



DAFTAR PUSTAKA

- Abdel-Rahman, R., Ghoneimy, E., Abdel-Wahab, A., Eldeeb, N., Salem, M., Salama, E., & Ahmed, T. (2021). The therapeutic effects of *Ficus carica* extract as antioxidant and anticancer agent. *South African Journal of Botany*, 141, 273–277. <https://doi.org/10.1016/j.sajb.2021.04.019>
- Abdelhedi, O., Salem, A., Nasri, R., Nasri, M., & Jridi, M. (2022). Food applications of bioactive marine gelatin films. *Current Opinion in Food Science*, 43, 206–215. <https://doi.org/10.1016/j.cofs.2021.12.005>
- Addis, M. (2015). Major Causes Of Meat Spoilage and Preservation Techniques: A Review. *Food Science and Quality Management*, 41, 2224–6088. www.iiste.org
- Adilah, A. N., Jamilah, B., Noranizan, M. A., & Hanani, Z. A. N. (2018). Utilization of mango peel extracts on the biodegradable films for active packaging. *Food Packaging and Shelf Life*, 16(November 2017), 1–7. <https://doi.org/10.1016/j.fpsl.2018.01.006>
- Agustina, E. (2017). Uji Aktivitas Senyawa Antioksidan dari Ekstrak Daun Tin (*Ficus carica* Linn) dengan Pelarut Air, Metanol dan Campuran Metanol-Air. *Klorofil*, 1(1), 38–47.
- Agustina, E., Lusiana, N., Purnamasari, R., Faidah, N. I., & Mitha, A. (2021). Antioxidant And Antibacterial Activities Of Methanol Extract Of Fig Fruit And Leaves (*Ficus Carica* L.). *Journal of Islamic Medicine*, 5(1), 1–8. <https://doi.org/10.18860/jim.v5i1.11376>
- Ahmad, J., Khan, I., Khan, S., & Iqbal, D. (2013). Evaluation of Antioxidant and Antimicrobial Activity of *Ficus Carica* Leaves: an In Vitro Approach. *Journal of Plant Pathology & Microbiology*, 4(1), 1–4. <https://doi.org/10.4172/2157-7471.1000157>
- Al-Hassan, A. A., & Norziah, M. H. (2012). Starch-gelatin edible films: Water vapor permeability and mechanical properties as affected by plasticizers. *Food Hydrocolloids*, 26(1), 108–117. <https://doi.org/10.1016/j.foodhyd.2011.04.015>
- Alipal, J., Mohd Pu’ad, N. A. S., Lee, T. C., Nayan, N. H. M., Sahari, N., Basri, H., Idris, M. I., & Abdullah, H. Z. (2019). A review of gelatin: Properties, sources, process, applications, and commercialisation. *Materials Today: Proceedings*, 42, 240–250. <https://doi.org/10.1016/j.matpr.2020.12.922>
- Amessis-Ouchemoukh, N., Ouchemoukh, S., Meziant, N., Idiri, Y., Hernanz, D., Stinco, C. M., Rodríguez-Pulido, F. J., Heredia, F. J., Madani, K., & Luis, J. (2017). Bioactive metabolites involved in the antioxidant, anticancer and anticalpain activities of *Ficus carica* L., *Ceratonia siliqua* L. and *Quercus ilex* L. extracts. *Industrial Crops and Products*, 95, 6–17. <https://doi.org/10.1016/j.indcrop.2016.10.007>
- Amin, U., Khan, M. U., Majeed, Y., Rebezov, M., Khayrullin, M., Bobkova, E., Shariati, M. A., Chung, I. M., & Thiruvengadam, M. (2021). Potentials of polysaccharides, lipids and proteins in biodegradable food packaging applications. *International Journal of Biological Macromolecules*,



- 183(February), 2184–2198. <https://doi.org/10.1016/j.ijbiomac.2021.05.182>
- Andreuccetti, C., Carvalho, R. A., Galicia-García, T., Martínez-Bustos, F., & Grossi, C. R. F. (2011). Effect of surfactants on the functional properties of gelatin-based edible films. *Journal of Food Engineering*, 103(2), 129–136. <https://doi.org/10.1016/j.jfoodeng.2010.10.007>
- Ansel, H., C. (1989). Pengantar Bentuk Sediaan Farmasi, Edisi 4. In F. Ibrahim (Ed.), *Introduction to Pharmaceutical Dosage Forms* (4th ed., p. 306). Universitas Indonesia Press. Jakarta.
- Atarés, L., & Chiralt, A. (2016). Essential oils as additives in biodegradable films and coatings for active food packaging. *Trends in Food Science and Technology*, 48, 51–62. <https://doi.org/10.1016/j.tifs.2015.12.001>
- Avena-Bustillos, R. J., Chiou, B., Olsen, C. W., Bechtel, P. J., Olson, D. A., & McHugh, T. H. (2011). Gelation, Oxygen Permeability, and Mechanical Properties of Mammalian and Fish Gelatin Films. *Journal of Food Science*, 76(7), 519–524. <https://doi.org/10.1111/j.1750-3841.2011.02312.x>
- Bahriul, P., Rahman, N., & Diah, A. W. M. (2014). Antioxidant Activity Test of Bay Leave (*Syzygium polyanthum*) Extract using 1,1-diphenyl-2-picrilhidrazil. *Jurnal Akademika Kimia*, 3(August), 368–374.
- Bañón, S., Díaz, P., Rodríguez, M., Garrido, M. D., & Price, A. (2007). Ascorbate, green tea and grape seed extracts increase the shelf life of low sulphite beef patties. *Meat Science*, 77(4), 626–633. <https://doi.org/10.1016/j.meatsci.2007.05.015>
- Baraja, M. (2008). *Uji Toksisitas Ekstrak Daun Ficus elastica Nois ex Blume terhadap Artemia salina Leach dan Profil Kromatografi Lapis Tipis*. Universitas Muhamadiyah Surakarta.
- Biduski, B., Silva, F. T. da, Silva, W. M. da, Halal, S. L. de M. El, Pinto, V. Z., Dias, A. R. G., & Zavareze, E. da R. (2017). Impact of acid and oxidative modifications, single or dual, of sorghum starch on biodegradable films. *Food Chemistry*, 214, 53–60. <https://doi.org/10.1016/j.foodchem.2016.07.039>
- Bobbarala, V. (2012). *Antimicrobial Agents* (Issue June). <https://doi.org/10.5772/1867>
- Bourtoom. T. (2008). Edible films and coatings : characteristics and properties. *International Food Research Journal*, 15(3), 237–248.
- Cai, L., Cao, A., Li, Y., Song, Z., Leng, L., & Li, J. (2015). The effects of essential oil treatment on the biogenic amines inhibition and quality preservation of red drum (*Sciaenops ocellatus*) fillets. *Food Control*, 56, 1–8. <https://doi.org/10.1016/j.foodcont.2015.03.009>
- Cao, N., Fu, Y., & He, J. (2007). Mechanical properties of gelatin films cross-linked, respectively, by ferulic acid and tannin acid. *Food Hydrocolloids*, 21(4), 575–584. <https://doi.org/10.1016/j.foodhyd.2006.07.001>
- Cao, R., Yan, L., Xiao, S., Hou, B., Zhou, X., Wang, W., Bai, T., Zhu, K., Cheng, J., & Zhang, J. (2023). Effects of Different Low-Temperature Storage Methods on the Quality and Processing Characteristics of Fresh Beef. *Foods*, 12(4), 782. <https://doi.org/10.3390/foods12040782>
- Cheng, J., & Cui, L. (2021). Effects of high-intensity ultrasound on the structural, optical, mechanical and physicochemical properties of pea protein isolate-



