



## DAFTAR PUSTAKA

- Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2002). *Molecular biology of the cell* (4th ed.). Garland Science.
- Agustiani, F.R.T., Sjahid, L.R., dan Nursal, F.K. (2022). Kajian Literatur: Peranan Berbagai Jenis Polimer Sebagai Gelling agent Terhadap Sifat Fisik Sediaan Gel. *Majalah Farmasetika*, 7, 270–287.
- Aponno, J.V. (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.
- Barros, L., Ferreira, M. J., Queirós, B., Ferreira, I. C., dan Baptista, P. (2007). Total phenols, ascorbic acid, β-carotene and lycopene in Portuguese wild edible mushrooms and their antioxidant activities. *Food Chemistry*, 103(2), 413-419. doi: 10.1016/j.foodchem.2006.07.038
- Baur, J. A., Sinclair, D. A. (2006). Therapeutic potential of resveratrol: the in vivo evidence. *Nature Reviews Drug Discovery*, 5(6), 493-506. doi: 10.1038/nrd2060
- Bhattacharyya, A., Klapperich, C. M., & Papautsky, I. (2006). *Device for filtration of biological particles*. US Patent No. 7,033,630.
- Blois, M. S. (1958). Antioxidant Determinations by the Use of a Stable Free Radical. *Nature*, 181(4617), 1199-1200.
- Bonferoni, M. C., Rossi, S., dan Ferrari, F. (2019). Impact of Excipients on the Antioxidant Properties of Phenolic Extracts: New Insights from a Screening Study. *Antioxidants*, 8(5), 132.
- Brand-Williams, W., Cuvelier, M. E., dan Berset, C. (1995). Use of a Free Radical Method to Evaluate Antioxidant Activity. *LWT-Food Science and Technology*, 28(1), 25-30.
- Buzanowska, K., Juszczak, L., Witkowska-Banaszczak, E., dan Pilarczyk, M. (2019). Effect of Sample Clarity on UV-Vis Spectrophotometric Measurements. *Molecules*, 24(12), 2310.
- Byrdie. (2021). *A Dermatologist Explains the Benefits of Gel-Based Skincare*. Byrdie. Diperoleh dari <https://www.byrdie.com/benefits-of-gel-based-skincare-5115372>.
- Carr, A. C., dan Maggini, S. (2017). Vitamin C and immune function. *Nutrients*, 9(11), 1211. doi: 10.3390/nu9111211
- Carrasco-Castilla, J., Hernández-Álvarez, A. J., dan Jiménez-Martínez, C. (2017). Effect of Selected Excipients on the Antioxidant Activity of Broccoli Infusions. *Plant Foods for Human Nutrition*, 72(2), 143-149.
- Chen, H.-M., Zheng, Y.-X., dan Zhao, Y.-H. (2013). Optimization of the culture conditions for mycelial growth and exo-polysaccharide production by *Pleurotus ostreatus* in submerged culture. *Food Chemistry*, 141(4), 3743–3748.



