skin's surface. This damage to the epidermal barrier is therefore seen as a key event in the pathophysiology of AD. Allergy sensitivity to staphylococcal superantigens and protein antigens is mostly caused by disrupted barrier function [7-12]. Furthermore, the inflammation behind the barrier may change the epidermis's differentiation, impairing the barrier's ability to function. Studies have demonstrated that Th2-related cytokines (IL-4) worsen skin barrier dysfunction via altering the intercellular compartment of the SC's keratinocyte development and lipid production. Therefore, it has been suggested that early therapies to repair the epidermal barrier with the use of suitable cleansers, emollients, or moisturizers may be helpful in controlling this chronic condition and preventing its advancement, also known as atopic march [16-22].

Skin proliferation and inflammation. Every day, external stimuli bombard the skin. Injuries and/or infections brought on by noxious stimuli can occasionally cause wounds, inflammatory dermatoses, skin aging, or skin cancer. When the usual skin barrier is damaged, inflammation results. The innate immune response, cutaneous differentiation, and skin barrier repair are among the intricate repair pathways in which the inflammatory response is involved at the molecular level. Keratinocytes and innate immune cells, including leukocytes (PMNs, macrophages, and lymphocytes), mast cells, and dendritic cells, are first triggered by an inflammatory response. Immune cells are drawn to the site of injury and infection by chemokines of chemotaxis, which are

induced by secreted cytokines such IL-1α, TNF-α, and IL-6. Immune cells and activated keratinocytes create ROS [6-10]. Elastases and proteinases are also secreted by immune cells. Infection prevention and management, as well as tissue restoration, are facilitated by the inflammatory microenvironment. However, the skin tissue nearby the inflammatory response target might also be harmed by the chemokines generated by immune cells and activated keratinocytes. In order to prevent or at least minimize harm to healthy skin tissue, the degree of inflammation and the duration of its resolution are crucial. Therefore, controlling inflammation is crucial to preserving skin homeostasis. The inflammatory response will persist and the ensuing inflammatory microenvironment will disturb skin homeostasis if the initial acute reaction is unable to address the underlying cause. Chronic inflammatory dermatoses like psoriasis or AD will develop if the deregulation of the inflammatory skin response continues [11-18].

The Components of Plant Oils. Due to their numerous beneficial physiological effects, plant oils have long been used to the skin for both cosmetic and therapeutic purposes. For instance, applying plant oil to the skin may have an occlusive effect that protects it and keeps moisture in the skin, lowering TEWL levels. Topical treatments also have the advantage of having a localized effect rather than a systemic one and a better bioavailability in the skin. Prior studies on plant oils have shown that when applied topically, almond, jojoba, soybean, and avocado oils primarily stay on the skin's surface without deeply penetrating the SC's initial superficial layers. Glycerol helps keep SC hydrated even though triglycerides do not get deeper into SC. Free fatty acids (FFAs), particularly monounsaturated FFAs like oleic acid, have the potential to damage the skin's barrier and increase the permeability of other substances found in plant oils [6-13]. Other elements, such tocopherols and phenolic chemicals, have an antioxidant effect and may influence physiological processes like inflammation, WH, and skin barrier homeostasis. Sodium dl-α-tocopheryl-6-O-phosphate, a water-soluble derivative of vitamin E (dl-α-tocopherol), increases ceramide formation and gene expression of differentiation markers (transglutaminase 1, cytokeratin 10, involucrin, and loricrin) when administered topically to hairless mice. Another component of plant oils, phospholipids, mostly fuse with the SC's outer lipid layer, possibly improving chemical permeability. By controlling the covalently bound ω-hydroxy ceramides in the epidermis and lowering the gene expression of both thymus activation-regulated chemokine (TARC) and thymic stromal lymphopoietin (TSLP), phospholipids have been demonstrated to improve the skin barrier and exhibit the anti-inflammatory effect in a study of the murine AD model with given dietary phospholipid supplementation. The occlusive action of topical plant oil application reduces water loss from the SC and controls keratinocyte proliferation without going further into the epidermis [16-23].