- based edible film. *Ultrasonics Sonochemistry*, 80, 105809. <https://doi.org/10.1016/j.ultsonch.2021.105809>
- Choe, E., & Min, D. B. (2006). Mechanisms and factors for edible oil oxidation. *Comprehensive Reviews in Food Science and Food Safety*, 5(4), 169–186. <https://doi.org/10.1111/j.1541-4337.2006.00009.x>
- Choi, I., Lee, S. E., Chang, Y., Lacroix, M., & Han, J. (2018). Effect of oxidized phenolic compounds on cross-linking and properties of biodegradable active packaging film composed of turmeric and gelatin. *Lwt*, 93(December 2017), 427–433. <https://doi.org/10.1016/j.lwt.2018.03.065>
- Coll Cardenas, F. J., & Olivera, D. F. (2016). Texture Changes in Meat during Storage. In *Reference Module in Food Science* (Issue 1998). Elsevier. <https://doi.org/10.1016/b978-0-08-100596-5.03294-7>
- da Nóbrega Santos, E., Cesar de Albuquerque Sousa, T., Cassiano de Santana Neto, D., Brandão Grisi, C. V., Cardoso da Silva Ferreira, V., & Pereira da Silva, F. A. (2022). Edible active film based on gelatin and Malpighia emarginata waste extract to inhibit lipid and protein oxidation in beef patties. *Lwt*, 154(November 2021). <https://doi.org/10.1016/j.lwt.2021.112837>
- Das, D. K., Dutta, H., & Mahanta, C. L. (2013). Development of a rice starch-based coating with antioxidant and microbe-barrier properties and study of its effect on tomatoes stored at room temperature. *LWT - Food Science and Technology*, 50(1), 272–278. <https://doi.org/10.1016/j.lwt.2012.05.018>
- Dinika, I., Verma, D. K., Balia, R., Utama, G. L., & Patel, A. R. (2020). Potential of cheese whey bioactive proteins and peptides in the development of antimicrobial edible film composite: A review of recent trends. *Trends in Food Science and Technology*, 103(January), 57–67. <https://doi.org/10.1016/j.tifs.2020.06.017>
- Djagny, K. B., Wang, Z., & Xu, S. (2001). Gelatin: A valuable protein for food and pharmaceutical industries: Review. *Critical Reviews in Food Science and Nutrition*, 41(6), 481–492. <https://doi.org/10.1080/20014091091904>
- Du, H., Liu, C., Unsalan, O., Altunayar-Unsalan, C., Xiong, S., Manyande, A., & Chen, H. (2021). Development and characterization of fish myofibrillar protein/chitosan/rosemary extract composite edible films and the improvement of lipid oxidation stability during the grass carp fillets storage. *International Journal of Biological Macromolecules*, 184(June), 463–475. <https://doi.org/10.1016/j.ijbiomac.2021.06.121>
- Duconseille, A., Astruc, T., Quintana, N., & Meersman, F. (2015). *Food Hydrocolloids Gelatin structure and composition linked to hard capsule dissolution : A review.* 43, 360–376. <https://doi.org/10.1016/j.foodhyd.2014.06.006>
- Dwimayasantini, R., & Kumayanjati, B. (2019). Karakterisasi Edible Film dari Karagenan dan Kitosan dengan Metode Layer by Layer. *Jurnal Pascapanen Dan Bioteknologi Kelautan Dan Perikanan*, 14(2), 141. <https://doi.org/10.15578/jpbkp.v14i2.603>
- Edhirej, A., Sapuan, S. M., Jawaid, M., & Zahari, N. I. (2017). Effect of various plasticizers and concentration on the physical, thermal, mechanical, and structural properties of cassava-starch-based films. *Starch/Staerke*, 69(1–2),