- Chen, L., Chen, H., dan Deng, W. (2009). Rheological behavior of aqueous sodium carboxymethylcellulose solutions in the presence of propylene glycol. *Journal of Applied Polymer Science*, 114(4), 2406-2412.
- Cheung, P. C. K., dan Cheung, M. L. (2005). Mushroom extracts with antioxidant activity against lipid peroxidation. *Food Chemistry*, 89(3), 403-409. doi: 10.1016/j.foodchem.2004.02.039
- Cheung, Y. C., Siu, K. C., Liu, M. Y., Yang, F., Fung, K. P., dan Wu, J. Y. (2013). Ergothioneine, an unusual antioxidant and naturally occurring amino acid, protects against nonfree radical-induced oxidative damage. *Journal of Agricultural and Food Chemistry*, 61(6), 12546-12551. doi: 10.1021/jf4040729
- Chorilli, M., Leonardi, G. R., dan Salgado, H. R. N. (2007). Free radicals and antioxidant agents: concepts to application in pharmaceutical and cosmetic formulations. *Rev Bras Farm*, 88(3), 113-118.
- Corvari, V., Bettinelli, M., dan Bignozzi, C. A. (2019). Chemical stability of cosmetic formulations: A critical review. *International Journal of Cosmetic Science*, 41(1), 12-25.
- Deepalakshmi, K., dan Mirunalini, S. (2014). *Pleurotus ostreatus*: an oyster mushroom with nutritional and medicinal properties 9.
- Farris, P. (2005). Idebenone, green tea, and CoffeeBerry extract: new and innovative antioxidants. *Dermatologic Therapy*, 18(3), 252-259. doi: 10.1111/j.1529-8019.2005.00029.x
- Ganceviciene, R., Liakou, A. I., Theodoridis, A., Makrantonaki, E., dan Zouboulis, C. C. (2012). Skin anti-aging strategies. *Dermato-endocrinology*, 4(3), 308-319.
- Garg, S., dan Sharma, S. (2013). Evaluation of viscosity of pharmaceutical and cosmetic products. *Journal of Applied Pharmaceutical Science*, 3(5), 105-109.
- Gašparović, A. (2020). Free Radical Research in Cancer. *Antioxidants*, 9(2).
- Ghica, M. V., Ciobanu, A., Tudorache, M., Lupu, D., dan Profire, L. (2021). Stability study and quality control of a polyherbal serum for hair growth. *Journal of Pharmaceutical and Biomedical Analysis*, 201, 114111.
- Girsang, E., Lister, I. N. E., Ginting, C. N., Sholihah, I. A., Raif, M. A., Kunardi, S., Million, H., dan Widowati, W. (2020). Antioxidant and Antiaging Activity of Rutin and Caffeic Acid. *Pharmaciana*, 10(2), 147.
- Gupta, V.K., Huang, H.C. (2015). Freeze-Thaw Method. *Handbook of Sample Preparation*, 1-13.
- Gutef, A., Al-Attraqchi, A., Tawfeeq, A., dan Sahib, H. (2020). Evaluation of antibacterial potential of fruiting body extracts of *Pleurotus ostreatus* in vitro and in vivo study. *Drug Invention Today*, 14, 854–863.
- Halliwell, B., dan Gutteridge, J. M. C. (2007). *Free radicals in biology and medicine*. Oxford University Press.



- Hamzah, M., dan Mazwadehet, A. (2006). Anti-Inflammatory Activity of Achillea and Ruscus Topical Gel on Carrageenan-Induced Paw Edema in Rats. *Acta Poloniae Pharmaceutica - Drug Research*, 63(4), 277–280.
- Han, S.-R., Kim, K.-H., Lim, K.-O., dan Oh, T.-J. (2015). Biological Activity Analysis of Different Solvent Extracts from *Pleurotus ostreatus*. *Indian Journal of Science and Technology*, 8.
- Haneefa, M., Hanan, S., R, S., Mohanta, G.P., dan Nayar, C. (2010). Formulation and evaluation of herbal gel of *Pothos scandens* Linn. *Asian Pacific Journal of Tropical Medicine*, 988–992.
- Harris, D. C. (2010). *Quantitative Chemical Analysis*. W. H. Freeman and Company.
- Huang, H. Y., Appel, L. J., Croft, K. D., Miller, E. R., Mori, T. A., Puddey, I. B., ... dan Burke, V. (2002). Vitamin E supplementation and cardiovascular events in high-risk patients. *New England Journal of Medicine*, 346(15), 1145-1151. doi: 10.1056/NEJMoa010580
- Ianni, F., Blasi, F., Angelini, P., Simone, S.C.D., Flores, G.A., Cossignani, L., dan others. (2021). Extraction Optimization by Experimental Design of Bioactives from *Pleurotus ostreatus* and Evaluation of Antioxidant and Antimicrobial Activities. *Processes*, 9, 743.
- Jain, R., dan Bhattacharyya, K. G. (2015). UV-Visible Spectrophotometry. *Methods of Analysis of Food Components and Additives (Second Edition)*, 59-79.
- Kar, M., Chourasiya, Y., Maheshwari, R., dan Tekade, R.K. (2019). Chapter 2 - Current Developments in Excipient Science: Implication of Quantitative Selection of Each Excipient in Product Development. In R.K. Tekade (Ed.), *Basic Fundamentals of Drug Delivery, Advances in Pharmaceutical Product Development and Research* (pp. 29–83). Academic Press.
- Karacsonyi, S., dan Kuniak, L. (1994). Polysaccharides of *Pleurotus ostreatus*: isolation and structure of pleuran, an alkali-insoluble beta-D-glucan. *Carbohydrate Polymers*, 24, 107–111.
- Karaman, M., Jovin, E., Malbasa, R., Matavuly, M., dan Popovie, M. (2010). Medicinal and edible lignicolous fungi as natural source of antioxidative and antibacterial agents. *Phytotherapy Research*, 24, 1473–1481.
- Korolchuk, V.I., Miwa, S., Carroll, B., dan von Zglinicki, T. (2017). Mitochondria in Cell Senescence: Is Mitophagy the Weakest Link. *EBioMedicine*, 21, 7-13.
- Kozarski, M., Klaus, A., Jakovljevic, D., Todorovic, N., Vunduk, J., Petrović, P., ... dan Nikšić, M. (2011). Antioxidants of edible mushrooms. *Molecules*, 16(4), 2727-2747. doi: 10.3390/molecules16042727
- Kumari, R., dan Jat, P. (2021). Mechanisms of Cellular Senescence: Cell Cycle Arrest and Senescence Associated Secretory Phenotype. *Front Cell Dev Biol*, 9, 29.
- Kunjadia, P.D., Nagee, A., Pandya, P.Y., Mukhopadhyaya, P.N., Sanghvi, G.V., dan Dave, G.S. (2014). Medicinal and Antimicrobial Role of the Oyster Culinary-Medicinal Mushroom *Pleurotus ostreatus* (Higher Basidiomycetes) Cultivated



