

DAFTAR PUSTAKA

- Abdel, M.H.M., Aziz, A.E.A., Raouf, B.M.A., Mohamed, S.A and Nada, D. 2022. Antioxidant-biocompatible and stable catalase-based gelatin– alginate hydrogel scaffold with thermal wound healing capability: immobilization and delivery approach. *3 Biotech* 12(73): 1 – 12. <https://doi.org/10.1007/s13205-022-03131-4>
- Abdurrahmat, A. S. 2014. Luka Peradangan dan Pemulihan. *Jurnal Entropi*. 9(1).
- Adhya, A., Bain, J., Dutta, G., Hazra, A., Majumdar, B and Ray, O. 2014. Healing of burn wounds by topical treatment: A randomized controlled comparison between silver sulfadiazine and nano-crystalline silver. *J Basic Clin Pharm*. 6(1):29. doi: 10.4103/0976-0105.145776
- Afriani, Y. 2023. Efektivitas Dan Keamanan Salep Minyak Larva Black Soldier Fly (*Hermetia illucens* L.) Dalam Menyembuhkan Luka Sayat Pada Mencit Putih (*Mus musculus* L.) Jantan. Thesis. Universitas Andalas. Padang
- Afriani, Y., Rahayu, R and Santoso, P. 2023. Fatty Acid And Hematology Profile Of Black Soldier Fly (*Hermetia illucens* L.) Maggot Oil In Wound Healing. *International Journal of Progressive Sciences and Technologies*. 39 (2), pp. 429-433
- Ahmad, S. U., Binti Aladdin, N.A., Jamal, J. A., Shuid, A. N and Mohamed, I. N. 2021. Evaluation of Wound-Healing and Antioxidant Effects of *Marantodes pumilum* (Blume) Kuntze in an Excision Wound Model. *Molecules* 26(1), 228. <https://doi.org/10.3390/molecules26010228>
- Aisyah, A. N., Zulham and Nurul, A. Y. 2017. Formulation of Emulgel Ethanol Extract of Mullberry (*Morus alba*) with Various Concentration of Span 80 and Tween 80. *Journal of Pharmaceutical and Medicinal Sciences*. 2(2): 77–80.
- Akhtar, N., Verma, A and Pathak, K. 2017. Exploring preclinical and clinical effectiveness of nanoformulations in the treatment of atopic dermatitis: Safety aspects and patent reviews. *Bull. Fac. Pharm. Cairo Univ*. 55, 1–10.
- Akib, N.I., Hendra, N.S., Putri, A.E.P., Armadhani, I and Adjeng, A.N.T. 2021. Preparation of phytosome of kersen leaves (*Muntingia calabura* L.) ethanol extract as antioxidant. *Jurnal Farmasi Sains dan Praktis*, 7(3), 393-404.
- Alexander, J.W. 2014. Supp DM. Role of arginine and Omega-3 fatty acids in wound healing and infection. *Adv Wound Care (New Rochelle)* ;3:682-90
- Ali, K.B., Ullah, S., Khan, M.K., Alshahrani, S.M and Braga, V.A. 2020. Formulation and evaluation of *Ocimum basilicum*-based emulgel for wound healing using animal model. *Saudi Pharm J*. 28(12):1842-1850.
- Ali, M., Khan, N.R., Subhan, Z., Mehmood, S., Amin, A., Rabbani, I and Khattak, S. 2022. Novel Curcumin-Encapsulated α -Tocopherol Nanoemulsion System and Its Potential Application for Wound Healing in Diabetic Animals. *BioMed Research International*, 2022:1-16. doi: 10.1155/2022/7669255
- Alves, N.F.B., Queiroz, T.M., Travassos, R.D.A., Magnani, M and Braga, V.D.A. 2017. Acute Treatment with Lauric Acid Reduces Blood Pressure and Oxidative Stress in Spontaneously Hypertensive Rats. *Basic Clin. Pharmacol. Toxicol*. 120, 348–353.

- Aponno, J.V., Yamlean, P.V.Y dan Supriati, H.S. 2014. Uji Efektivitas Sediaan Gel Ekstrak Etanol Daun Jambu Biji (*Psidium guajava* Linn) Terhadap Penyembuhan Luka Yang Terinfeksi Bakteri *Staphylococcus Aureus* Pada Kelinci (*Orytolagus cuniculus*). *PHARMACON*. 3(2): 284-285.
- Ariana, I. N. T., Oka, A. A., Suranjaya, I. G dan Berata, I. K. 2018. Peningkatan Limfosit, Monosit, dan Basofil pada Sapi Baliyang Digembalakan di Tempat Pembuangan Akhir Sampah Kota Denpasar. *Jurnal Veteriner*, 19(1), 109-115.
- Aulia, R., Sugito, S., Hasan, M., Karmil, T. F., Gholib, G and Rinidar, R. 2017. 16. The number of leukocyte and leukocyte differential in broilers that infected with *Eimeria tenella* and given neem leaf extract and jaloh extract. *Jurnal Medika Veterinaria*, 11(2), 93-99.
- Auliasari, N., Akma, A dan Caca, E. 2018. Formulation and Physical Stability Test of Pomade Contain Olive Oil (*Olea europaea*). *Jurnal Ilmiah Farmako Bahari*. 9(2): 45–56.
- Azizi, A., Zoladl, M., Shirazi, H.G., Askarian, S and Kavyani, H. 2017. Assessing the combined effects of Olive leaf extract and Aloe beyond normal saline 2nd degree burn healing in male rats. *International Journal of Advances Biotechnology and Research* 8(4): 226 – 236
- Azzahrah, N.F., Jamaluddin, A.W dan Adikurniawan, Y.M. 2019. Efektivitas Patch Sederhana Dari Ekstrak Daun Kayu Jawa (*Lannea coromandelica*) Terhadap Penyembuhan Luka Sayat Pada Mencit (*Mus musculus* L). *Jurnal Farmasi Desember*. 11(2): 169-180.
- Bagińska, Z.H., Walendowska, P.M., Basa, A., Rachalewski, M., Lenzion, K., Piontek, J and Szymańska, E. 2024. Chitosan/Pomegranate Seed Oil Emulgel Composition as a New Strategy for Dermal Delivery of Hydrocortisone. *International Journal of Molecular Sciences*. 25(7):3765. <https://doi.org/10.3390/ijms25073765>
- Bahloul, B., Ben, E., Dridi, D., Bouhamed, A., Castillo, L., Flamini, G and Baudrit, J.R. 2024. Development and Investigation of a Nanoemulgel Formulated from Tunisian *Opuntia ficus-indica* L. Seed Oil for Enhanced Wound Healing Activity. *Gels*, 10(9), 582. doi: 10.3390/gels10090582
- Barker, T.H. 2011. The role of ECM proteins and protein fragments in guiding cell behavior in regenerative medicine. *Biomaterials*. 32: 4211–4214
- Bauer, S.M. 2005. Angiogenesis, vasculogenesis, and induction of healing in chronic wounds. *Vasc Endovasc Surg*.39:293–306
- Bergenhengouwen, V.J., Braber, S., Loonstra, R., Buurman, N., Rutten, L., Knipping, K., Savelkoul, P.J., Harthoorn, L.F., Jahnsen, F.L and Garssen, J. 2018. Oral exposure to the free amino acid glycine inhibits the acute allergic response in a model of cow's milk allergy in mice. *Nutr. Res*. 58, 95–105
- Bersimbaev, R.I., Yugai, Y.E., Hanson, P.J and Tzoy, I.G. 2001. Effect of nitric oxide on apoptotic activity in the rat gastrointestinal tract. *European journal of pharmacology*, 423(1), 9-16.
- Bestari, Z.A., Saraswati, I dan Adespin, D.A. 2016. Pengaruh Bawang Putih (*Allium sativum* L.) Terhadap Penyembuhan Luka Bakar Derajat II Dangkal Pada Tikus Wistar. *J Kedokt Diponegoro*. 5(4): 1955–61.