- 1–11. <https://doi.org/10.1002/star.201500366>
- EFSA. (2016). Growth of spoilage bacteria during storage and transport of meat. *EFSA Journal*, 14(6). <https://doi.org/10.2903/j.efsa.2016.4523>
- Egan, A. F. (1983). Lactic acid bacteria of meat and meat products. *Antonie van Leeuwenhoek*, 49(3), 327–336. <https://doi.org/10.1007/BF00399507>
- El Dessouky Abdel-Aziz, M., Darwish, M. S., Mohamed, A. H., El-Khateeb, A. Y., & Hamed, S. E. (2020). Potential activity of aqueous fig leaves extract, olive leaves extract and their mixture as natural preservatives to extend the shelf life of pasteurized buffalo milk. *Foods*, 9(5), 1–22. <https://doi.org/10.3390/foods9050615>
- Erkmen, O., & Bozoglu, T. F. (2016). Spoilage of Meat and Meat Products. In *Food Microbiology: Principles into Practice* (pp. 279–295). <https://doi.org/10.1002/9781119237860.ch16>
- Fagundes, C., Palou, L., Monteiro, A. R., & Pérez-Gago, M. B. (2014). Effect of antifungal hydroxypropyl methylcellulose-beeswax edible coatings on gray mold development and quality attributes of cold-stored cherry tomato fruit. *Postharvest Biology and Technology*, 92, 1–8. <https://doi.org/10.1016/j.postharvbio.2014.01.006>
- Farhan, M. ., Chusniasih, D., & Marcellia, S. (2022). ANTIBACTERIAL ACTIVITY TESTING OF FINE (*Ficus carica L.*) LEAF EXTRACT AGAINST *Escherichia coli* and *Staphylococcus aureus* UJI AKTIVITAS ANTIBAKTERI EKSTRAK DAUN TIN (*Ficus carica L.*) TERHADAP BAKTERI *Escherichia coli* dan *Staphylococcus aureus* Program Studi. *Pharmacon*, 11(1), 1328–1334.
- Fitri, A., Anandito, R. B. K., & Siswanti. (2016). Penggunaan Daging dan Tulang Ikan Bandeng (*Chanos Chanos*) Pada Stik Ikan Sebagai Makanan Ringan Berkalsium dan Berprotein Tinggi. *Jurnal Teknologi Hasil Pertanian*, 9(2), 65–77. <https://jurnal.uns.ac.id/ilmupangan/article/view/17468/13954>
- Flieger, M., Kantorová, M., Prell, A., Řezanka, T., & Votruba, J. (2003). Biodegradable plastics from renewable sources. *Folia Microbiologica*, 48(1), 27–44. <https://doi.org/10.1007/BF02931273>
- Freitas, C. F. de, Carvalho, L. M. V. F., Camargo, A. C., Almeida, O. G. G. de, Oliveira, R. R. d., De Martinis, E. P., Yamatogi, R. S., & Nero, L. A. (2024). Bacterial microbiota shifts in vacuum-packed beef during storage at different temperatures: Impacts on blown pack spoilage. *Food Microbiology*, 119(November 2023). <https://doi.org/10.1016/j.fm.2023.104448>
- Fu, B., Mei, S., Su, X., Chen, H., Zhu, J., Zheng, Z., Lin, H., Dai, C., Luque, R., & Yang, D. P. (2021). Integrating waste fish scale-derived gelatin and chitosan into edible nanocomposite film for perishable fruits. *International Journal of Biological Macromolecules*, 191(September), 1164–1174. <https://doi.org/10.1016/j.ijbiomac.2021.09.171>
- Gamage, S. D., Faith, N. G., Luchansky, J. B., Buege, D. R., & Ingham, S. C. (1997). Inhibition of microbial growth in chub-packed ground beef by refrigeration (2°C) and medium-dose (2.2 to 2.4 kGy) irradiation. *International Journal of Food Microbiology*, 37(2–3), 175–182. [https://doi.org/10.1016/S0168-1605\(97\)00073-1](https://doi.org/10.1016/S0168-1605(97)00073-1)



- Giménez, B., López de Lacey, A., Pérez-Santín, E., López-Caballero, M. E., & Montero, P. (2013). Release of active compounds from agar and agar-gelatin films with green tea extract. *Food Hydrocolloids*, 30(1), 264–271. <https://doi.org/10.1016/j.foodhyd.2012.05.014>
- Gómez-Guillén, M. C., Ihl, M., Bifani, V., Silva, A., & Montero, P. (2007). Edible films made from tuna-fish gelatin with antioxidant extracts of two different murta ecotypes leaves (*Ugni molinae* Turcz). *Food Hydrocolloids*, 21(7), 1133–1143. <https://doi.org/10.1016/j.foodhyd.2006.08.006>
- Gontard, N., Guilbert, S., & Cuq, J.-L. (1993). Water and Glycerol as Plasticizers Affect Mechanical and Water Vapor Barrier Properties of an Edible Wheat Gluten Film. *Journal of Food Science*, 58(1), 206–211. <https://doi.org/10.1111/j.1365-2621.1993.tb03246.x>
- Guerrero, P., O'Sullivan, M. G., Kerry, J. P., & De La Caba, K. (2015). Application of soy protein coatings and their effect on the quality and shelf-life stability of beef patties. *RSC Advances*, 5(11), 8182–8189. <https://doi.org/10.1039/c4ra13421d>
- Gunawan, F., Suptijah, P., & Uju. (2017). Ekstraksi dan Karakterisasi Gelatin Kulit Ikan Tenggiri (*Scomberomorus commersonii*) dari Provinsi Kepulauan Bangka Belitung. *Jphpi*, 20(Dkp 2015), 568–581.
- Hadidi, M., Jafarzadeh, S., Forough, M., Garavand, F., Alizadeh, S., Salehabadi, A., Khaneghah, A. M., & Jafari, S. M. (2022). Plant protein-based food packaging films; recent advances in fabrication, characterization, and applications. *Trends in Food Science and Technology*, 120(January), 154–173. <https://doi.org/10.1016/j.tifs.2022.01.013>
- Hafnimardiyanti, & Ikhlas Armin, M. (2016). Effect of plasticizer on physical and mechanical characteristics of edible film from mocaf flour. *Der Pharmacia Lettre*, 8(19), 301–308.
- Haider, N., Rafi, Z., Abdel Hussein, R., & Emad, B. (2023). The Effects of Alcoholic Extract of *Ficus carica* Leaves on Some Chemical and Microbiological Properties of Beef during Refrigerated Storage. *Iraqi Journal of Science*, 64(11), 5541–5553. <https://doi.org/10.24996/ijss.2023.64.11.7>
- Hamann, D., Puton, B. M. S., Comin, T., Colet, R., Valduga, E., Zeni, J., Steffens, J., Junges, A., Backes, G. T., & Cansian, R. L. (2022). Active edible films based on green tea extract and gelatin for coating of fresh sausage. *Meat Science*, 194(September). <https://doi.org/10.1016/j.meatsci.2022.108966>
- Harmely, F., Deviarny, C., & Yenni, W. S. (2015). Formulasi dan Evaluasi Sediaan Edible Film dari Ekstrak Daun Kemangi (*Ocimum americanum* L.) sebagai Penyegar Mulut. *Jurnal Sains Farmasi & Klinis*, 1(1), 38. <https://doi.org/10.29208/jsfk.2014.1.1.10>
- Hasbullah, R., Niam, A. G., Pujantoro, L., & Mardjan, S. (2018). Pengaruh Suhu Terhadap Permeabilitas Gas Pada Plastik Film Untuk Pengemasan Secara Atmosfir Termodifikasi. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, 7(3), 133. <https://doi.org/10.23960/jtep-l.v7i3.133-141>
- Holman, B. W. B., van de Ven, R. J., Mao, Y., Coombs, C. E. O., & Hopkins, D. L. (2017). Using instrumental (CIE and reflectance) measures to predict