on Banana Agrowastes in India. *International Journal of Medicinal Mushrooms*, 16.

Liu, Y., Zhang, J., Shi, J., Zhang, J., Liu, L., dan Zhang, H. (2016). Optimization of enzyme-assisted extraction, characterization and antioxidant activities of polysaccharides from *Pleurotus ostreatus*. *Carbohydrate Polymers*, 139, 87-96. doi: 10.1016/j.carbpol.2015.12.046

Manach, C., Scalbert, A., Morand, C., Rémesy, C., dan Jiménez, L. (2004). Polyphenols: food sources and bioavailability. *The American Journal of Clinical Nutrition*, 79(5), 727-747. doi: 10.1093/ajcn/79.5.727

Marchianti, A.C.N., Sakinah, E.N., Elfiah, U., Putri, N.K.S., Wahyuliswari, D.I., Maulana, M., dan others. (2021). Gel formulations of Merremia mammosa (Lour.) accelerated wound healing of the wound in diabetic rats. *Journal of Traditional and Complementary Medicine*, 11, 38–45.

Middleton Jr, E., Kandaswami, C., dan Theoharides, T. C. (2000). The effects of plant flavonoids on mammalian cells: implications for inflammation, heart disease, and cancer. *Pharmacological Reviews*, 52(4), 673-751.

Mishra, V., Tomar, S., Yadav, P., Vishwakarma, S., dan Singh, M.P. (2022). Elemental Analysis, Phytochemical Screening and Evaluation of Antioxidant, Antibacterial and Anticancer Activity of *Pleurotus ostreatus* through In Vitro and In Silico Approaches. *Metabolites*, 12, 821.

Molyneux, P. (2004). The Use of the Stable Free Radical Diphenylpicrylhydrazyl (DPPH) for Estimating Antioxidant Activity. *Songklanakarin Journal of Science and Technology*, 26(2), 211-219.

Muzzalupo, R., Tavano, L., dan Beatrice, F. (2018). Stability study of a serum formulation containing coenzyme Q10-loaded solid lipid nanoparticles using different encapsulation techniques. *Journal of Drug Delivery Science and Technology*, 45, 257-266.

Nurhayati, N., Rusli, M. S., dan Batubara, I. (2021). Kajian Potensi Minyak Atsiri sebagai Bahan Aktif Antioksidan dan Antiaging pada Produk Kosmetika. Tesis Agro-Industrial Engineering, IPB University, 26-27.