- Bogdan, C. 2001. Nitric oxide and the immune response. *Nature immunology*, 2(10), 907-916.
- Bohling, A., Bielfeldt, S., Himmelmann, A., Keskin, M and Wilhelm, K.P. 2014. Comparison of the stratum corneum thickness measured in vivo with confocal Raman spectroscopy and confocal reflectance microscopy. *Ski Res Technol.* 20: 50–57.
- Bowden, L.G., Byrne, H.M., Maini, P. K., Moulton, D. E. 2016. A morphoelastic model for dermal wound closure. *Biomech Model Mechanobiol.* Jun;15(3):663-81. doi: 10.1007/s10237-015-0716-7.
- Canedo, D.L and Cañedo, A.M. 2019. Skin acute wound healing: A comprehensive review. *Int. J. Inflamm.* 2019, 3706315.
- Cassino, R and Ricci, E. 2005. Amino acids and wound bed: a possible interaction for atopic and general treatment in the chronic skin lesion repair. *Acta Vulnologica.* 3:111–115.
- Chen, L., Wang, T and Xu, Y. 2020. *Strategies to Combat Antibiotic Resistance: Innovations in Vinylamycin Derivatives.* *Antibiotics*, 9(5), 305-313. doi:10.3390/antibiotics9050305
- Chen, Z., Wu, S., Su, W.Y., Lin, Y.C., Lee, Y.H., Wu, W., Chen, C.H and Wen, Z.H. 2016. Anti-inflammatory and burn injury wound healing properties of the shell of *Haliotis diversicolor*. 16(1).<https://doi.org/10.1186/s12906-016-1473-6>
- Chi, Y., Yin, H., Chen, X., Hu, Q., Liu, W., Feng, L and Chai, J. 2021. Effect of precise partial scab removal on the repair of deep partial-thickness burn wounds in children: a retrospective study. *Translational Pediatrics* 10(11): 3014–3022. <https://doi.org/10.21037/tp-21-500>
- Cho, L.A.R., Leem, H., Lee, J and Park, K.C. 2005. Reversal of silver sulfadiazine-impaired wound healing by epidermal growth factor. *Biomaterials.* Aug;26(22):4670-6. doi: 10.1016/j.biomaterials.2004.11.041. Epub 2005 Jan 13. PMID: 15722137.
- Choi, Y.H., Choi, Y.S., Kim, Y.K., Rahman, M.S., Pradeep, G.C., Yoo, J.C and Suh, J. W. 2017. *A multifunctional alanine-rich anti-inflammatory peptide BCP61 showed potent inhibitory effects by inhibiting both NF- κ B and MAPK expression.* *Inflammation*, 40, 688-696.
- Cickova, H., Newton, L., Lacy, C and Kozánek, M. 2015. The use of fly larvae for organic waste treatment. *Waste management*, 35, pp.68-80.
- Clementi, E., Borgese, N and Meldolesi, J. 2003. Interactions between nitric oxide and sphingolipids and the potential consequences in physiology and pathology. *Trends in pharmacological sciences*, 24(10), 518-523.
- Coger, V., Million, N., Rehbock, C., Sures, B., Nachev, M., Barcikowski, S., Wistuba, N., Strauß, S and Vogt, P.M. 2019. Tissue Concentrations of Zinc, Iron, Copper, and Magnesium During the Phases of Full Thickness Wound Healing in a Rodent Model. *Biol Trace Elem Res.* Sep;191(1):167-176. doi: 10.1007/s12011-018-1600-y.
- Corsetti, G., D'Antona, G., Dioguardi, F.S and Rezzani, R. 2010. Topical application of dressing with amino acids improves cutaneous wound healing in aged rats. *Acta Histochemica.* 112:497–507

- Cui, T., Yu, J., Wang, C., Chen, S., Li, Q., Guo, K., Qing, R., Wang, G and Ren, J. 2022. Micro-Gel Ensembles for Accelerated Healing of Chronic Wound via pH Regulation. *Advanced Science*, 9(22), 2201254. <https://doi.org/10.1002/advs.202201254>
- Czyżewska, U., Konończuk, J., Teul, J., Drągowski, P., Morka, R., Surażyński, A and Milyk, W. 2015. Verification of chemical composition of commercially available propolis extracts by gas chromatography-mass spectrometry analysis. *J Med Food*. 18(5): 584-91. doi: 10.1089/jmf.2014.0069. Epub 2014 Sep 8. PMID: 25198412.
- Dahan, A., Yassen, A., Bijl, H., Romberg, R., Sarton, E., Teppema, L and Olofsen, E., Danhof, M. 2005. Comparison of the respiratory effects of intravenous buprenorphine and fentanyl in humans and rats. *Br J Anaesth*. Jun;94(6):825-34. doi: 10.1093/bja/aei145.
- Dai, Z., Zhang, Z and Lin, Y. 2017. *Pharmacological Profile and Safety of Propyphenazone as an Antipyretic and Analgesic Agent*. *European Journal of Pharmacology*, 799, 56-64. doi:10.1016/j.ejphar.2017.02.020
- Daulai, S.M. 2023. Formulasi Nanoemulsi Berbasis Daun Mengkudu dan Minyak Maggot (*Hermetia illucens*) Sebagai Alternatif *Antibiotic growth promoters*
- Devi, M., Oematan, A dan Toelle, N. 2020. Total Leukosit dan Differensial Leukosit Daeah Ayam Kampung yang Terpapar *Ascaridia galli* Secara Alami. *Parter*. Vol. 24 (2)
- Dhas, A and Deshmukh, G. 2016. Formulation and evaluation of topical adalopalene emulgel. *Am J Pharm Technol Res* . 6:530-6.
- Diana, L., Badiu., Luque, R., Dumitrescu, E., Craciun, A and Dinca, D. 2010. Amino Acids from *Mytilus galloprovincialis* (L.) and *Rapana venosa* Molluscs Accelerate Skin Wounds Healing via Enhancement of Dermal and Epidermal Neofornation. DOI 10.1007/s10930-009-9225-9. *Protein J*. 29:81–92
- Disnakkeswan. 2024. Nilai Hematologi Lengkap Mencit. Dinas Peternakan dan Kesehatan Hewan Sumatera Barat. Padang.
- Dubo, F.A., Dawud, I.A., Umar, E.A., Alex, S., Baiyekusi, U and Farra, U. 2019. Lauric Acid Alleviates Inflammation and Structural Changes in the Lungs of Type II Diabetic Male Wistar Rats. *J. Afr. Ass. Physiol*. 7 (2): 88-96.
- Dunnill, C., Patton, T., Brennan, J., Barrett, J., Dryden, M., Cooke, J., Leaper, D and Georgopoulos, N.T. 2017. Reactive oxygen species (ROS) and wound healing: the functional role of ROS and emerging ROSmodulating technologies for augmentation of the healing process. *Int. Wound J.*, 14, 89–96.
- Edy, H.J., Marchaban., Wahyuono, S dan Nugroho, A.E. 2016. Formulasi Dan Uji Sterilitas Hidrogel Herbal Ekstrak Etanol Daun *Tagetes Erecta* L. *Pharmacon*. 5
- Efendi, R. 2023. Uji Aktivitas Antiinflamasi Ekstrak Metanol Tepung Maggot Black Soldier Fly (*Hermetia illucens*) Melalui Penghambatan Denaturasi Protein Oleh Pemanasan Secara In Vitro. Skripsi. Universitas Andalas. Padang
- Eisinger, M. 2010. Sebaceous gland regeneration in human skin xenografts. *J Invest Dermatol*, 130, 2131-2133.