- consumers' acceptance of beef colour. *Meat Science*, 127, 57–62. <https://doi.org/10.1016/j.meatsci.2017.01.005>
- Hoque, M. S., Benjakul, S., & Prodpran, T. (2011). Properties of film from cuttlefish (*Sepia pharaonis*) skin gelatin incorporated with cinnamon, clove and star anise extracts. *Food Hydrocolloids*, 25(5), 1085–1097. <https://doi.org/10.1016/j.foodhyd.2010.10.005>
- Hosseini, S. F., Rezaei, M., Zandi, M., & Ghavi, F. F. (2013). Preparation and functional properties of fish gelatin-chitosan blend edible films. *Food Chemistry*, 136(3–4), 1490–1495. <https://doi.org/10.1016/j.foodchem.2012.09.081>
- Hu, X., Yuan, L., Han, L., Li, S., & Song, L. (2019). Characterization of antioxidant and antibacterial gelatin films incorporated with: Ginkgo biloba extract. *RSC Advances*, 9(47), 27449–27454. <https://doi.org/10.1039/c9ra05788a>
- Huang, T., Tu, Z. cai, Shangguan, X., Sha, X., Wang, H., Zhang, L., & Bansal, N. (2019). Fish gelatin modifications: A comprehensive review. *Trends in Food Science and Technology*, 86(February), 260–269. <https://doi.org/10.1016/j.tifs.2019.02.048>
- Hur, S. J., Jin, S. K., Park, J. H., Jung, S. W., & Lyu, H. J. (2013). Effect of modified atmosphere packaging and vacuum packaging on quality characteristics of low grade beef during cold storage. *Asian-Australasian Journal of Animal Sciences*, 26(12), 1781–1789. <https://doi.org/10.5713/ajas.2013.13225>
- Ibrahim, N., Aali, A., Abed, D., AlObaidi, A., & Abdul, N. I. (2018). Effect of storage conditions on some sensory markers and bacteriological quality of corned beef cans stored at 4°C. *Current Research in Microbiology and Biotechnology*, 6(2), 1616–1621. <http://crmb.aizeonpublishers.net/content/2018/2/crmb1616-1621.pdf>
- Isnindar, Wahyuono, S., & Setyowati, E. P. (2011). Isolasi dan Identifikasi Senyawa Antioksidan Daun Kesemek (*Diospyros kaki* Thunb.) dengan Metode DPPH (2,2-Difenil-1-Pikrilhidrazil). *Majalah Obat Tradisional*, 16(3), 157–164. <https://jurnal.ugm.ac.id/TradMedJ/article/view/8054/6245>
- Jabbari, S., & Mirbagheri Firoozabad, M. S. (2021). Antimicrobial Effect of *Ficus carica* on Nosocomial Bacterial Infections. *Avicenna Journal of Pharmaceutical Research*, 2(2), 73–78. <https://doi.org/10.34172/ajpr.2021.14>
- Jamróz, E., Kulawik, P., Krzyściak, P., Talaga-Ćwiertnia, K., & Juszczak, L. (2019). Intelligent and active furcellaran-gelatin films containing green or pu-erh tea extracts: Characterization, antioxidant and antimicrobial potential. *International Journal of Biological Macromolecules*, 122, 745–757. <https://doi.org/10.1016/j.ijbiomac.2018.11.008>
- Jeong, M. R., Kim, H. Y., & Cha, J. D. (2009). Antimicrobial activity of methanol extract from *Ficus carica* leaves against oral bacteria. *Journal of Bacteriology and Virology*, 39(2), 97–102. <https://doi.org/10.4167/jbv.2009.39.2.97>
- Joseph, B., & Justin Raj, S. (2011). Pharmacognostic and phytochemical properties of *Ficus carica* linn - An overview. *International Journal of PharmTech Research*, 3(1), 8–12.
- Jridi, M., Boughriba, S., Abdelhedi, O., Nciri, H., Nasri, R., Kchaou, H., Kaya, M., Sebai, H., Zouari, N., & Nasri, M. (2019). Investigation of physicochemical



- and antioxidant properties of gelatin edible film mixed with blood orange (*Citrus sinensis*) peel extract. *Food Packaging and Shelf Life*, 21(April), 100342. <https://doi.org/10.1016/j.fpsl.2019.100342>
- Jridi, M., Mora, L., Souissi, N., Aristoy, M. C., Nasri, M., & Toldrá, F. (2018). Effects of active gelatin coated with henna (*L. inermis*) extract on beef meat quality during chilled storage. *Food Control*, 84, 238–245. <https://doi.org/10.1016/j.foodcont.2017.07.041>
- Karayannidis, P. D., & Zotos, A. (2015). Physicochemical Properties of Yellowfin Tuna (*Thunnus albacares*) Skin Gelatin and its Modification by the Addition of Various Coenhancers. *Journal of Food Processing and Preservation*, 39(5), 530–538. <https://doi.org/10.1111/jfpp.12258>
- Karim, A. A., & Bhat, R. (2009). Fish gelatin: properties, challenges, and prospects as an alternative to mammalian gelatins. *Food Hydrocolloids*, 23(3), 563–576. <https://doi.org/10.1016/j.foodhyd.2008.07.002>
- Karim, K., Jura, M., & Sabang, S. (2015). Uji Aktivitas Antioksidan Ekstrak Daun Patikan Kebo (*Euphorbia Hirta L.*). *Jurnal Akademika Kimia*, 4(2), 56–63.
- Katrin, K., & Bendra, A. (2015). Aktivitas Antioksidan Ekstrak, Fraksi dan Golongan Senyawa Kimia Daun *Premna oblongata Miq.* *Pharmaceutical Sciences and Research*, 2(1), 21–31. <https://doi.org/10.7454/psr.v2i1.3332>
- Kchaou, H., Jridi, M., Benbettaieb, N., Debeaufort, F., & Nasri, M. (2020). Bioactive films based on cuttlefish (*Sepia officinalis*) skin gelatin incorporated with cuttlefish protein hydrolysates: Physicochemical characterization and antioxidant properties. *Food Packaging and Shelf Life*, 24(June 2019). <https://doi.org/10.1016/j.fpsl.2020.100477>
- Khezrian, A., & Shahbazi, Y. (2018). Application of nanocomposite chitosan and carboxymethyl cellulose films containing natural preservative compounds in minced camel's meat. *International Journal of Biological Macromolecules*, 106, 1146–1158. <https://doi.org/10.1016/j.ijbiomac.2017.08.117>
- Khiari, Z., Rico, D., Martin-Diana, A. B., & Barry-Ryan, C. (2013). Comparison between gelatines extracted from mackerel and blue whiting bones after different pre-treatments. *Food Chemistry*, 139(1–4), 347–354. <https://doi.org/10.1016/j.foodchem.2013.01.017>
- Khoirunnisa, A. R., Joni, I. M., Panatarani, C., Rochima, E., & Praseptiangga, D. (2018). UV-screening, transparency and water barrier properties of semi refined iota carrageenan packaging film incorporated with ZnO nanoparticles. *AIP Conference Proceedings*, 1927. <https://doi.org/10.1063/1.5021234>
- Kola, V., & Carvalho, I. S. (2023). Plant extracts as additives in biodegradable films and coatings in active food packaging. *Food Bioscience*, 54(March), 102860. <https://doi.org/10.1016/j.fbio.2023.102860>
- Kondjoyan, A., Sicard, J., Cucci, P., Audonnet, F., Elhayel, H., Lebert, A., & Scislawski, V. (2022). Predicting the Oxidative Degradation of Raw Beef Meat during Cold Storage Using Numerical Simulations and Sensors—Prospects for Meat and Fish Foods. *Foods*, 11(8). <https://doi.org/10.3390/foods11081139>
- Ksouri, W. M., Medini, F., Mkadmini, K., Legault, J., Magné, C., Abdelly, C., & Ksouri, R. (2013). LC-ESI-TOF-MS identification of bioactive secondary