Padayatty, S. J., Katz, A., Wang, Y., Eck, P., Kwon, O., Lee, J. H., ... dan Levine, M. (2003). Vitamin C as an antioxidant: evaluation of its role in disease prevention. *Journal of the American College of Nutrition*, 22(1), 18-35. doi: 10.1080/07315724.2003.10719272

Paiva, S. A., dan Russell, R. M. (1999). Beta-carotene and other carotenoids as antioxidants. *Journal of the American College of Nutrition*, 18(5), 426-433. doi: 10.1080/07315724.1999.10718880

Patel *et al.* (2021). Optimization of Glipizide Floating Matrix Tablet Using Simplex Lattice Design. Babaria Institute of Pharmacy, *Indian Journal of Pharmaceutical Sciences*, KPGU, Vadodara (Formerly BITS Edu Campus).

Patel, S. S., Chaudhary, A. A., dan Chalikwar, S. S. (2013). Viscosity enhancement of CMC solution using propylene glycol as plasticizer. *International Journal of Pharmaceutical Research and Development*, 5(4), 1-6.



- Pebriani, A.S., Megantara, S., dan Wijayanti, R. (2022). Tinjauan Critical Quality Attributes (CQA) dan Critical Process Parameter (CPP) Sebagai Bagian dari Pendekatan Quality by Design dalam Proses Pengembangan Tablet Salut Selaput Film. *Majalah Farmasetika*, 7, 255–269.
- Pisoschi, A. M., Pop, A., dan Negulescu, G. P. (2018). The Role of Antioxidants in the Chemistry of Oxidative Stress: A Review. *European Journal of Medicinal Chemistry*, 178, 170-185.
- Podda, M., Traber, M. G., Weber, C., Yan, L. J., dan Packer, L. (1998). UV-irradiation depletes antioxidants and causes oxidative damage in a model of human skin. *Free Radical Biology and Medicine*, 24(1), 55-65. doi: 10.1016/s0891-5849(97)00181-2
- Poljsak, B., dan Dahmane, R. (2012). Free radicals and extrinsic skin aging. *Dermatology Research and Practice*, 2012, 1-4. doi: 10.1155/2012/135206
- Rao, A. V., dan Rao, L. G. (2007). Carotenoids and human health. *Pharmacological Research*, 55(3), 207-216. doi: 10.1016/j.phrs.2007.01.012
- Rayalam, S., Della-Fera, M. A., dan Baile, C. A. (2008). Synergism between resveratrol and other phytochemicals: implications for obesity and osteoporosis. *Molecular Nutrition and Food Research*, 52(S1), S115-S125. doi: 10.1002/mnfr.200700184
- Ribeiro, B., Rangel, J., Valentão, P., Baptista, P., Seabra, R. M., dan Andrade, P. B. (2017). Pleurotus ostreatus Fruiting Body and Spent Substrate as Sources of Value-Added Compounds Obtained by Extraction and Enzymatic Treatments. *International Journal of Medicinal Mushrooms*, 19(9), 805–817.
- Rice-Evans, C. A., Miller, N. J., dan Paganga, G. (1997). Antioxidant properties of phenolic compounds. *Trends in Plant Science*, 2(4), 152-159.
- Rowe, R.C., Sheskey, P.J., dan Quinn, M.E. (2009). *Handbook of Pharmaceutical Excipients*. Lexi-Comp: American Pharmaceutical Association, Inc.
- Sánchez, C., Jiménez-Escríg, A., dan Saura-Calixto, F. (2010). Study of edible mushrooms (Pleurotus ostreatus and Agaricus bisporus) as a source of dietary fiber. *Journal of Food Composition and Analysis*, 23(5), 417-423.
- Sayuti, N.A. (2015). Formulasi dan Uji Stabilitas Fisik Sediaan Gel Ekstrak Daun Ketepeng Cina (Cassia alata L.). *Jurnal Kefarmasian Indonesia*, 74–82.
- Serio, F., Chirico, B. D., De Santis, D., dan Mallardo, P. (2019). Antioxidant Activity of Essential Oils and Extracts: A Review. *International Journal of Food Science*, 2019, 1-14.
- Sethi, A., Kaur, T., Malhotra, S., dan Gambhir, M. (2016). Moisturizers: The Slippery Road. *Indian Journal of Dermatology*, 61, 279–287.
- Setyawaty, R., Gustin, G., dan Setiyabudi, R. (2021). Gel Formulation from Ethanol Extract of The Leaf of White Guava (*Psidium guajava* L.). *Majalah Obat Tradisional*, 26, 149–154.
- Sinton, D., & Horsley, D. A. (1999). *Fluid mechanics of micromachined devices*. Springer Science & Business Media.