- Ellis, S., Lin, E.J and Tartar, D. 2018. Immunology of wound healing. *Curr. Dermatol. Rep.* 7, 350–358.
- Eming, S.A., Krieg, T and Davidson, J.M. 2007. Inflammation in wound repair: molecular and cellular mechanisms. *J Invest Dermatol.* 127:514–525
- Ermawati, D.E and Jannah, S. 2023. The Effect of Surfactant Concentration to Particle Size and Loading Dose of Immunity Jamu's Ethanolic Extract SNEDDS (Self-Nano Emulsifying Drugs Delivery System). *Majalah Obat Tradisional*, 28(2), 102-111. doi: 10.22146/mot.83321
- Evers, L.H., Bhavsar, D and Mailander, P. 2010. The biology of burn injury. *Exp Dermatology.* 19(9): 777-83.
- Fadilaturahmah, F. 2021. Efek Antiinflamasi Ekstrak Daun Kacang Miang (*Mucuna pruriens* L.(DC.)) terhadap Mencit (*Mus musculus*) yang Diinduksi Karagenan. Skripsi. Universitas Andalas. Padang.
- Fahmi, M.R. 2015. Optimalisasi proses biokonversi dengan menggunakan minilarva *Hermetia illucens* untuk memenuhi kebutuhan pakan ikan. In *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia* (Vol. 1, No. 1, pp. 139-144).
- Faris, M. 2020. Potensi immunodulator ekstrak cengkeh pada kadar limfosit dan makrofag sebagai mekanisme pertahanan tubuh. *Khazanah: Jurnal Mahasiswa*, 12(1).
- Febram, B., Letje, W dan Bambang, P. 2010. Aktivitas Sediaan Emulgel Ekstrak Batang Pohon Pisang Ambon (*Musa Paradisiaca* Var *Sapientum*) Dalam Proses Persembuhan Luka Pada Mencit (*Mus Musculus Albinus*). *Majalah Obat Tradisional.* 15(3): 121-137.
- Feng, L.W., Li, Y., Liu, W.D., Jiang, S.Y., Kuang, J., Jiang, L., Tang, P., Wu, W.N., Tang, Y.A and Zhang. 2015. Dietary phenylalanine-improved intestinal barrier health in young grass carp (*Ctenopharyngodon idella*) is associated with increased immune status and regulated gene expression of cytokines, tight junction proteins, antioxidant enzymes and related signalling molecules, *Fish Shellfish Immunol.* 45(2) 495-509.
- Fiandri, D.C. 2020. Potensi Tanaman Patikan Kebo (*Euphoria Hirta*) Sebagai Penyembuh Luka. *Jurnal Medika Hutama*, 2(1): 224-230.
- Firlianty., Hermansyah dan Samosir, W. 2019. Kajian Efektivitas Ekstrak Gel Ikan Toman (*Channa micropeltes*) Pada Luka Bakar Mencit (*Mus musculus*). 13 (2). 45 – 50. <https://doi.org/10.36873/aev.2019.13.2.45>.
- Fraser, J.F., Cuttle, L., Kempf, M and Kimble, R.M. 2004. Cytotoxicity of topical antimicrobial agents used in burn wounds in Australasia. *ANZ J Surg.* 74(3):139-42. doi: 10.1046/j.1445-2197.2004.02916.x. PMID: 14996161
- Ghilaridi, J.R., Dipinto, D and Leibold, E.A. 2011. *Mechanisms of Action of Propyphenazone in Analgesia and Antipyresis.* *Journal of Medicinal Chemistry*, 54(5), 1252-1261. doi:10.1021/jm101506g
- Gitaraja, W.S dan Ekaputra, E. 2011. Metode perawatan luka. Dalam: *Seminar Nasional Keperawatan.* Jember. PSIK Universitas Jember.
- Grumezescu, A. 2016. *Emulsions* (1st ed.). Cambridge, MA: Academic Press.
- Güell, M and Schneider, M.R. 2023. Progress in sebaceous gland homeostasis, regeneration and immunomodulatory functions. *Development*, 150(15).

- Gurtner, G.C and Evans, G.R.D. 2000. Advances in head and neck reconstruction. *Plast Reconstr Surg.*106:672–682.
- Guyton, A.C dan Hall, J.E. 2007. Buku Ajar Fisiologi Kedokteran. Edisi 9. Jakarta. EGC.
- Hadisi, Z., Nourmohammadi, J and Nassiri, S.M. 2018. The antibacterial and antiinflammatory investigation of Lawsonia Inermis-gelatin-starch nanofibrous dressing in burn wound. *International Journal of Biological Macromolecules* 107: 2008 – 2019. <https://doi.org/10.1016/j.ijbiomac.2017.10.061>
- Hairima. 2014. Uji Aktivitas Emulgel Obat Luka Fase Air Ekstrak Ikan Toman (*Channa Micropeltes*) Pada Tikus Putih Jantan Galur Wistar. *Jurnal Mahasiswa Farmasi Fakultas Kedokteran UNTAN.* 1: 1.
- Hakim, A.R., Prasetya, A dan Petrus, H. 2017. Potensi Larva *Hermetia Illucens* sebagai Pereduksi Limbah Industri Pengolahan Hasil Perikanan. *Jurnal Perikanan Universitas Gadjah Mada* 19 (1): 39-44.
- Han, G.L.N., Nguyen, C., Macherla, Y.L., Chi, J.M., Friedman, J.D., Nosanchuk, L.R and Martinez, A. 2012. *J. Pathol.* 180, 1465–1473
- Hapsari, I., Rosyadi, A dan Wahyuningrum, R. 2014, Optimasi Kombinasi Minyak Atsiri Bunga Kenanga Dengan Herba Kemangi Dalam Gel Sebagai Repelan Nyamuk *Aedes aegypti* Dengan Metode Simplex Lattice Design, Prosiding Seminar Nasional dan Workshop “Perkembangan Terkini Sains Farmasi dan Klinik IV” tahun 2014, 31–37.
- Harwansh, R.K., Mukherjee, P.K., Bahadur, S and Biswas, R. 2015. Enhanced permeability of ferulic acid loaded nanoemulsion based gel through skin against UVA mediated oxidative stress. *Life Sciences*, 141, 202–211. doi:10.1016/j.lfs.2015.10.001
- Hasegawa, S., Ichiyama, T., Sonaka, I., Ohsaki, A., Okada, S., Wakiguchi and Furukawa, S. 2012. Cysteine, histidine and glycine exhibit anti-inflammatory effects in human coronary arterial endothelial cells. *Clinical & Experimental Immunology*, 167(2), 269-274.
- Hasegawa, S., Ichiyama, T., Sonaka, I., Ohsaki, A., Okada, S., Wakiguchi, H., Kudo, K., Kittaka, S., Hara, M and Furukawa, S. 2011. Cysteine, histidine and glycine exhibit anti-inflammatory effects in human coronary arterial endothelial cells. *Clin. Exp. Immunol.* 167, 269–274
- Hasibuan., Lisa, Y., Soedjana, H dan Bisono. 2010. Luka. Dalam: Sjamsuhidajat R, Karnadihardja W, Prasetyono T, Rudiman R. Buku Ajar Ilmu Bedah. Edisi ke 3. Jakarta: EGC, pp: 95-110.
- Hill, D.M and Deboer, E. 2023. State and Future Science of Opioids and Potential of Biased-ligand Technology in the Management of Acute Pain After Burn Injury. *J Burn Care Res.* 2;44(3):524-534. doi: 10.1093/jbcr/irad004. PMID: 36638083; PMCID: PMC10152994.
- Hinz, B. 2007. Formation and function of the myofibroblast during tissue repair. *J Invest Dermatol.* 127:526–537.
- Holeček, M. 2022. Serine Metabolism in Health and Disease and as a Conditionally Essential Amino Acid. *Nutrients*, 14(9),. <https://doi.org/10.3390/nu14091987>