- metabolites involved in the antioxidant, anti-inflammatory and anticancer activities of the edible halophyte *Zygophyllum album* Desf. *Food Chemistry*, 139(1–4), 1073–1080. <https://doi.org/10.1016/j.foodchem.2013.01.047>
- Kusumawati, D. H., & Putri, W. D. R. (2013). Karakteristik Fisik dan Kimia Edible Film Pati Jagung yang Diinkorporasi dengan Perasan Temu Hitam. *Jurnal Pangan Dan Agroindustri*, 1(1), 90–100.
- Lacroix, M., & Vu, K. D. (2013). Edible Coating and Film Materials: Proteins. In *Innovations in Food Packaging: Second Edition*. Elsevier Ltd. <https://doi.org/10.1016/B978-0-12-394601-0.00011-4>
- Leceta, I., Etxabide, A., Cabezudo, S., De La Caba, K., & Guerrero, P. (2014). Bio-based films prepared with by-products and wastes: Environmental assessment. *Journal of Cleaner Production*, 64, 218–227. <https://doi.org/10.1016/j.jclepro.2013.07.054>
- Li, C., Yu, M., Li, S., Yang, X., Qiao, B., Shi, S., Zhao, C., & Fu, Y. (2021). Valorization of fig (*Ficus carica L.*) waste leaves: HPLC-QTOF-MS/MS-DPPH system for online screening and identification of antioxidant compounds. *Plants*, 10(11). <https://doi.org/10.3390/plants10112532>
- Li, J. H., Miao, J., Wu, J. L., Chen, S. F., & Zhang, Q. Q. (2014). Preparation and characterization of active gelatin-based films incorporated with natural antioxidants. *Food Hydrocolloids*, 37, 166–173. <https://doi.org/10.1016/j.foodhyd.2013.10.015>
- Li, J., Ye, F., Liu, J., & Zhao, G. (2015). Effects of octenylsuccination on physical, mechanical and moisture-proof properties of stretchable sweet potato starch film. *Food Hydrocolloids*, 46, 226–232. <https://doi.org/10.1016/j.foodhyd.2014.12.017>
- Li, Z., Yang, Y., Liu, M., Zhang, C., Shao, J., Hou, X., Tian, J., & Cui, Q. (2021). A comprehensive review on phytochemistry, bioactivities, toxicity studies, and clinical studies on *Ficus carica* Linn. leaves. *Biomedicine and Pharmacotherapy*, 137(November 2020), 111393. <https://doi.org/10.1016/j.biopha.2021.111393>
- Liu, J., Liu, S., Zhang, X., Kan, J., & Jin, C. (2019). Effect of gallic acid grafted chitosan film packaging on the postharvest quality of white button mushroom (*Agaricus bisporus*). *Postharvest Biology and Technology*, 147(April 2018), 39–47. <https://doi.org/10.1016/j.postharvbio.2018.09.004>
- Liu, J., Yong, H., Liu, Y., Qin, Y., Kan, J., & Liu, J. (2019). Preparation and characterization of active and intelligent films based on fish gelatin and haskap berries (*Lonicera caerulea L.*) extract. *Food Packaging and Shelf Life*, 22(July), 100417. <https://doi.org/10.1016/j.fpsl.2019.100417>
- Liu, Y., Wang, S., Lan, W., & Qin, W. (2019). Development of ultrasound treated polyvinyl alcohol/tea polyphenol composite films and their physicochemical properties. *Ultrasonics Sonochemistry*, 51(June 2018), 386–394. <https://doi.org/10.1016/j.ultsonch.2018.07.043>
- López, D., Márquez, A., Gutiérrez-Cutiño, M., Venegas-Yazigi, D., Bustos, R., & Matiacevich, S. (2017). Edible film with antioxidant capacity based on salmon gelatin and boldine. *Lwt*, 77, 160–169. <https://doi.org/10.1016/j.lwt.2016.11.039>



- Lorenzo, J. M., Pateiro, M., Domínguez, R., Barba, F. J., Putnik, P., Kovačević, D. B., Shpigelman, A., Granato, D., & Franco, D. (2018). Berries extracts as natural antioxidants in meat products: A review. *Food Research International*, 106(December 2017), 1095–1104. <https://doi.org/10.1016/j.foodres.2017.12.005>
- Lu, Y., Luo, Q., Chu, Y., Tao, N., Deng, S., Wang, L., & Li, L. (2022). Application of Gelatin in Food Packaging: A Review. *Polymers*, 14(3). <https://doi.org/10.3390/polym14030436>
- Madikizela, B., Aderogba, M. A., Finnie, J. F., & Van Staden, J. (2014). Isolation and characterization of antimicrobial compounds from Terminalia phanerophlebia Engl. & Diels leaf extracts. *Journal of Ethnopharmacology*, 156, 228–234. <https://doi.org/10.1016/j.jep.2014.09.003>
- Mahmoudi, S., Khali, M., Benkhaled, A., Benamirouche, K., & Baiti, I. (2016). Phenolic and flavonoid contents, antioxidant and antimicrobial activities of leaf extracts from ten Algerian *Ficus carica* L. varieties. *Asian Pacific Journal of Tropical Biomedicine*, 6(3), 239–245. <https://doi.org/10.1016/j.apjtb.2015.12.010>
- Mannozzi, C., Cecchini, J. P., Tylewicz, U., Siroli, L., Patrignani, F., Lanciotti, R., Rocculi, P., Dalla Rosa, M., & Romani, S. (2017). Study on the efficacy of edible coatings on quality of blueberry fruits during shelf-life. *LWT - Food Science and Technology*, 85, 440–444. <https://doi.org/10.1016/j.lwt.2016.12.056>
- Mao, Y., Yang, S., Zhang, Y., Luo, X., Niu, L., & Holman, B. W. B. (2023). High-pressure processing and modified atmosphere packaging combinations for the improvement of dark, firm, and dry beef quality and shelf-life. *Meat Science*, 198(January), 109113. <https://doi.org/10.1016/j.meatsci.2023.109113>
- Marjoni, M. R., & Zulfisa, A. (2017). Antioxidant Activity of Methanol Extract/Fractions of Senggani Leaves (*Melastoma candidum* D. Don). *Pharmaceutica Analytica Acta*, 08(08), 1–6. <https://doi.org/10.4172/2153-2435.1000557>
- Maruddin, F., Malaka, R., Baba, S., Amqam, H., Taufik, M., & Sabil, S. (2020). Brightness, elongation and thickness of edible film with caseinate sodium using a type of plasticizer. *IOP Conference Series: Earth and Environmental Science*, 492(1). <https://doi.org/10.1088/1755-1315/492/1/012043>
- Mawaddah, R. (2008). *Kajian Hasil Riset Potensi Antimikroba Alami dan Aplikasinya dalam Bahan Pangan di Pusat Informasi Teknologi Pertanian Fateta IPB*. Institut Pertanian Bogor.
- Mehdizadeh, T., Tajik, H., Razavi Rohani, S. M., & Oromiehie, A. R. (2012). Antibacterial, antioxidant and optical properties of edible starch-chitosan composite film containing Thymus kotschyuanus essential oil. *Veterinary Research Forum : An International Quarterly Journal*, 3(3), 167–173. <http://www.ncbi.nlm.nih.gov/pubmed/25610564%0Ahttp://www.ncbi.nlm.nih.gov/articlerender.fcgi?artid=PMC4299978>
- Miglioranza, B. M. G., Spinelli, F. R., Stoffel, F., & Piemolini-Barreto, L. T. (2021). Biodegradable film for raisins packaging application: Evaluation of physico-chemical characteristics and antioxidant potential. *Food Chemistry*,



