

## DAFTAR PUSTAKA

1. Haerani A, Chaerunisa AY, Subranas A. Artikel Tinjauan: Antioksidan untuk Kulit. *Farmaka*. 2018;16:135–51.
2. Yusharyahya SN. Mekanisme Penuaan Kulit sebagai Dasar Pencegahan dan Pengobatan Kulit Menua. *eJournal Kedokt Indones*. 2021;9(2):150.
3. Zhang Y, Wang J, Cheng X, Yi B, Zhang X, Li Q. Apigenin Induces Dermal Collagen Synthesis Via smad2/3 Signaling Pathway. *Eur J Histochem*. 2015;59(2):98–106.
4. Rizkyah A, Karimah SN. Literature Review : Penuaan Dini pada Kulit : Gejala , Faktor Penyebab dan Pencegahan. *JGK J Gizi dan Kesehat*. 2023;3(2):107–16.
5. ERHA Skincare. ERHA Skincare. 2025. Menurut Survei, Masalah Penuaan Dini Bikin Masalah Serius di Kehidupan Sosial!
6. Ulfa E., Yuli Y, Diyani G. Pemanfaatan Ekstrak Daun Sungkai (*Peronema canescens* Jack) Sebagai Antioksidan pada Sabun Mandi Padat. *J Res Educ Chem*. 2025;7(1):1–20.
7. Tarigan IL, Sutrisno, Rumaida, Aini IPS, Latief M. Isolation of a Flavone Apigenin and a Steroids Squalene from *Peronema canescens* Jack Leaves with Anti-Inflammatory Activities. *Pharmacogn J*. 2022;14(6):744–52.
8. Dillasamola D, Aldi Y, Fitria N, Oktomalioputri B, Lestari U, Multia R. Isolation of Apigenin from Sungkai ( *Peronema canescens* ) Leaves and Its Immunomodulatory Effects : An In Vivo Study on Granzyme B , Interferon- $\gamma$  , and Perforin Expression with Supporting In Silico Analysis. *F1000Research*. 2025;1–21.
9. Majma Sanaye P, Mojaveri MR, Ahmadian R, Sabet Jahromi M, Bahramsoltani R. Apigenin and its Dermatological Applications: A Comprehensive Review. *Phytochemistry*. 2022;203:113390.
10. Choi S, Youn J, Kim K, Joo DH, Shin S, Lee J, et al. Apigenin Inhibits UVA-Induced Cytotoxicity in Vitro and Prevents Signs of Skin Aging in Vivo. *Int J Mol Med*. 2016;38(2):627–34.
11. Ma X, Lin Y, Liu yingying, Li W, He J, Fang M, et al. Effects of Apigenin Treatment on Random Skin Flap Survival in Rats. *Front Pharmacol*. 2021;12:1–10.
12. Liu C, Guo X, Chen Y, Zhao M, Shi S, Luo Z, et al. Anti-Photoaging Effect and Mechanism of Flexible Liposomes Co-loaded with Apigenin and Doxycycline. *Biomed Pharmacother*. 2023;164:114998.
13. Sang Y, Zhang F, Wang H, Yao J, Chen R, Zhou Z, et al. Apigenin exhibits protective effects in a mouse model of d-galactose-induced aging via