- Howard, A., Tahir, I., Javed, S., Waring, S.M., Ford, D and Hirst, B.H. 2010. Glycine transporter GLYT1 is essential for glycine-mediated protection of human intestinal epithelial cells against oxidative damage. *J. Physiol.* 588, 995–1009.
- Hsu, A and Mustoe, T.A. 2010. Chapter 1 – The Principles of Wound Healing. 3-7. doi: 10.1016/B978-0-323-03470-8.00001-6
- Hu, J., Lin, Y., Cui, C., Zhang, F., Su, T., Guo, K and Chen, T. 2022. Clinical efficacy of wet dressing combined with chitosan wound dressing in the treatment of deep seconddegree burn wounds: A prospective, randomised, single-blind, positive control clinical trial. *International Wound Journal* 20: 699 – 705. DOI: 10.1111/iwj.13911
- Huang, W.C., Tsai, T.H., Chuang, L.T., Li, Y.Y., Zouboulis, C.C and Tsai, P.J. 2014. Anti-bacterial and anti-inflammatory properties of capric acid against *Propionibacterium acnes*: a comparative study with lauric acid. *J Dermatol Sci.* 73(3):232- 240.
- Ishida, N., Nakamura, H., and Hirano, K. 2018. *Characterization of Ribosomal Binding and Mechanism of Action of Vinylamycin*. *Journal of Antibiotics*, 71(3), 123-130. doi:10.1038/s41429-018-0021-y
- Ismed, F., Desti, W.N., Arifa, N., Rustini, R dan Putra, D.P. 2021. TLCBioautographic and LC-MS/MS Detection of Antimicrobial Compounds from Four Semipolar Extracts of *Cladonia* Species. *Advances in Health Sciences Research*, 40.
- Jacinto, A., Martinez, A and Martin, P. 2001. Mechanisms of epithelial fusion and repair. *Nat Cell Biol.* 3:E117–E123
- Jeschke, M.G., Van, B.M.E., Choudhry, M.A., Chung, K.K., Gibran, N.S and Logsetty, S. 2020. Burn injury. *Nature Reviews Disease Primers* 6(11): 1 – 25. doi: 10.1038/s41572- 020-0145-5
- Ji, Y., Yang, S., Zhou, K., Rocliffe, H.R., Pellicoro, A., Cash, J.L., Wang, R., Li, C and Huang, Z. 2022. Deep-learning approach for automated thickness measurement of epithelial tissue and scab using optical coherence tomography. *Journal of Biomedical Optics*, 27(1), 015002.
- Jones, R. 2018. *Anti-inflammatory Effects of Lysine in the Healing of Burn Wounds*. *Journal of Inflammation and Immunology*, 13(6), 98-105.
- Kemenkes, R.I. 2019. Pedoman Nasional Pelayanan Kedokteran Tata Laksana Luka Bakar. Keputusan Menteri Kesehatan Republik Indonesia: 7.
- Kemenkes. 2017. Penentuan Nilai Rujukan Parameter Faal Hewan Percobaan Sebagai Model Penyakit Manusia Dan Hewan.
- Khorasani, G., Hosseinimehr, S.J., Azadbakht, M., Zamani, A., Mahdavi, M.R. 2009. Aloe versus Silver Sulfadiazine Creams for Second-Degree Burns: A Randomized Controlled Study. 39, 587–591.
- Kim, S., Thiessen, P.A., Bolton, E.E., Chen, J., Fu, G., Gindulyte, A., Han, L., He, J., He, S., Shoemaker, B.A., Wang, J., Yu, B., Zhang, J and Bryant, S.H. 2016. PubChem Substance and Compound databases. *Nucleic Acids Res.*
- Kim, Y., Sim, W.J., Lee, J and Lim, T.G. 2022. Snail mucin is a functional food ingredient for skin. *Journal of Functional Foods*, 92, 105053.

- Kumar, D., 2021. *Anti-inflammatory Properties of Phenylalanine in Burn Treatment*. International Journal of Inflammation Research, 38(1), 45-55.
- Kurahashi, T and Fujii, J. 2015. Roles of antioxidative enzymes in wound healing. J. Dev. Biol., 3, 57–70.
- Landén, N.X., Li, D and Ståhle, M. 2016. Transition from inflammation to proliferation: a critical step during wound healing. Cell Mol Life Sci. 73(20):3861-85. doi: 10.1007/s00018-016-2268-0.
- Lau, K., Paus, R., Tiede, S., Day, P and Bayat, A. 2009. Exploring the role of stem cells in cutaneous wound healing. Exp Dermatol. 18:921– 933
- Lavers and Isabel. 2017. Exploring Skin Anatomy, Function and Site-Specific Treatment Options. Journal of Aesthetic Nursing. (6): 4.
- Li, Z and Hong, K. 2019. *Novel Antibiotic Compounds: Structural and Functional Studies of Vinylamycin and Its Derivatives*. Bioorganic and Medicinal Chemistry, 27(12), 2305-2312. doi:10.1016/j.bmc.2019.05.011
- Liang, M., Wang, Z., Li, H., Cai, L., Pan, J., He, H., Wu, Q., Tang, Y., Ma, J and Yang, L. 2018. L-Arginine Induces Antioxidant Response to Prevent Oxidative Stress via Stimulation of Glutathione Synthesis and Activation of Nrf2 Pathway. Food Cosmet. Toxicol. 115, 315– 328.
- Lim, J.Y., Kim, N.A., Lim, D.G., Kim, K.H., Hada, S and Jeong, S.H. 2015. Evaluation of etanercept degradation under oxidative stress and potential protective effects of various amino acids. Int. J. Pharm. 492, 127–136
- Ling, Z.N., Jiang, Y.F and Ru, J.N. 2023. Amino acid metabolism in health and disease. *Sig Transduct Target Ther* 8, 345. <https://doi.org/10.1038/s41392-023-01569-3>
- Liu, F., Lu, W., Fang, Y and Liu, J. 2014. Evolution of oxidation dynamics of histidine: Nonreactivity in the gas phase, peroxides in hydrated clusters, and pH dependence in solution. Phys. Chem. Chem. Phys. 16, 22179–22191
- Liu, W.H., Liu, T.C and Yin, M.C. 2008. Beneficial effects of histidine and carnosine on ethanol-induced chronic liver injury. Food Chem. Toxicol. 46, 1503–1509
- Lutfy, K and Cowan, A. 2004. Buprenorphine: a unique drug with complex pharmacology. Curr Neuropharmacol. 2(4):395-402. doi: 10.2174/1570159043359477
- Ma, Z., Wang, C and Li, H. 2021. *Advances in Indanomycin Research and its Potential as an Antibacterial Agent against Resistant Strains*. Bioorganic and Medicinal Chemistry Letters, 31, 127736. doi:10.1016/j.bmcl.2021.127736
- Mahata, D., Jana, M., Jana, A., Mukherjee, A., Mondal, N., Saha, T., Sen, S., Nando, G.B., Mukhopadhyay, C.K., Chakraborty, R and Mandal, S.M. 2017. Lignin-graft-Polyoxazoline Conjugated Triazole a Novel Anti-Infective Ointment to Control Persistent Inflammation. Sci Rep. 12;7:46412. doi: 10.1038/srep46412. PMID: 28401944; PMCID: PMC5401907.
- Mahdi, E.S., Sakeena, M.H.F., Abdulkarim, M., Sattar, M., Noor, A.M and Abdullah, G. 2011. Formulation and in vitro release evaluation of newly synthesized palm kernel oil esters-based nanoemulsion delivery system for 30% ethanolic dried extract derived from local Phyllanthus urinaria for skin antiaging. International Journal of Nanomedicine, 2499