- 365(July), 130538. <https://doi.org/10.1016/j.foodchem.2021.130538>
- Mirzapour-Kouhdasht, A., Moosavi-Nasab, M., Krishnaswamy, K., & Khalesi, M. (2020). Optimization of gelatin production from Barred mackerel by-products: Characterization and hydrolysis using native and commercial proteases. *Food Hydrocolloids*, 108(September 2019), 105970. <https://doi.org/10.1016/j.foodhyd.2020.105970>
- Miskiyah, Juniawati, & Iriani, E. S. (2015). Potensi Edible Film Antimikroba Sebagai Pengawet Daging. *Buletin Peternakan*, 39(2), 129. <https://doi.org/10.21059/buletinperternak.v39i2.6718>
- Mohamed, S. A. A., El-Sakhawy, M., & El-Sakhawy, M. A. M. (2020). Polysaccharides, Protein and Lipid -Based Natural Edible Films in Food Packaging: A Review. *Carbohydrate Polymers*, 238(February), 116178. <https://doi.org/10.1016/j.carbpol.2020.116178>
- Mulyono, N., & Kleopas Sugih, A. (2015). Active Biopackaging From Dammar for Commminated Meat Preservation. *Jurnal Teknologi Dan Industri Pangan*, 26(1), 26–33. <https://doi.org/10.6066/jtip.2015.26.1.26>
- Munir, S., Hu, Y., Liu, Y., & Xiong, S. (2019). Enhanced properties of silver carp surimi-based edible films incorporated with pomegranate peel and grape seed extracts under acidic condition. *Food Packaging and Shelf Life*, 19(October 2018), 114–120. <https://doi.org/10.1016/j.fpsl.2018.12.001>
- Murni, W., Pawignyo, H., Widyawati, D., & Sari, N. (2013). Prosiding Seminar Nasional Teknik Kimia “Kejuangan” Pembuatan Edible Film dari Tepung Jagung (*Zea Mays L.*) dan Kitosan. 1–9.
- Mustapa, R., Restuhadi, F., & Efendi, R. (2017). Pemanfaatan Kitosan sebagai Bahan Dasar Pembuatan Edible Film dari Pati Ubi Jalar Kuning. *JOM Faperta*, 4(2).
- Nagai, T., & Suzuki, N. (2000). Isolation of collagen from fish waste material - Skin, bone and fins. *Food Chemistry*, 68(3), 277–281. [https://doi.org/10.1016/S0308-8146\(99\)00188-0](https://doi.org/10.1016/S0308-8146(99)00188-0)
- Najwa, I. S. N. A., Guerrero, P., de la Caba, K., & Hanani, Z. A. N. (2020). Physical and antioxidant properties of starch/gelatin films incorporated with Garcinia atroviridis leaves. *Food Packaging and Shelf Life*, 26(October), 100583. <https://doi.org/10.1016/j.fpsl.2020.100583>
- Nandane, A. S., & Jain, R. (2015). Study of mechanical properties of soy protein based edible film as affected by its composition and process parameters by using RSM. *Journal of Food Science and Technology*, 52(6), 3645–3650. <https://doi.org/10.1007/s13197-014-1417-4>
- Narasimha Rao, D., & Ramesh, B. S. (1992). The microbiology of sheep carcasses processed in a modern Indian abattoir. *Meat Science*, 32(4), 425–436. [https://doi.org/10.1016/0309-1740\(92\)90084-H](https://doi.org/10.1016/0309-1740(92)90084-H)
- Narasimha Rao, D., & Sachindra, N. M. (2002). Modified atmosphere and vacuum packaging of meat and poultry products. *Food Reviews International*, 18(4), 263–293. <https://doi.org/10.1081/FRI-120016206>
- Nethra, P. V., Sunoj, K. V., Aaliya, B., Navaf, M., Akhila, P. P., Sudheesh, C., Mir, S. A., Shijin, A., & George, J. (2023). Critical factors affecting the shelf life of packaged fresh red meat – A review. *Measurement: Food*,