- activating the Nrf2 pathway. *Food Funct.* 2017;8(6):2331–40.
14. Shalihin MI, Khatib A, Yusnaidar Y, Tarigan IL, Latief M. An in-Vogue Plant, *Peronema canescens* Jack: Traditional Uses and Scientific Evidence of its Bioactivities. *Discov Plants.* 2024;1(1).
  15. Dillasamola D, Aldi Y, Wahyuni FS, Rita RS, Dachriyanus, Umar S, et al. Study of Sungkai (*Peronema canescens*, Jack) leaf extract activity as an immunostimulators with in vivo and in vitro methods. *Pharmacogn J.* 2021;13(6):1397–407.
  16. Fadhli H, Susanti E. Segala Sesuatu Tentang Sungkai. 2024. 15–15 p.
  17. Maigoda TC. Potensi Ekstrak Daun Sungkai (*Peronema canescens*) terhadap Inflamasi dan Edema Paru dengan Model ARDS. Penerbit NEM; 2024.
  18. Dillasamola D, Adab P. Eksplorasi Potensi Apigenin Dalam Daun Sungkai Untuk Meningkatkan Fertilitas. Penerbit Adab; 2025.
  19. Syofyan S, Almahdy A, Rachmaini F, Dillasamola D. The Immunostimulatory Effects of *Peronema canescens*. Jack Leaves Extract in *Mus musculus* L. Using the Carbon Clearance Method. *Trop J Nat Prod Res.* 2024;
  20. Budiarti IS. Indra Peraba; Kulit. Bumi Aksara; 2023.
  21. Murlistyarini S, Prawitasari S, Setyowatie L. Intisari Ilmu Kesehatan Kulit dan Kelamin. Universitas Brawijaya Press; 2018.
  22. Wibawa, Eka Arya Gede I & Winaya KK. Karakteristik Penderita Acne Vulgaris di Rumah Sakit Umum (RSU) Indera Denpasar Periode 2014-2015. *J Med Udayana Univ Udayana.* 2019;8(11):1–4.
  23. Ana KD. Sistem Igumen. Bookchapter Keperawatan Med Bedah. 2024;1:2–7.
  24. Ansary TM, Hossain MR, Kamiya K, Komine M, Ohtsuki M. Inflammatory Molecules Associated with Ultraviolet Radiation-Mediated Skin Aging. *Int J Mol Sci.* 2021;22(8):0–14.
  25. Widiyastuti S, Megantara S. Review Artikel: Sumber Dan Manfaat Kolagen Dalam Industri Kosmetik. *Farmaka.* 2021;18:53–9.
  26. Afifah A, Nugraha, Aditya Wahyu Larassati DP. Aplikasi Ekstrak Kolagen Sebagai Minuman Kolagen: Sebuah Tinjauan. *J Agroindustri Pangan.* 2023;2(2):28–43.
  27. Rahman VR, Bratadiredja MA, Saptarini, M.Si, Apt. NM. Artikel Review: Potensi Kolagen sebagai Bahan Aktif Sediaan Farmasi. *Maj Farmasetika.* 2021;6(3):253.
  28. Reilly DM, Lozano J. Skin Collagen Through the Lifestages: Importance for Skin Health and Beauty. *Plast Aesthetic Res.* 2021;8.
  29. Murlistyarini S, Dani AA. Peran Matriks Metaloproteinase (MMP) Pada

- Proses Photoaging. *J Dermatology, Venereol Aesthetic*. 2022;13–21.
30. Wong QYA, Chew FT. Defining Skin Aging and Its Risk Factors: a Systematic Review and Meta-analysis. *Sci Rep*. 2021;11(1):1–13.
  31. Farage MA, Miller KW, Elsner P, Maibach HI. Structural characteristics of the aging skin: A review. *Cutan Ocul Toxicol*. 2007;26(4):343–57.
  32. Sutanto NR, Yusharyahya SN, Nilasari H, Legiawati L, Astriningrum R, Fitri EM. Perkembangan Terkini Proses Penuaan Kulit. *J Kedokt Meditek*. 2023;29(1):98–108.
  33. Cadenas E, Davies KJA. Mitochondrial free radical generation, oxidative stress, and aging. *Free Radic Biol Med*. 2000;29(3–4):222–30.
  34. Zhang S, Duan E. Fighting against Skin Aging: The Way from Bench to Bedside. *Cell Transplant*. 2018;27(5):729–38.
  35. Bintang SSBS, Siregar Y, Ichwan M. Studi Preliminari Tentang Pengaruh D-Galaktosa Dalam Menginduksi Stres Oksidatif Pada Mencit Jantan Galur Outbred FK USU. *J Farm*. 2019;2(1):1–5.
  36. Kammeyer A, Luiten RM. Oxidation events and skin aging. *Ageing Res Rev*. 2015;21:16–29.
  37. Tsikas D. GC – MS and GC – MS / MS Measurement of Malondialdehyde (MDA ) in Clinical Studies : Pre-analytical and Clinical Considerations. *J Mass Spectrom Adv Clin Lab*. 2023;30:10–24.
  38. Situmorang N, Zulham Z. Malondialdehyde (MDA). *J Keperawatan Dan Fisioter*. 2020;2(2):117–23.
  39. Fajar IN, Purwanti S, Triliana R. Penuaan dan Suplementasi Vitamin C dan E Mempengaruhi Kadar MDA Darah Pria Sehat Di Kota Malang. *J Community Med*. 2024;12:1–9.
  40. Kartika RW, Sidharta VM, Djuartina T, Timotius KH, Sartika CR, Rika I. Pemberian Dosis Tinggi D-galactose Jangka Pendek secara Intraperitoneal untuk Menginduksi Proses Aging pada Tikus Jantan. *Heal Med J*. 2023;5(3):162–8.
  41. Sulistyoningrum E, Rosmelia R, Hamid MK, Nuraini WST. Anti-aging Effects of *Muntingia Calabura* Leaves Extract in D-galactose-Induced Skin Aging Mouse Model. *J Appl Pharm Sci*. 2019;9(9):23–9.
  42. Gao J, Yu Z, Jing S, Jiang W, Liu C, Yu C, et al. Protective Effect of Anwulignan Against D-galactose-Induced Hepatic Injury Through Activating p38 MAPK–Nrf2–HO-1 Pathway in Mice. *Clin Interv Aging*. 2018;13:1859–69.
  43. Hakimizadeh E, Zamanian M, Giménez-Llort L, Sciorati C, Nikbakhtzadeh M, Kujawska M, et al. Calcium Dobesilate Reverses Cognitive Deficits and Anxiety-Like Behaviors in the D-galactose-Induced Aging Mouse Model Through Modulation of Oxidative Stress. *Antioxidants*. 2021;10(5):1–11.