- Makkar, H.S., Tran G., Heuze, V dan Ankers, P. 2014. Keadaan seni dalam penggunaan serangga sebagai pakan ternak. *Anim Pakan Sci Technol.* 197: 1 - 33.
- Makrantonaki, E., Ganceviciene, R and Zouboulis, C.C. 2011. An update on the role of the sebaceous gland in the pathogenesis of acne. *DermatoEndocrinology*, 3(1),41–49. <https://doi.org/10.4161/derm.3.1.13900>
- Mangunsong, S dan Marsela, L. 2021. Efek Ekstrak Metanol Maggot (*Hermetia illucens*) Terhadap Penyembuhan Luka Terbuka Pada Tikus (*Rattus norvegicus*). *JKPharm Jurnal Kesehatan Farmasi*, 3(2), pp.99-104
- Maryunani, A. 2015. Perawatan Luka Modern, Terkini dan Terlengkap. In *Media*. Jakarta. 86-87.
- Matsui, T and Amagai, M. 2015. Dissecting the formation, structure and barrier function of the stratum corneum. *Int Immunol.* 27: 269–280.
- Matsumoto, Y and Kuroyanagi, Y.J. 2010. *Biomater. Sci., Polym. Ed.* 21, 715–726
- Mclaughlin, E.S and Paterson, A.O. 2012. *BURNS, Prevention, Causes and Treatment*, 1st ed., Nova Science Publishers, Inc.: New York, NY, USA.
- Medina, L.E. 2022. Wound Healing. 14-17. doi: 10.1002/9781119793588.ch2
- Moen, I., Ugland, H., Strömberg, N., Sjöström, E., Karlson, A., Ringstad, L., Bysell, H., Moghaddam, M and Haglerød, C. 2018. Development of a novel in situ gelling skin dressing: Delivering high levels of dissolved oxygen at pH 5.5. *Health Science Reports*, 1(7), e57. <https://doi.org/10.1002/hsr2.57>
- Moendjat, Y. 2009. *Luka Bakar dan Tatalaksana Edisi ke-4*. FKUI. Jakarta.
- Moenek, D. Y., Oematan, A. B dan Toelle, N. N. 2019. Total leukosit dan diferensial leukosit darah ayam kampung yang terpapar *Ascaridia galli* secara alami. *Partner*, 24(2), 991-997.
- Mondal, S., Ghosh, D., Ganapaty, S., Reddy, M.S and Ramakrishna, K. 2016. Evaluation of healing potential of *Achyranthes aspera* L. (Amaranthaceae) seeds in excision, incision, dead space and burn wound model-an in-vivo study. *Pharmacogn. J.* 8(3): 300 – 307. DOI: 10.5530/pj.2016.3.20
- Munir, M., Shah, S.N.H., Almas, U., Khan, F.A., Zaidi, A., Bukhari, S.M and Murtaza, G. 2021. An assessment of the wound healing potential of a herbal gel containing an *Azadirachta indica* leaf extract. *Veterinari Medicina* 66(3): 99 – 109. <https://doi.org/10.17221/46/2020-VETMED>
- Nasr, A., Gardouh, A dan Ghorab, M. 2016. Novel Solid SelfNanoemulsifying Drug Delivery System (S-SNEDDS) for Oral Delivery of Olmesartan Medoxomil: Design, Formulation, Pharmacokinetic and Bioavailability Evaluation. *Pharmaceutics*. 8;(20): 1-29.
- Naumov, A.A., Shatalin, Y.V and Potselueva, M.M. 2010. Effects of a Nanocomplex Containing Antioxidant, Lipid, and Amino Acid on Thermal Burn Wound Surface. *Bulletin of Experimental Biology and Medicine*, Vol. 149(1)
- Nauta, A., Gurtner, G and Longaker, M. 2011. Wound healing and regenerative strategies. *Oral Dis.* 18;17:541–549.
- Naveh, H.R., Jafari, T.M.M., Shariati, M., Vazeirnejad, R and Rezvani M.E. 2011. Both omega-3 and omega-6 polyunsaturated fatty acids stimulate foot

- wound healing in chronic diabetic rat. *Afr J of Pharm and Pharmacol.* 5(14): 1713-1717.
- Nicodemus., Andrie, M dan Luliana, S. 2014. Uji Efek Penyembuhan Luka Sayat Ekstrak Ikan Toman (*Channa micropellets*) secara Oral pada Tikus Putih Jantan Wistar. *Jurnal Mahasiswa Farmasi Fakultas Kedokteran UNTAN.* 1(1): 1–14.
- Niczyporuk, M. 2018. Rat skin as an experimental model in medicine. *Progress in Health Sciences* 8(2): 223–228. <https://doi.org/10.5604/01.3001.0012.8351>
- Nielson, C.B., Duethman, N.C., Howard, J.M., Moncure, M and Wood, J.G. 2017. Burns: Pathophysiology of Systemic Complications and Current Management. *J Burn Care Res.* 38(1):e469-e481. doi: 10.1097/BCR.0000000000000355. PMID: 27183443; PMCID: PMC5214064.
- Nofriyanti, S.N dan Mistawati, A. 2020. Formulasi Dan Uji Aktivitas Emulgel Minyak Ikan Gabus (*Channa striata*) Sebagai Penyembuh Luka Bakar. *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy) (e-Journal).* 6(2): 253–268.
- Nurpermatasari, A dan Ernoviya, E. 2020. Formulasi dan Evaluasi Nanoemulsi Ketokonazole. *Jurnal Dunia Farmasi,* 4(3), 138-148.
- Oehlke, K., Adamiuk, M., Behnsilian, D., Gräf, V., Miebach, E., Walz, E and Greiner, R. 2014. Potential bioavailability enhancement of bioactive compounds using food-grade engineered nanomaterials: a review of the existing evidence. *Food & function,* 5(7), 1341-1359. doi: 10.1039/C3FO60067J
- Ohshima, H and Makino, K. 2014. Colloid and interface science in pharmaceutical research and development. Kidlington, Oxford: Elsevier
- Olczyk, P., Koprowski, R., Kafmierczak, J., Mencner, L., Wojtyczka, R., Stojko, J., Olczyk, K and Komosinska, K. 2016. Bee Pollen as a Promising Agent in the Burn Wounds Treatment. *Hindawi Publishing Corporation.* <http://dx.doi.org/10.1155/2016/8473937>
- Oyovwi, M.O and Atere, A.D. 2024. Exploring the medicinal significance of l-Arginine mediated nitric oxide in preventing health disorders, *European Journal of Medicinal Chemistry Reports,* Volume 12,100175,ISSN 2772-4174, <https://doi.org/10.1016/j.ejmcr.2024.100175>.
- Palma, C.D., Paola, R., Perrotta, C., Mazzon, E., Cattaneo, D., Trabucchi, E and Clementi, E. 2009. Ibuprofen–arginine generates nitric oxide and has enhanced anti-inflammatory effects. *Pharmacological research,* 60(4), 221-228.
- Pant, S., Badola. A., Baluni. S and Pant, W. 2015. A Review on Emulgel Novel Approach for Topical Drug Delivery System. *World Journal of Pharmacy and Pharmaceutical Sciences* 4(10): 1728-1743
- Park, H.J., Lee, J., Kim, M.J., Kang, T.J., Jeong, Y., Um, S.H and Cho, S.W. 2012. Sonic hedgehog intradermal gene therapy using a biodegradable poly(β -amino esters) nanoparticle to enhance wound healing. *Biomaterials.* 33(35):9148-56. doi: 10.1016/j.biomaterials.2012.09.005.
- Pastar, I., Stojadinovic, O., Yin, N.C., Ramirez, H., Nusbaum, A.G., Sawaya, A., Patel, S.B., Khalid, L., Isseroff, R.R and Canic, M. 2014. Epithelialization in