- 10(February). <https://doi.org/10.1016/j.meafoo.2023.100086>
- Newton, K. G., Harrison, J. C. L., & Wauters, A. M. (1978). Sources of Psychrotrophic Bacteria on Meat at the Abattoir. *Journal of Applied Bacteriology*, 45(1), 75–82. <https://doi.org/10.1111/j.1365-2672.1978.tb04200.x>
- Niamaimandi, N., Kaymaram, F., Hoolihan, J. P., Mohammadi, G. H., & Fatemi, S. M. R. (2015). Population dynamics parameters of narrow-barred Spanish mackerel, *Scomberomorus commerson* (Lacèpède, 1800), from commercial catch in the northern Persian Gulf. *Global Ecology and Conservation*, 4, 666–672. <https://doi.org/10.1016/j.gecco.2015.10.012>
- Nie, X., Gong, Y., Wang, N., & Meng, X. (2015). Preparation and characterization of edible myofibrillar protein-based film incorporated with grape seed procyanidins and green tea polyphenol. *Lwt*, 64(2), 1042–1046. <https://doi.org/10.1016/j.lwt.2015.07.006>
- Ningrum, A., Widayastuti Perdani, A., Supriyadi, Siti Halimatul Munawaroh, H., Aisyah, S., & Susanto, E. (2021). Characterization of Tuna Skin Gelatin Edible Films with Various Plasticizers-Essential Oils and Their Effect on Beef Appearance. *Journal of Food Processing and Preservation*, 45(9), 1–13. <https://doi.org/10.1111/jfpp.15701>
- Nirwana, I., Rianti, D., Helal Soekartono, R., Listyorini, R. D., & Basuki, D. P. (2018). Antibacterial activity of fig leaf (*Ficus carica* Linn.) extract against *Enterococcus faecalis* and its cytotoxicity effects on fibroblast cells. *Veterinary World*, 11(3), 342–347. <https://doi.org/10.14202/vetworld.2018.342-347>
- Norajit, K., Kim, K. M., & Ryu, G. H. (2010). Comparative studies on the characterization and antioxidant properties of biodegradable alginate films containing ginseng extract. *Journal of Food Engineering*, 98(3), 377–384. <https://doi.org/10.1016/j.jfoodeng.2010.01.015>
- Oliveira, A. P., Valentão, P., Pereira, J. A., Silva, B. M., Tavares, F., & Andrade, P. B. (2009). *Ficus carica* L.: Metabolic and biological screening. *Food and Chemical Toxicology*, 47(11), 2841–2846. <https://doi.org/10.1016/j.fct.2009.09.004>
- Olivera, D. F., Bambicha, R., Laporte, G., Cárdenas, F. C., & Mestorino, N. (2013). Kinetics of colour and texture changes of beef during storage. *Journal of Food Science and Technology*, 50(4), 821–825. <https://doi.org/10.1007/s13197-012-0885-7>
- Pagella, C., Spigno, G., & De Faveri, D. M. (2002). Characterization of starch based edible coatings. *Food and Bioproducts Processing: Transactions of the Institution of Chemical Engineers, Part C*, 80(3), 193–198. <https://doi.org/10.1205/096030802760309214>
- Papadaki, A., Manikas, A. C., Papazoglou, E., Kachrimanidou, V., Lappa, I., Galiotis, C., Mandala, I., & Kopsahelis, N. (2022). Whey protein films reinforced with bacterial cellulose nanowhiskers: Improving edible film properties via a circular economy approach. *Food Chemistry*, 385(February), 132604. <https://doi.org/10.1016/j.foodchem.2022.132604>
- Pavlath, A. E., & Orts, W. J. (2009). Edible Films and Coatings for Food



- Applications. In *Edible Films and Coatings for Food Applications* (Issue December 2015). <https://doi.org/10.1007/978-0-387-92824-1>
- Pham, B. T. T., Tran, N. Q., Huynh, N. Y. T., Bach, L. G., Ha Thuc, C. N., Nguyen, D. Van, Ton That, Q., & Nguyen, T. T. (2024). Multifunctional coating films of gelatin/D-glucose/agarose reinforced by Piper L. leaf extract: Physicochemical properties and mandarin preservation. *Progress in Organic Coatings*, 192(April). <https://doi.org/10.1016/j.porgcoat.2024.108509>
- Poeloengan, M., Logawa, B., Tresnowati, T., Noor, S. M., & Supartono. (2001). Uji Anti Bakteri Ekstrak Daun Waru (*Habiscus Tiliaceus L*) Terhadap *Staphylococcus Aureus*, *Staphylococcus Epidermidis* Dan Penapisan Kandungan Kimia. *Media Peternakan*, 24(3), 45–48.
- Poppe, J. (1997). Gelatin. In A. Imeson (Ed.), *Thickening and Gelling Agents for Food* (Second Edi, p. 144). Springer-Science+Business Media, B.V.
- Pranoto, Y., Marseno, D. W., & Rahmawati, H. (2011). Characteristics of gelatins extracted from fresh and sun-dried seawater fish skins in Indonesia. *International Food Research Journal*, 18(4), 1335–1341.
- Purwanti, A. (2010). Analisis Kuat Tarik dan Elongasi Plastik Kitosan Terplastisasi Sorbitol. *Jurnal Teknologi*, 3(2), 99–106.
- Qodriah, R., Simanjuntak, P., Aurelia, D., & Putri, E. (2021). Uji Aktivitas Antioksidan dari Ekstrak Daun Tin (*Ficus carica L.*) varietas Iraqi Menggunakan Metode Ekstraksi Sonikasi. *Jurnal Ilmu Kefarmasian*, 14(2), 114–120.
- Rachmawati, A. K., Anandito, R. B. K., & Manuhara, G. J. (2010). Extraction and characterization of pectin on green cincau (*Premna oblongifolia*) in edible film production. *Biofarmasi*, 8(1), 1–10. <https://doi.org/10.13057/biofar/f080101>
- Rai, S., Acharya-Siwakoti, E., Kafle, A., Devkota, H. P., & Bhattachari, A. (2021). Plant-Derived Saponins: A Review of Their Surfactant Properties and Applications. *Sci*, 3(4), 44. <https://doi.org/10.3390/sci3040044>
- Rangaraj, V. M., Rambabu, K., Banat, F., & Mittal, V. (2021). Effect of date fruit waste extract as an antioxidant additive on the properties of active gelatin films. *Food Chemistry*, 355(November 2020), 129631. <https://doi.org/10.1016/j.foodchem.2021.129631>
- Ranjitha, K., Sudhakar Rao, D. V., Shivashankara, K. S., Oberoi, H. S., Roy, T. K., & Bharathamma, H. (2017). Shelf-life extension and quality retention in fresh-cut carrots coated with pectin. *Innovative Food Science and Emerging Technologies*, 42, 91–100. <https://doi.org/10.1016/j.ifset.2017.05.013>
- Rashid, A., Khan, A. A., Dar, S. H., Nabi, N. G., & Teli, A. R. (2017). Phytochemical and therapeutic properties of *Ficus carica* Linn. : An overview. *International Journal of PharmTech Research*, 2(6), 16–23.
- Rasid, N. A. M., Nazmi, N. N. M., Isa, M. I. N., & Sarbon, N. M. (2018). Rheological, functional and antioxidant properties of films forming solution and active gelatin films incorporated with *Centella asiatica* (L.) urban extract. *Food Packaging and Shelf Life*, 18(September), 115–124. <https://doi.org/10.1016/j.fpsl.2018.10.002>
- Risch, S. J. (2009). Food Packaging History and Innovations. *Journal of Agricultural and Food Chemistry*, 57(18), 8089–8092.