- Skoog, D. A., Holler, F. J., Crouch, S. R., dan West, D. M. (2013). *Fundamentals of Analytical Chemistry*. Cengage Learning.
- Smith, R. M., dan Dent, G. (2018). UV-Visible Spectrophotometry and Derivatives. *Modern Raman Spectroscopy*, 473-500.
- StyleCraze. (2021). *Water-Based Serums Vs. Oil-Based Serums: Which One Should You Choose?* StyleCraze. Diperoleh dari <https://www.stylecraze.com/articles/water-based-serums-vs-oil-based-serums/>.
- Sugihartini, N., dan Wiradhika, R.Y. (2017). Gel formulation of ethanol extract of mangosteen peel (*Garcinia mangostana L.*) as a medication for burns in wistar rats. *JKKI: Jurnal Kedokteran dan Kesehatan Indonesia*, 110–117.
- Tang, Y., Li, J., Li, F., dan Wen, S. (2016). Antioxidant activities of different fractions of polysaccharide conjugates from *Pleurotus ostreatus* mycelium. *International Journal of Biological Macromolecules*, 87, 322-328. doi: 10.1016/j.ijbiomac.2016.02.052
- Torres-Martínez, B. del M., Vargas-Sánchez, R.D., Ibarra-Arias, F.J., Ibarra-Torres, E.V., Torrescano-Urrutia, G.R., dan Sánchez-Escalante, A. (2021). Effect of extraction solvent on chemical composition, physicochemical and biological properties of edible mushrooms extracts. *TIP. Revista especializada en ciencias químico-biológicas*, 24.
- Traber, M. G., dan Stevens, J. F. (2011). Vitamins C and E: beneficial effects from a mechanistic perspective. *Free Radical Biology and Medicine*, 51(5), 1000-1013. doi: 10.1016/j.freeradbiomed.2011.05.017
- Tsabitah, A.F., Zulkarnain, A.K., Wahyuningsih, M.S.H., dan Nugrahaningsih, D.A.A. (2020). Optimasi Carbomer, Propilen Glikol, dan Trietanolamin Dalam Formulasi Sediaan Gel Ekstrak Etanol Daun Kembang Bulan (*Tithonia diversifolia*). *Majalah Farmasetika*, 16, 111–118.
- Valko, M., Rhodes, C. J., Moncol, J., Izakovic, M., dan Mazur, M. (2006). Free radicals, metals and antioxidants in oxidative stress-induced cancer. *Chemico-Biological Interactions*, 160(1), 1-40.
- Wang, A. S., dan Dreesen, O. (2018). Biomarkers of Cellular Senescence and Skin Aging. *Front. Genet.*, 9, 247.
- Wasser, S. P., Weis, A. L., Sybirna, N. O., Sybirny, A. A., dan Nevo, E. (2002). Effects of carbon source on *Pleurotus ostreatus* (Basidiomycetes) growth and secretion of laccase and Mn peroxidase activities. *International Journal of Medicinal Mushrooms*, 4(4), 327-332.
- Widjaja, A., Giraud, F., Lim, K. H., dan Loh, K. C. (2014). *Ultraviolet-Visible Spectrophotometry*. Encyclopedia of Analytical Chemistry.
- Wu, J. P., Chen, H. M., dan Lin, Y. H. (2008). Optimization of fermentation conditions for the production of mycelial biomass and exopolysaccharides with *Cordyceps sinensis*. *Food Microbiology*, 25(6), 913-921.



UNIVERSITAS  
GADJAH MADA

Optimasi Formula Sediaan Serum Ekstrak Jamur Tiram (*Pleurotus ostreatus*) sebagai Antioksidan dalam

Upaya Pencegahan Penuaan Sel Kulit

Lucky Octavianus Saputra, Dr. apt. Indah Purwantini, S.Si., M.Si.; Dr. apt. Teuku Nanda Saifullah Sulaiman, S.Si., M.

Universitas Gadjah Mada, 2023 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Zhang, J., Zhang, J., Wang, H., dan Ng, T. B. (2017). Pleurotus mushrooms: A rich source of natural antioxidants. *Trends in Food Science and Technology*, 66, 220-230.