- Wound Healing: A Comprehensive Review. *Adv Wound Care* (New Rochelle). 1;3(7):445-464. doi: 10.1089/wound.2013.0473
- Patel, N., Kumar, N., Singh, A and Gupta, A. 2021. Formulation and optimization of synthetic polymer based herbal emulgel for anti-microbial activity. *Journal of Innovations in Applied Pharmaceutical Science (JIAPS)*, 37-42.
- Paula, O.A., Franco, E.D.S., Barreto, R.R., Cordeiro, D.P., Melo, R.G., Aquino, C.M.F., Rodrigues, A.A., Medeiros, P.L., Silva, T.G., Silva, A.J and Sousa, M.B. 2013. "Effect of semisolid formulation of persea americana mill (avocado) oil on wound healing in rats", *Evidence- based Complementary and Alternative Medicine: Ecam*, 472382
- Philippe, A.S., Murielle, M., Corrine, S., Marjorie, F., Nathalie, H.B., Anthony, B.R., Wassim, R and Lee, A. 2019. Cell therapies for skin regeneration: an overview of 40 years of experience in burn units. *Swiss Medical Weekly* 149: 1 – 7.
- Pilat, D., Piotrowska, A., Rojewska, E., Jurga, A., Ślusarczyk, J., Makuch, W., Basta, A., Przewlocka, B., Mika, J. 2016. Blockade of IL-18 signaling diminished neuropathic pain and enhanced the efficacy of morphine and buprenorphine. *Mol. Cell Neurosci.* 71, 114–124.
- Poljsak, N., Kreft, S and Kocevar, G.N. 2020. Vegetable butters and oils in skin wound healing: Scientific evidence for new opportunities in dermatology. *Phytother Res.* 34(2): 254-269
- Prakoewa, F. R. 2020. Peranan sel limfosit dalam imunologi: Artikel review. *Jurnal Sains Dan Kesehatan*, 2(4), 525-537.
- Prasetyo, B.F., Wientarsih, I dan Priosoeryanto, B.P. 2010. Aktivitas sediaan gel ekstrak batang pohon pisang ambon dalam proses penyembuhan luka pada mencit. *Jurnal Veteriner*, 2(2): 70-73.
- Pratiwi, D. 2016. Uji Efek Antiinflamasi Topikal Ekstrak Etanol Daun Jambu Biji (*Psidium guajava* Linn.) pada Edema Kulit Punggung Mencit Galur Swiss Terinduksi Karagenan. Skripsi. Universitas Sanata Dharma. Yogyakarta.
- Prihantini, E., Zulfa, L.D., Pratiwi, I dan Yulianti, D. 2020. Pengaruh Waktu Ultrasonikasi Terhadap Karakteristik Fisika Nanopartikel Kitosan Ekstrak Etanol Daun Suji (*Pleomele Angustifolia*) dan Uji Stabilitas Fisika Menggunakan Metode Cycling Test. *Jurnal Ilmu Farmasi dan Farmasi Klinik*, vol. 16, no. 02, pp. 125–133.
- Primadina, N., Achmad, B and David, S.P. 2019. Penyembuhan Luka Dari Aspek Mekanisme Seluler dan Molekuler. *Qanun Medika.* 3: 1.
- Pubchem. 2022. National Library of Medicine, website, <https://pubchem.ncbi.nlm.nih.gov/>, Diakses pada 26 Maret 2024
- Purnomo, D., Sugiharto, S dan Isroli, I. 2015. Total leukosit dan diferensial leukosit darah ayam broiler akibat penggunaan tepung onggok fermentasi rhizopus oryzae pada ransum. *Jurnal Ilmu-Ilmu Peternakan*, 25(3), 59-68.
- Puspitasari, F., Saraswati, I dan Wulandari, F. 2023. Formulasi dan Evaluasi Fisik Sediaan Emulgel Ekstrak Daun Kelor (*Moringa oleifera* Lam.) sebagai Antioksidan dengan Gelling Agent HPMC. *Generics: Journal of Research in Pharmacy*, 3(1), 36-44.

- Putra, R.E., Yenyen, F., Ida, K., Agus, D.P., Mia, R and Elisa, N.R. 2021. Omega-3 Content of Black Soldier Fly Prepupa (*Hermetia illucens*) fed with marine Fish Offal and Tofu Dreg. *BIOTROPIA*. 28(1): 64-73.
- Putri, C.E.D., Shinta, H.E., Fatmaria, F and Trinovita, E. 2023. The Effectiveness of Sungkai Leaf (*Peronema canescens* Jack.) Extract Gel on the Collagen Density of Incision Wounds in Vivo. *Traditional Medicine Journal*. 28(2): 69-76. <https://doi.org/10.22146/mot.80458>
- Qiao, X.W., Kai, Y.L., Chun, Q and Liang, S.L. 2009. Hyperactivity of fibroblasts and functional regression of endothelial cells contribute to microvessel occlusion in hypertrophic scarring. *Microvasc Res*. 77:204–211
- Rahayu, R., Rahmawati, R., Mairawita, Devianto, D and Putra, R.E. 2023. Performance of Tropical Fruit Wastes as Oviposition Attractants and Growing Substrates in Rearing Black Soldier Fly (*Hermetia illucens*). *International Journal Of Agriculture and Biology*, 30(3) 221–228
- Rahayu, R., Utari, S.D and Santoso, P. 2024. The potential of black soldier fly prepupa oil (*Hermetia illucens* L.) on wound healing in mice (*Mus musculus* L.). *Journal of Research in Pharmacy*, (in press)
- Rahman, N., Rahman, H., Haris, M and Mahmood, R. 2017. Wound healing potentials of *Thevetia peruviana*: Antioxidants and inflammatory markers criteria. *Journal Tradit Complement Me*. 7: 4.
- Rahmaniyah, D.N.K. 2018. Perbandingan Formulasi Nanoemulsi dan Nanoemulsi Gel Hidrokortison dengan Variasi Konsentrasi Fase Minyak Palm Oil.” Universitas Islam Negeri Maulana Malik Ibrahim.
- Rahmawati, R., Rahayu, R and Mairawita. 2022. Organic Waste Bioconversion Technology Using Black Soldier Fly (*Hermetia Illucens* Linnaeus, 1758). *International Journal of Progressive Sciences and Technologies*. 35(1), pp. 280-284.
- Raina, N., Rani, R., Thakur, V.K and Gupta, M. 2023. New Insights in Topical Drug Delivery for Skin Disorders: From a Nanotechnological Perspective. *ACS Omega*. 8, 19145–19167. <https://doi.org/10.1021/acsomega.2c08016>.
- Rajput, A., Gaur, R., Kulshreshtha, M., Jadaun, S.S and Kumari, V. 2024. Development and evaluation of celecoxib emulgel by using natural oil. *Anti-Inflammatory & Anti-Allergy Agents in Medicinal Chemistry*, 23(2), 129-137.
- Rama, R.K.V., Reddy, P.V.B., Tong, X and Norenberg, M.D. 2010. Brain edema in acute liver failure: Inhibition by L-histidine. *Am. J. Pathol*. 176, 1400–1408
- Ramanathan, V., Venugopalan, S., Ganapathy, D., Ramadoss, R., Kumar, S.M., Kannan, R.K., Jayakumar, A and Duraisamy, R. 2022. Effect of Dietary Amino Acids L-Arginine and Lysine on Implant Osseointegration. *J Pharm Bioallied Sci*. 2022 Jul;14(Suppl 1):S106-S109. doi: 10.4103/jpbs.jpbs_594_21. 13. PMID: 36110804; PMCID: PMC9469227.
- Rehman, K and Zulfakar, M.H. 2014. Recent advances in gel technologies for topical and transdermal drug delivery. *Drug Dev. Ind. Pharm*. 40, 433–440.
- Reinke, J.M and Sorg, H. 2012. Wound repair and regeneration. *Eur Surg Res*. 49(1):35-43. doi: 10.1159/000339613.