44. Ho SC, Liu JH, Wu RY. Establishment of the mimetic aging effect in mice caused by D-galactose. *Biogerontology*. 2003;4(1):15–8.
45. Bo-Htay C, Palee S, Apaijai N, Chattipakorn SC, Chattipakorn N. Effects of D-galactose-Induced Ageing on the Heart and its Potential Interventions. *J Cell Mol Med*. 2018;22(3):1392–410.
46. Wolucka BA, Montagu M Van. The VTC2 cycle and the de novo biosynthesis pathways for vitamin C in plants : An opinion. *Phytochemistry*. 2007;68:2602–13.
47. PubChem. Apigenin | C15H10O5 | CID 5280443 - PubChem. National Center for Biotechnology Information. 2004.
48. Sung B, Chung HY, Kim ND. Role of Apigenin in Cancer Prevention via the Induction of Apoptosis and Autophagy. *J Cancer Prev*. 2016;21(4):216–26.
49. Ali F, Rahul, Naz F, Jyoti S, Siddique YH. Health Functionality of Apigenin: a Review. *Int J Food Prop*. 2017;20(6):1197–238.
50. Kholieqoh AH, Anam K, Kusriani D. Isolation and Antioxidant Activity of Flavonoid Compound in Ethanolic Extract of Celery Leaves (*Apium graveolens* L.). *J Kim Sains dan Apl*. 2022;25(12):450–5.
51. Nayaka HB, Londonkar RL, Umesh MK, Tukappa A. Antibacterial Attributes of Apigenin, Isolated from *Portulaca oleracea* L. *Int J Bacteriol*. 2014;1–8.
52. Aisya S, Megawati, Ariani N, Kurniawan HH, Hendra M, Primahana G, et al. Isolation and Identification of Apigenin, a Flavonoid Compound From *Macaranga Hypoleuca* (Reichb.F. & Zoll.). *Ber Biol*. 2024;23(1):83–90.
53. Yoon S, Kim M, Shin S, Woo J, Son D, Ryu D, et al. Effect of *Cirsium japonicum* Flower Extract on Skin Aging Induced by Glycation. *Molecules*. 2022;27(7).
54. Allemailem KS, Almatroudi A, Alharbi HOA, AlSuhaymi N, Alsugoor MH, Aldakheel FM, et al. Apigenin: A Bioflavonoid with a Promising Role in Disease Prevention and Treatment. *Biomedicines*. 2024;12(6).
55. Oliveira AL, de Oliveira MG, Mónica FZ, Antunes E. Methylglyoxal and Advanced Glycation End Products (AGEs): Targets for the Prevention and Treatment of Diabetes-Associated Bladder Dysfunction? *Biomedicines*. 2024;12(5).
56. Yusuf MMRAG, Rorrong YYA, Badaring DR, Aswanti H, MZ SMA, Nurazizah, et al. Percobaan Memahami Perawatan Dan Kesejahteraan Hewan Percobaan. *Jur Biol FMIPA Prgram Stud Biol*. 2022;1–109.
57. Hasanah U, Rusny, Masri M. Analisis Pertumbuhan Mencit ( *Mus musculus* L.) ICR Dari Hasil Perkawinan Inbreeding Dengan Pemberian Pakan AD1 dan AD2. *Mikrobiol Kesehat dan Lingkung*. 2015;1(1):140–5.
58. Noor SM, Dharmayanti NLPI, Wahyuwardani S, Muharsini S. Penanganan