The possible advantages of using plant oils topically to the skin. Fruits from Olea europaea trees are used to make olive oil. With lower amounts of other fatty acids like linoleic acid and palmitic acid, oleic acid makes up the majority of it. Olive oil has been shown to contain over 200 distinct chemical constituents, such as phenolic compounds, carotenoids, triterpenic alcohols, and sterols. The most prevalent antioxidants in olive oil are hydrophilic phenols. The antioxidant qualities of the phenolic contents are superior to those of vitamin E. When olive oil is incorporated into a daily diet, these phenolic compounds and their antioxidant activity actually show anti-inflammatory qualities. It should come as no surprise that olive oil has long been utilized in many cultures as a skin care and hair cosmetic [9-17]. Research conducted on mice has demonstrated that applying olive oil topically to pressure ulcers improves WH by lowering oxidative damage, improving skin regeneration, and reducing inflammation. In rats treated with olive oil, full-thickness burns contracted more quickly than those treated with silver sulfadiazine and normal

saline (control). Additionally, studies have demonstrated the benefits of using other oils, like buckthorn oil, in conjunction with olive oil. A combination of olive oil, sesame oil, and honey was shown to be an effective burn treatment in a randomized controlled experiment by Zahmatkesh et al. by avoiding infections, speeding up tissue healing, and making debridement easier. Furthermore, Ichihashi et al. discovered that applying extra virgin olive oil to the skin delayed the onset and decreased the incidence of skin cancer development in a UVB-exposed murine study. This was probably due to a decrease in the number of 8-hydroxy-2′-deoxyguanosine (8-OHdG) positive cell formation, a biomarker of oxidative stress and carcinogenesis. Additionally, daily consumption of olive oil phenolics has been shown to protect postmenopausal women from DNA oxidation and to disrupt the G1 cell cycle in human colon adenocarcinoma and promyelocytic leukemia cells [18-24].

Discussion. Throughout history, plant oils have been incorporated into foods, cosmetics, and pharmaceutical items, among other uses. Their impact on skin illnesses and the restoration of cutaneous homeostasis are becoming more well acknowledged. The biological effects of topical skin applications of various plant oils (olive oil, olive pomace oil, sunflower seed oil, coconut oil, safflower seed oil, argan oil, soybean oil, peanut oil, sesame oil, avocado oil, borage oil, jojoba oil, oat oil, pomegranate seed oil, almond oil, bitter apricot oil, rose hip oil, German chamomile oil, and shea butter) are briefly reviewed. Due to their antimicrobial, anti-inflammatory, and antioxidative properties, as well as their ability to stimulate dermal reconstruction, increase collagen synthesis, promote cell proliferation, and repair the skin's lipid barrier function, vegetable butters and oils have shown promising results in the treatment of skin wounds [2,3,11,14]. Argan (*Argania spinosa*), avocado (*Persea americana*), black cumin (*Nigella sativa*), calophyllum (*Calophyllum inophyllum*), coconut (*Cocos nucifera*), cranberry (*Vaccinium macrocarpon*), grape (*Vitis vinifera*), green coffee (*Coffea arabica*), lentisk (*Pistacia lentiscus*), linseed (*Linum usitatissimum*), lucuma (*Pouteria lucuma*), olive (*Olea europaea*), pomegranate (*Punica granatum*), pumpkin (*Cucurbita pepo*), rapeseed (*Brassica napus*), sea buckthorn (*Hippo*). Vegetable oils frequently outperformed synthetic wound-healing agents that were employed as controls [12-18]. Vegetable oils frequently outperformed synthetic wound-healing agents that were employed as controls. Vegetable oils' fatty acid components—especially polyunsaturated fatty acids like linoleic acid—are thought to be crucial to the healing of wounds. Research indicates that oils with a higher ratio of linoleic to oleic acid are better at repairing the lipid barrier. However, further research is required to understand how vegetable oils affect the skin and vice versa. Vegetable oils' fatty acid components—especially polyunsaturated fatty acids like linoleic acid—are thought to be crucial to the healing of wounds. Research indicates that oils with a higher ratio of linoleic to oleic acid are better at repairing the lipid barrier. However, further research is required to understand how vegetable oils affect the skin and vice versa. It thus concentrates on the medicinal advantages of these plant oils based on their anti-inflammatory and antioxidant effects on the skin, as well as their ability to promote wound healing and skin barrier restoration. Depending on their composition and the skin's pathophysiological environment, topical treatments of plant oils may have varying effects on the skin [14,15,19]. Different extraction techniques provide different compositions. Plant oil constituents (triglycerides, phospholipids, FFAs, phenolic compounds, and antioxidants) may work in concert when applied topically through a number of mechanisms, including (i) promoting skin barrier homeostasis; (ii) antioxidative activities; (iii) anti-inflammatory properties; (iv) direct and indirect (upregulation of antimicrobial peptides) anti-microbial properties; (v) promoting wound healing; and (vi) anti-carcinogenic properties. With the potential to create dermatological therapies

and skin care products utilizing these oils, future research can supplement present findings to provide a deeper knowledge of these oils [21-25].