- Rizki, S., Hartami, P dan Erlangga, E. 2017. Tingkat densitas populasi maggot pada media tumbuh yang berbeda. *Acta Aquatica: Aquatic Sciences Journal*, 4(1), pp.21-25.
- Rizki, T., Yasni, S., Muhandr, T dan Yuliani, S. 2023. Sintesis Nanoemulsi dari Ekstrak Kulit Manggis dengan Metode Energi Tinggi. *Teknologi dan Industri Pangan Vol. 34(1): 109-118*. <https://doi.org/10.6066/jtip.2023.34.1.109>
- Robson, M.C., Steed, D.L and Franz, M.G. 2001. Wound healing: biologic features and approaches to maximize healing trajectories. *Curr Probl Surg*. 38:72–140.
- Rojkind, M., Rosales, N and Greenwel, P. 2002. *Cell. Mol. Life Sci.* 59, 1872–1891.
- Roy, S., Khanna, S., Nallu, K., Hunt, T.K., Sen, C.K. 2006. Dermal wound healing is subject to redox control. *Mol. Ther.*, 13, 211–220.
- Rupina, W., Trianto, H.F and Fitrianingrum, I. 2016. Efek salep ekstrak etanol 70% daun karamunting terhadap re-epitelisasi luka insisi kulit tikus wistar. *eJournal Kedokteran Indonesia*. 4(1): 26-30. DOI: 10.23886/ ejki.4.5905.26-30
- Ruszkiewicz, J and Albrecht, J. 2015. Changes of the thioredoxin system, glutathione peroxidase activity and total antioxidant capacity in rat brain cortex during acute liver failure: Modulation by L-histidine. *Neurochem. Res.* 40, 293–300
- Saeed, N.M., Demerdash, E., Rahman, A.H.M., Algandaby, M.M., Abbasi, F.A and Naim, A.B. 2012. Anti-inflammatory activity of methyl palmitate and ethyl palmitate in different experimental rat models. *Toxicol Appl Pharmacol.* 264(1): 84-93.
- Safitri, F.I., Nawangsari, D and Febrina, D. 2021. Overview: Application of Carbopol 940 in Gel. *Www.atlantis-Press.com; Atlantis Press*. <https://doi.org/10.2991/ahsr.k.210127.018>
- Sakamoto, K., Lochhead, R.Y., Maibach, H.I and Yamashita, Y. 2017. *Cosmetic science and technology: Theoretical principles and applications (1st ed.)*. Cambridge, MA: Elsevier.
- Salehi, S., Koeck, K and Scheibel, T. 2020. Spider silk for tissue engineering applications. *Molecules*, 25(3), 737. <https://doi.org/10.3390/molecules25030737>
- Sanaji, J.B., Krismala, M.S and Liananda, F.R. 2019. Pengaruh Konsentrasi Tween 80 Sebagai Surfaktan Terhadap Karakteristik Fisik Sediaan Nanoemulgel Ibuprofen. *Indonesian Journal on Medical Science*, 6(2).
- Saputro, B. E., Sutrisna, R., Santosa, P. E dan Fathul, F. 2016. Pengaruh ransum yang berbeda pada itik jantan terhadap jumlah leukosit dan diferensial leukosit. *Jurnal Ilmiah Peternakan Terpadu*, 4(3).
- Sen, S., Hsei, L., Tran, N., Romanowski, K., Palmieri, T., Greenhalgh, D and Cho, K. 2019. Early clinical complete blood count changes in severe burn injuries. *Burns* 45(1): 97–102. <https://doi.org/10.1016/j.burns.2018.09.004>
- Shafri, M.A and Mat, J.A.M. 2012. Therapeutic Potential of Haruan (*Channa striatus*): from food to medicinal uses. *Mal. J. Nutr.* 18:125- 136.

- Shehab, M.H and Ghalia, A.M. 2013. A comparison between the effects of topical application of honey and that of amino acids on improving wound healing in aged rats: a histological and immunohistochemical study. *The Egyptian Journal of Histology*. DOI: 10.1097/01.EHX.0000428642.64535.9e
- Shimadzu. 2019. Fundamental Guide to Liquid Chromatography Mass Spectrometry (LCMS). Shimadzu Corporation.
- Shoviantari, F., Fajriyah, S., Agustin, E dan Khairani, S. 2021. Aktivitas gel lendir bekicot (*Achatina fulica*) sebagai penyembuhan luka sayat. *As-Syifaa Jurnal Farmasi* 13(1): 12 – 19.
- Sigh, R. 2014. Emulgel: A Recent Approach for Topical Drug Delivery System. *Asian Journal of Pharmaceutical Research and Development* 2(2): 13-15.
- Simon, P. 2012. Formulasi Dan Uji Penetrasi Mikroemulsi Natrium Diklofenak Dengan Metode Sel Difusi Franz Dan Metode Tape Stripping, Skripsi. Prodi Farmasi FMIPA Universitas Indonesia. Depok.
- Singh, M., Sharma, S., Khokra, S.L and Saini, V. 2011. Formulation and evaluation of topical emulgel of rofecoxib. *Int J Pharm Pharm Sci*. 3(1):210-3
- Smith, R. 2019. Aspartate as an Antioxidant in Wound Repair Mechanisms. *Journal of Oxidative Medicine*, 28(3), 421-429.
- Son, D.O., Satsu, H and Shimizu, M. 2005. Histidine inhibits oxidative stress- and tnf-a-induced interleukin-8 secretion in intestinal epithelial cells. *FEBS lett.* 579, 4671–4677
- Song, Y., Cui, Y., Hao, L., Zhu J., Yi, J., Kang, Q., Huang, J and Lu, J. 2021. Wound-healing activity of glycoproteins from white jade snail (*Achatina fulica*) on experimentally burned mice. *International Journal of Biological Macromolecules* 175: 313 – 321. <https://doi.org/10.1016/j.ijbiomac.2021.01.193>
- Sorg, H., Krueger, C and Vollmar, B. 2007. Intravital insights in skin wound healing using the mouse dorsal skin fold chamber. *J Anat.* 211:810–818
- Sorg, H., Tilkorn, D.J., Hager, S., Hauser, J and Mirastschijski, U. 2017. Skin Wound Healing: an Update on The Current Knowledge and Concepts. *Eur. Surg. Res.* 58, 81–94
- Speer, H., Cunha, N.M., Davies, M.J., McKune, A.J and Naumovski, N. 2020. *The physiological effects of amino acids arginine and citrulline: Is there a basis for development of a beverage to promote endurance performance.* A narrative review of orally administered supplements. *Beverages*, 6(1), 11.
- Stoffels, B., Türler, A., Schmidt, J., Nazir, A., Tsukamoto, T., Moore, B.A., Schnurr, C., Kalf, J.C and Bauer, A.J. 2011. Anti-inflammatory role of glycine in reducing rodent postoperative inflammatory ileus. *Neurogastroenterol. Motil.* 23, 76-e8.
- Strodtbeck, F. 2001. Physiology of wound healing. *Newborn Infant Nurs Rev.* 1:43–52.
- Sumoza, N.S., Efrizal dan Rahayu, R. 2014. Pengaruh Gambir (*Uncaria gambir* R.) Terhadap Penyembuhan Luka Bakar pada Mencit Putih (*Mus musculus* L.) *Jantan. Jurnal Biologi Universitas Andalas.* 3(4).

- Sun, B., Wu, L., Wu, Y., Zhang, C., Qin, L., Hayashi, M., Kudo, M., Gao, M and Liu, T. 2020. Therapeutic Potential of Centella Asiatica and Its Triterpenes: A Review. *Front. Pharmacol.* 11, 568032
- Susanti., Wahida, H dan Nisa, I.H. 2022. Formulasi dan Evaluasi Sediaan Emulgel Ekstrak Etanolik Daun Tekelan (*Chromolaena odorata* L.) dengan Berbagai Basis. *Jurnal Ilmu Farmasi dan Farmasi Klinik.* 19(2): 88-94.
- Sutrisno, T., Huda, N., Nurlily, N., Cahaya, N dan Srikartika, V.M. 2016. Efektivitas Gel Kuersetin pada Penyembuhan Luka Bakar Derajat IIA. *Media Pharmaceutica Indonesiana*, 1(1): 1-11.
- Tabarraei, H., Hassan, J., Parvizi, M.R., Golshahi, H and Keshavarz, T.H. 2019. Evaluation of the acute and sub-acute toxicity of the black caraway seed essential oil in Wistar rats. *Toxicol Rep.* 6: 869-874.
- Tadros, T.F. 2013. Emulsion formation, stability, and rheology. *Emulsion formation and stability*, 1-75.
- Takiguchi, Y., Nakanishi, S and Miyazaki, Y. 2019. *Mechanism of Action of Indanomycin and its Effect on Membrane Ion Transport in Bacteria.* *Journal of Antibiotics*, 72(4), 245-253. doi:10.1038/s41429-018-0155-y
- Tamales, D. A., Dewi, N and Rosida, L. 2016. Extract of haruan (*channa striata*) extract increasing reepithelialization count in wound healing process on wistar rat's buccal mucosa. *Journal of Dentomaxillofacial Science*, 1(1), 12-15.
- Tiara, D., Tiho, M dan Mewo, Y. M. 2016. Gambaran kadar limfosit pada pekerja bangunan. *eBiomedik*, 4(2).
- Titaley, S., Fatimawali dan Lolo, W.A. 2014. Formulasi dan uji efektivitas sediaan gel ekstra etanol daun mangrove api-api (*Avicennia marina*) sebagai antiseptik tangan. *Pharmacon.* 3(2): 99-106.
- Tomberlin, J.K., Sheppard, D.C and Joyce, J.A. 2002. Selected life-history traits of black soldier fly (Diptera: Stratiomyidae) reared on three artificial diets. *Annals of the Entomological Society of America*, 95(3), pp.379-386.
- Tsai, H.C., Chang, G.R.L., Fan, H.C., Yang, H.O., Huang, L.C., Wu, S.C and Chen, C.M. 2019. A mini-pig model for evaluating the efficacy of autologous platelet patches on induced acute full thickness wound healing. *BMC Veterinary Research.* 191(15): 1-13.
- Tziotzios, C., Profyris, C and Sterling, J. 2012. Cutaneous scarring: pathophysiology, molecular mechanisms, and scar reduction therapeutics. *J Am Acad Dermatol.* 66:13-24.
- Tzschentke, T.M. 2002. Behavioral pharmacology of buprenorphine, with a focus on preclinical models of reward and addiction. *Psychopharmacology (Berl).* 161(1):1-16. doi: 10.1007/s00213-002-1003-8.
- Utami, E. T., Risqillah, U dan Fajariah, S. 2020. Profil hematologi mencit (*Mus musculus* L.) strain Balb/c jantan akibat paparan asap rokok elektrik. *Jurnal Biologi Udayana*, 24(2), 115-125.
- Utari, S., Rahayu, R and Santoso, P. 2023. Fatty Acid as an Anti-inflammatory Component from Black Soldier Fly (*Hermetia illucens*) Prepupa Oil. *International Journal of Progressive Sciences and Technologies*, 40(2), 107-108. doi: 10.52155/ijpsat.v40.2.5524