- Rodensia dalam Penelitian Sesuai Kaidah Kesejahteraan Hewan. IAARD Press. 2022. 1–111 p.
59. dr. Gita Sekar Prihanti MPK. Pengantar Biostatistik. UMMPress; 2016.
  60. Wang D, Yang Y, Zou X, Zhang J, Zheng Z, Wang Z. Antioxidant Apigenin Relieves Age-Related Muscle Atrophy by Inhibiting Oxidative Stress and Hyperactive Mitophagy and Apoptosis in Skeletal Muscle of Mice. *Journals Gerontol - Ser A Biol Sci Med Sci.* 2020;75(11):2081–8.
  61. Kurniasari S, Yanti AH, Setyawati TR. Kadar Malondialdehyde Induk dan Struktur Morfologis Fetus Mencit (*Mus musculus*) yang Diperdengarkan Murottal dan Musik Rock pada Periode Gestasi. *J Protobiont.* 2017;6(2):89–97.
  62. Febram B, Wientarsih I, Pontjo DB. Aktivitas Sediaan Salep Ekstrak Batang Pohon Pisang Ambon (*Musa paradisiaca var sapientum*) Dalam Proses Persembuhan Luka Pada Mencit (*Mus musculus albinus*). *Maj Obat Tradis.* 2010;15(3):121–37.
  63. Yosmar R, Putri AA, Almahdy A. the Effect of Catechins From Purified Gambier (*Uncaria Gambir Roxb.*) and Vitamin C on Malondialdehyde (Mda) Levels of Male White Mice After Physical Activity. *Int J Appl Pharm.* 2024;16(s1):58–61.
  64. Sumiwi YAA, Susilowati R, Purnomosari D, Paramita DK, Fachiroh J, Septyaningtrias DE, et al. *Buku Ajar Histologi.* UGM PRESS; 2023.
  65. Isaac UE, Oyo-Ita E, Igwe NP, Ije EL. Preparation of histology slides and photomicrographs: Indispensable techniques in anatomic education. *Anat J Africa.* 2023;12(1):2252–62.
  66. Reza L, Hidajati N, Triakoso N, Aksono EB. Assessment of Collagen Density in Second-Degree Burns of White Rats (*Rattus norvegicus*) Treated with Melinjo Leaf (*Gnetum gnemon L.*) Extract Cream. *J Pharm Sci.* 2025;196–203.
  67. Kurniawan IA, Dwiastuti R, Yuliani SH. The Effect of Tempeh Extract Gel on Wound Healing In Diabetes Rat: Overview of Tissue Collagen, Wound Closure, Epithelialization and Capillarization. *J Farm Sains dan Komunitas.* 2020;17(1):51–8.
  68. Kumar G, Jain P, Virmani T, Sharma A, Akhtar S, Aldosari SA. Enhancing Therapy with Nano-based Delivery Systems: Exploring the Bioactive Properties and Effects of Apigenin. *Ther Deliv.* 2024;15(9):717–35.
  69. Rowe RC, Sheskey PJ, Quinn ME. *Handbook of Pharmaceutical Excipients* Sixth edition. The Pharmaceutical Press and the American Pharmacists Association; 2009.
  70. Leon JAD De, Borges CR. Evaluation of Oxidative Stress in Biological Samples Using the Thiobarbituric Acid Reactive Substances Assay. *J Vis Exp.* 2020;159(e61122):1–10.

71. Ceccopieri C, Skonieczna J, Madej JP. Modification of a Haematoxylin , Eosin , and Natural Saffron Staining Method for The Detection of Connective Tissue. *J Vet Res.* 2021;65:125–30.
72. Muliando N. Malondialdehid sebagai Penanda Stres Oksidatif pada Berbagai Penyakit Kulit. *Cermin Dunia Kedokt.* 2020;47(1):39–44.
73. Kashyap P, Shikha D, Thakur M, Aneja A. Functionality of Apigenin as a Potent Antioxidant with Emphasis on Bioavailability, Metabolism, Action Mechanism and In Vitro and In Vivo Studies: A Review. *J Food Biochem.* 2022;46(e13950):1–23.