Conclusions. The effects of 17 vegetable oils on non-affected skin, baby skin, psoriasis, xerosis, UVB-induced erythema, atopic dermatitis, molluscum contagiosum, tungiasis, scars, striae, and striae gravidarum were the main topics of the examined studies. The most used oils were coconut, olive, and sunflower, indicating their accessibility and awareness in terms of a lengthy history of cutaneous application. Nonetheless, emphasis is being paid to recently found and lesser-known oils.

The value of vegetable butters and oils as therapeutically and cosmetically active components for cutaneous usage is demonstrated by the reviewed clinical research. The chemical makeup of the triglyceride fraction and unsaponifiable matter serves as the foundation for a thorough comprehension of the mechanisms of action and effects following their application on the skin, allowing for a tailored approach to the treatment of skin conditions and skin care. However, further research is necessary to understand how vegetable butters, oils, and their constituents are absorbed and/or metabolized in the skin after dermal application, as well as how they impact the microbiota of the skin and the structure and characteristics of the lipid matrix.

Depending on their composition and the pathophysiological context of the skin, topical treatments of plant oils may have varying effects on the skin. Different extraction techniques result in different compositions. Plant oil constituents (triglycerides, phospholipids, FFAs, phenolic compounds, and antioxidants) may work in concert when applied topically through a number of mechanisms, including: (i) promoting skin barrier homeostasis; (ii) antioxidative activities; (iii) anti-inflammatory properties; (iv) direct and indirect (upregulation of antimicrobial peptides) anti-microbial properties; (v) promoting wound healing; and (vi) anti-carcinogenic properties. With the potential to create dermatological therapies and skin care products employing these oils, future research can build on present discoveries to provide a deeper knowledge of these oils.

References.

1. Poljšak N, Kočevar Glavač N. Vegetable Butters and Oils as Therapeutically and Cosmetically Active Ingredients for Dermal Use: A Review of Clinical Studies. Front Pharmacol. 2022 Apr 25;13:868461. doi: 10.3389/fphar.2022.868461.
2. Poljšak N, Kreft S, Kočevar Glavač N. Vegetable butters and oils in skin wound healing: Scientific evidence for new opportunities in dermatology. Phytother Res. 2020 Feb;34(2):254-269. doi: 10.1002/ptr.6524.
3. Aripov A.N., Aripov O.A., Akhundjanova L.L., Nabiev A.U., Nabieva D.A., & Khamroev T.T. (2022). Study the effect of yantacin on some indicators of cellular renewal and on the level of protein expression on rat hepatocytes in chronic heliotrine liver damage. International Journal of Medical Sciences And Clinical Research, 2(05), 06–13. https://doi.org/10.37547/ijmscr/Volume02Issue05-02.
4. Aripov A. N, Akhunzhanova L. L, Nabiev A. U, Aripov A. O, Khamroev T. T.. Antifibrotic Efficacy of a New Phytocomposition of Essential Phospholipids with Glycyrrhizic Acid, Ecdysterone, Lycopene and Proanthacyanidin in Experimental Severe Chronic Hepatitis Compared with Phosphogliv. Biomed Pharmacol J 2023;16(3).Pages : 1815-1825. DOI : https://dx.doi.org/10.13005/bpj/2761
5. Aripov A.N, Akhunjanova L.L, Khamroev T.T, Aripov Abdumalik Nigmatovich, Akhunjanova Lola Lazizovna, & Khamroev Tolmas Tolibovich. (2022). Differential Analysis of Chronic Toxic Hepatitis Caused by The Introduction of Heliotrin Solution in Various Ways.