- Utari, S.D. 2022. Pengaruh Pemberian Minyak Prepupa Black Soldier Fly (*Hermetia illucens* L.) Terhadap Penyembuhan Luka Bakar Tipe II Pada Mencit (*Mus musculus* L.) Jantan. Skripsi, Universitas Andalas.
- Utari, S.D. 2023. Efektivitas dan Keamanan Emulgel Minyak Prepupa Black Soldier Fly (*Hermetia illucens* L.) Terhadap Penyembuhan Luka Bakar Derajat II Pada Mencit Putih (*Mus musculus* L.) Jantan. Thesis. Universitas Andalas. Padang
- Van, D.P.E., Mudde, Y.D., Coumans, F.W., Leeuwen, T.G., Sturk, A and Nieuwland, R. 2016. Wound scabs protect regenerating tissue against harmful ultraviolet radiation. *Medical Hypotheses*, 96, 39–41. <https://doi.org/10.1016/j.mehy.2016.09.011>
- Verhaegen, P.D., Zuijlen, P.P., Pennings, N.M., Marle, J., Niessen, F.B., Horst, C.M., Middelkoop, E. 2009. Differences in collagen architecture between keloid, hypertrophic scar, normotrophic scar, and normal skin: an objective histopathological analysis. *Wound Repair Regen.* 17:649–656.
- Wahyuningsih, I and Yuliani. S. 2023. Nanoemulgel Activity of Binahong Leaf Extract (*Anredera cordifolia*) againts Wound Healing of Hyperglycemic Rats. *Pharmaciana*, 13(1):100-100. doi: 10.12928/pharmaciana.v13i1.24600
- Wang, J., Jousse, M., Jayakumar, J., Arteaga, A., Castellví, S., Ferrando, M and Güell, C. 2021. Black soldier fly (*Hermetia illucens*) protein concentrates as a sustainable source to stabilize o/w emulsions produced by a low-energy high-throughput emulsification technology. *Foods*, 10(5), 1048. doi: 10.3390/FOODS10051048
- Wang, J.H., Michael, J and Eck, H. 2018. Protein Architecture: Relationship of Form and Function, *Hematology (Seventh Edition)*, Elsevier, 59-67, ISBN 9780323357623, <https://doi.org/10.1016/B978-0-323-35762-3.00006-8>.
- Wardani, I.G.A., Dwi, A.S., Ni, M.D and Ni, P.U.A. 2022. The Effect of *Xylocarpus granatum* J. Koenig Seed Extract Cream on the Number of Fibroblast and Re-Epithelialization in IIA Degree Burn Wound Healing. *Indonesian Journal of Pharmacy*. 33(4): 653-665.
- Weaver, A.J., Brandenburg, K.S., Smith, B.W and Leung, K.P. 2020. Comparative Analysis of the Host Response in a Rat Model of Deep-Partial and Full-Thickness Burn Wounds With *Pseudomonas aeruginosa* Infection. *Frontiers in cellular and infection microbiology*, 9, 466. <https://doi.org/10.3389/fcimb.2019.00466>
- Werner, S and Grose, R. 2003. Regulation of wound healing by growth factors and cytokines. *Physiol Rev.* 83:835–870.
- WHO. 2018. Burns. Diakses 30 Maret 2024 <https://www.who.int/news-room/factsheets/detail/burns>
- Widyaningrum, I., Triyoga, E.F., Wibisono, N., Kusumawati, S and Widiyana, A. P. 2023. Type of Cosurfactant Effects on Particle Size in Nanoemulsion Drug Delivery Systems. *East Asian Journal of Multidisciplinary Research*, 2(9), 3811-3820. <https://doi.org/10.55927/eajmr.v2i9.6276>
- Wilkinson, H.N and Hardman, M. 2020. J. Wound healing: Cellular mechanisms and pathological outcomes. *Open Biol* 10: 200223.

- Witte, M.B and Barbul, A. 2003. Arginine physiology and its implication for wound healing. *Wound Repair Regen.* 11:419-23.
- Woo, Y.C., Park, S.S., Subieta, A.R., Brennan, T.J. 2004. Changes in tissue pH and temperature after incision indicate acidosis may contribute to postoperative pain. *Anesthesiology.* 101:468–475
- Wu, L., Sun, W., Cui, Z., Wang, Y., Li, W., Zhou, C. 2021. *Anti-inflammatory Effects of Aspartate in Burn Wound Healing.* *Journal of Inflammation Research,* 39(2), 115-122.
- Yakup, A., Zhang, J., Dong, W., Dong, J and Lu, S. 2022. The epidemiological characteristic and trends of burns globally. *BMC Public Health* 22: 1596
- Yao, Y., Zhang, A., Yuan, C., Chen, X and Liu, Y. 2021. Recent trends on burn wound care: hydrogel dressings and scaffolds. *Biomater Sci* 9: 4523 – 4540.
- Yarbro, J. R and Pence, B. D. 2018. Monocytes in aging and exercise. *Exercise Medicine,* 2.
- Yati, K., Nugrahaeni, F., Melinda, R and Wati, L.R. 2024. Utilization of Emulgel Watermelon (*Citrullus lanatus*) Flesh Extract as a Topical Antioxidant. *Borneo Journal of Pharmacy,* 7(2), 147-160. doi: 10.33084/bjop.v7i2.6599
- Yip, W.L. 2014. Influence of oxygen on wound healing. *International Wound Journal,* 12(6), 620–624. <https://doi.org/10.1111/iwj.12324>
- Yu, G., Cheng, P., Chen, Y., Li, Y., Yang, Z., Chen, Y and Tomberlin, J.K. 2011. Inoculating poultry manure with companion bacteria influences growth and development of Black Soldier Fly (Diptera: Stratiomyidae) larvae. *Environmental Entomology,* 40:30-35.
- Zhang, S., Hou, J., Yuan, Q., Xin, P., Cheng, H., Gu, Z and Wu, J. 2020. Arginine Derivatives Assist Dopamine-Hyaluronic Acid Hybrid Hydrogels to Have Enhanced Antioxidant Activity for Wound Healing. *Chem. Eng. J.* 392, 123775.
- Zhao, Y., Wu, X and Wu, L. 2020. *Targeting AMPK and mTOR Pathways with Triazolypurine: A Potential Approach to Cancer Therapy.* *European Journal of Medicinal Chemistry,* 206, 112721. doi:10.1016/j.ejmech.2020.112721
- Zouboulis, C.C. 2004. Acne and sebaceous gland function. *Clinics in Dermatology.* 22:360–366.