Texas Journal of Medical Science, 4, 58–62. Retrieved from https://zienjournals.com/index.php/tjms/article/view/670

6. Rashidov S.Z., Rakhimboev S.D., Sanoev Z.I., Abdinazarov I.T., Khamroev T.T., Ismailova D.S., & Elmuradov B.J.. (2022). Study of psychoactive activity potassium salt 5-(o-aminophenyl)-1,3,4- oxadiazole-2-thion (D-361). International Journal of Medical Sciences And Clinical Research, 2(09), 1–5. https://doi.org/10.37547/ijmscr/Volume02Issue09-01
7. Арипов А.Н., Арипов О.А., Ахунджанова Л.Л., Набиев А.Ў., Нишанбаев С.З., Набиева Д.А., Ҳамроев Т.Т. Тажриба шароитида сафорофлавонолозиднинг гепатотроп фаоллигини ўрганиш. Oriental Journal of Medicine and Pharmacology, 2(02), 55–64. https://doi.org/10.37547/supsci-ojmp-02-02-07
8. Zakhidova L.T., Saidkhodjaeva D.M., Sanoev Z.I., Tukhtasheva V.F., Rakhmanova H.A.., Hamroyev T.T. Toxicological Characteristics Of N-Deacetyllappaconitine Under Chronic Administration In White Rats. The American Journal of Applied Sciences, 3(03), 34-41. https://doi.org/10.37547/tajas/Volume03Issue03-06
9. Khamroev T.T., Sanoev Z.I., Rakhimboev S.D., Abdinazarov I.T., Rashidov S.Z. Effect of antiarrhythmic substance N – dezacetyllapoconitin on the central nervous system. ISJ Theoretical &Applied Science, 07 (99), 153-157. http://soi.org/1.1/TAS-07-99-31 Doi:https://dx.doi.org/10.15863
10. Sanoev Z. I, Ismailova D. S, Rakhimboev S. D. O, Khamroev T, T, Elmuradov B. Z, Abdinazarov I. T, Rashidov S. Z. O. Synthesis and Research Anticonvulsant Activity of Annulated Triazolo-Thiadiazine Derivative in Laboratory Animals. Biomed Pharmacol J 2023;16(4). DOI : https://dx.doi.org/10.13005/bpj/2820
11. Sokhib Rashidov Zamon o‘g‘li, Muslimakhon Kamolova Mirzokhidjon qizi, Ikhvoliddin Mirzaev Komiljon o‘g‘li, Nodira Pardaeva Botir qizi, Sevara Rakhmatullaeva Shukhrat qizi/. (2025). The importance of cardiotonic drugs in medical practice, the range of applications and the advantages of their use. International Journal of Cognitive Neuroscience and Psychology, 3(5), 95–100. Retrieved from https://medicaljournals.eu/index.php/IJCNP/article/view/1856
12. Sanoev Zafar Isomiddinovich, Rashidov Sokhib Zamon ugli, Raximboev Sukhrob Davlatyor ugli, Abdinazarov Ibrokhim Tuychievich, Khamroev Tolmas Tolibovich, Ismailova Dilnoza Safaralievna, & Elmuradov Burkhon Juraevich. (2022). Research of Anticonvulsant Activity of Compound 5- (P-Aminophenyl) - 1,3,4-Oxadiazole-2-Thion. Texas Journal of Medical Science, 13, 17–21. Retrieved from https://zienjournals.com/index.php/tjms/article/view/2434
13. Yu. R. Mirzaev, T. T. Khamroev, E. M. Ruzimov, B. N. Khandamov, & Sh. M. Adizov. (2022). Evaluation of the Effect on the Nervous System of Substances with an Alkaloid Structure Having Antitumor Activity. Journal Healthcare Treatment Development(JHTD) ISSN : 2799-1148, 2(06), 6–10. Retrieved from http://journal.hmjournals.com/index.php/JHTD/article/view/1577
14. Aripov A.N., Aripov O.A., Akhunjanova L.L., Nabiev A.O., Nabieva D.A., & Khamroev T.T. (2022). Study the antifibrous efficacy of plant proanthocyanidin in rats with chronic heliotrine liver damage. Frontline Medical Sciences and Pharmaceutical Journal, 2(05), 16–25. https://doi.org/10.37547/medical-fmspj-02-05-03.
15. Sokhib Rashidov Zamon o‘g‘li, Nilufar Ergasheva Ag’zamjon qizi, Elyor Zokirboyev Anvarjon o‘gli, Umidjon Akramov Abdusamad o‘g‘li, & Aziza Egamberdieva Farkhod qizi. (2025). Drugs That Increase the Tone of the Human Body and Pharmacological Characteristics of Immunodeficiency Agents. American Journal of Biomedicine and Pharmacy, 2(5), 300–306. Retrieved from https://biojournals.us/index.php/AJBP/article/view/1065

16. Sokhib Rashidov Zamon o‘g‘li, Murodjon Nabiev Mahammadkarim o‘g‘li, Mo'tabar Yoqubjonova Khusanboy qizi, Shakhzodakhon Bekmurodova Po‘latjon qizi, & Jumanazar To‘ychiev Saidqul o‘g‘li. (2025). Comparative Analysis of Drugs Used for Anemia and Drugs Storing Iron. Research Journal of Trauma and Disability Studies, 4(5), 190–195. Retrieved from https://journals.academiczone.net/index.php/rjtds/article/view/5141
17. Sokhib Rashidov Zamon o‘g‘li, Shakhzoda Abduraimova Abdusattor qizi, Nigora Yusufjonova Mirrakhim qizi, Diyora Turdibekova Erkinjon qizi, & Makhsuma Dovutkho’jayeva Maqsudjonovna. (2025). Classification, Indications for Use, Range of Applications and Disadvantages of Medicines against Nematodes and Leishmania. Research Journal of Trauma and Disability Studies, 4(5), 196–201. Retrieved from https://journals.academiczone.net/index.php/rjtds/article/view/5142
18. Sokhib Rashidov Zamon o‘g‘li, Nigora Yusufjonova Mirrakhim qizi, Diyora Turdibekova Erkinjon qizi, Makhsuma Dovutkho’jaeva Maqsudjonovna, Shakhzoda Abduraimova Abdusattor qizi, Analysis of the effect of medicines used in medical practice for various diseases on the fetus , european journal of modern medicine and practice: Vol. 5 No. 5 (2025) 342-347.
19. Sokhib Rashidov Zamon o‘g‘li, Elyor Zokirboev Anvarjon ògli, Umidjon Akramov Abdusamad o‘g‘li, Aziza Egamberdiyeva Farkhod qizi, Munisa Qo‘shbekova Ro‘zimbek qizi. (2025). Analysis of general and specific pharmacological properties of fat-soluble vitamins. International Journal of Cognitive Neuroscience and Psychology, 3(5), 101–106. Retrieved from https://medicaljournals.eu/index.php/IJCNP/article/view/1857
20. Lin T-K, Zhong L, Santiago JL. Anti-Inflammatory and Skin Barrier Repair Effects of Topical Application of Some Plant Oils. *International Journal of Molecular Sciences*. 2018; 19(1):70. https://doi.org/10.3390/ijms19010070
21. Alves A. Q., Da Silva V. A., Góes A. J. S., Silva M. S., De Oliveira G. G., Bastos I. V. G. A., et al. (2019). The Fatty Acid Composition of Vegetable Oils and Their Potential Use in Wound Care. Adv. Skin Wound Care 32, 1–8. 10.1097/01.ASW.0000557832.86268.64
22. Anzaku A. A., Akyala J. I., Juliet A., Obianuju E. C. (2017). Antibacterial Activity of Lauric Acid on Some Selected Clinical Isolates. Ann. Clin. Lab. Res. 05, 2. 10.21767/2386-5180.1000170
23. Bielfeldt S., Blaak J., Staib P., Simon I., Wohlfart R., Manger C., et al. (2018). Observer-blind Randomized Controlled Study of a Cosmetic Blend of Safflower, Olive and Other Plant Oils in the Improvement of Scar and Striae Appearance. Int. J. Cosmet. Sci. 40, 81–86. 10.1111/ics.12438
24. Chen X., Zhao X., Deng Y., Bu X., Ye H., Guo N. (2019). Antimicrobial Potential of Myristic Acid against Listeria Monocytogenes in Milk. J. Antibiot. (Tokyo) 72, 298–305. 10.1038/s41429-019-0152-5
25. Elson L., Randu K., Feldmeier H., Fillinger U. (2019). Efficacy of a Mixture of Neem Seed Oil (Azadirachta indica) and Coconut Oil (Cocos Nucifera) for Topical Treatment of Tungiasis. A Randomized Controlled, Proof-Of-Principle Study. Plos Negl. Trop. Dis. 13, e0007822. 10.1371/journal.pntd.0007822