- <https://doi.org/10.1021/jf900040r>
- Salem, A., Jridi, M., Abdelhedi, O., Fakhfakh, N., Nasri, M., Debeaufort, F., & Zouari, N. (2021). Development and characterization of fish gelatin-based biodegradable film enriched with *Lepidium sativum* extract as active packaging for cheese preservation. *Heliyon*, 7(10), e08099. <https://doi.org/10.1016/j.heliyon.2021.e08099>
- Sanchís, E., González, S., Ghidelli, C., Sheth, C. C., Mateos, M., Palou, L., & Pérez-Gago, M. B. (2016). Browning inhibition and microbial control in fresh-cut persimmon (*Diospyros kaki* Thunb. cv. Rojo Brillante) by apple pectin-based edible coatings. *Postharvest Biology and Technology*, 112, 186–193. <https://doi.org/10.1016/j.postharvbio.2015.09.024>
- Sebranek, J. G., Sewalt, V. J. H., Robbins, K. L., & Houser, T. A. (2005). Comparison of a natural rosemary extract and BHA/BHT for relative antioxidant effectiveness in pork sausage. *Meat Science*, 69(2), 289–296. <https://doi.org/10.1016/j.meatsci.2004.07.010>
- Setiani, W., Sudiarti, T., & Rahmidar, L. (2013). Preparasi Dan Karakterisasi Edible Film Dari Poliblend Pati Sukun-Kitosan. *Jurnal Kimia VALENSI*, 3(2). <https://doi.org/10.15408/jkv.v3i2.506>
- Shafique, F., Naureen, U., Zikrea, A., Ali, Q., Sadiq, R., Naseer, M., Rafique, T., & Akhter, S. (2021). Antibacterial and Antifungal Activity of *Ficus carica* Plant Extract. *Journal of Pharmaceutical Research International*, March, 1–9. <https://doi.org/10.9734/jpri/2021/v33i1831311>
- Shahbazi, Y. (2017). The properties of chitosan and gelatin films incorporated with ethanolic red grape seed extract and *Ziziphora clinopodioides* essential oil as biodegradable materials for active food packaging. *International Journal of Biological Macromolecules*, 99, 746–753. <https://doi.org/10.1016/j.ijbiomac.2017.03.065>
- Shimizu, H., & Iwamoto, S. (2022). Problems of Lipid Oxidation in Minced Meat Products for a Ready-made Meal during Cooking, Processing, and Storage. In *Reviews in Agricultural Science* (Vol. 10, pp. 24–35). https://doi.org/10.7831/ras.10.0_24
- Shyni, K., Hema, G. S., Ninan, G., Mathew, S., Joshy, C. G., & Lakshmanan, P. T. (2014). Isolation and characterization of gelatin from the skins of skipjack tuna (*katsuwonus pelamis*), dog shark (*scoliodon sorakkowah*), and rohu (*labeo rohita*). *Food Hydrocolloids*, 39, 68–76. <https://doi.org/10.1016/j.foodhyd.2013.12.008>
- Simard, R. E., Zee, J., & L'heureux, L. (1984). Microbial Growth in Carcasses and Boxed Beef During Storage. *Journal of Food Protection*, 47(10), 773–777. <https://doi.org/10.4315/0362-028x-47.10.773>
- Sivertsvik, M., Jeksrud, W. K., & Rosnes, J. T. (2002). A review of modified atmosphere packaging of fish and fishery products - Significance of microbial growth, activities and safety. *International Journal of Food Science and Technology*, 37(2), 107–127. <https://doi.org/10.1046/j.1365-2621.2002.00548.x>
- Skurlys, O., Acevedo, C., Pedreschi, F., Enronoe, J., Osorio, F., & Aguilera, J. M. (2011). Food hydrocolloid edible films and coatings. *Food Hydrocolloid*

*Edible Films and Coatings*, 1–66.

- Sobir, & Amalya, M. (2013). *20 Tanaman Buah Koleksi Eksklusif*. Penebar Swadaya. Jakarta.
- Soekarto, S. T., & Yuliatmoko, W. (2018). *Teknologi Penyimpanan dan Penggudangan Produk Pangan*.
- Staroszczyk, H., Kusznierewicz, B., Malinowska-Pańczyk, E., Sinkiewicz, I., Gottfried, K., & Kołodziejska, I. (2020). Fish gelatin films containing aqueous extracts from phenolic-rich fruit pomace. *Lwt*, 117(September 2019). <https://doi.org/10.1016/j.lwt.2019.108613>
- Suderman, N. and, & Sarbon, N. M. (2019). Preparation and characterization of gelatin - based films with the incorporation. *Food Research*, 3(October), 506–514.
- Sukmadewi, E. (2019). *Pengaruh Ekstrak Buah Tin (Ficus carica L.) sebagai Antioksidan terhadap Gambaran Histopatologi Glomerulus Mencit yang Dipapar Rhodamin B*. Universitas Islam Negeri Maulana Malik Ibrahim Malang.
- Sukmawati, Nurnaningsih, & Pratama, M. (2020). Uji Aktivitas Ekstrak Etanol Daun Kersen (*Muntingia calabura L.*) sebagai Inhibitor Enzim α -Glukosidase dengan Menggunakan Elisa Reader. *Jurnal Fitofarmaka Indonesia*, 7(2), 1–5. <https://doi.org/10.33096/jffi.v7i2.506>
- Supeni, G., & Irawan, S. (2012). Pengaruh Penggunaan Kitosan Terhadap Sifat Barrier Edible Film Tapioka Termodifikasi. *Jurnal Kimia Dan Kemasan*, 34(1), 199–206. <https://doi.org/10.24817/jkk.v34i1.1854>
- Suriyaprom, S., Mosoni, P., Leroy, S., Kaewkod, T., Desvaux, M., & Tragooolpua, Y. (2022). Antioxidants of Fruit Extracts as Antimicrobial Agents against Pathogenic Bacteria. *Antioxidants*, 11(3). <https://doi.org/10.3390/antiox11030602>
- Susmitha, A., Sasikumar, K., Rajan, D., Padmakumar M, A., & Nampoothiri, K. M. (2021). Development and characterization of corn starch-gelatin based edible films incorporated with mango and pineapple for active packaging. *Food Bioscience*, 41(March), 100977. <https://doi.org/10.1016/j.fbio.2021.100977>
- Tafa, K. D., Satheesh, N., & Abera, W. (2023). Mechanical properties of tef starch based edible films: Development and process optimization. *Helijon*, 9(2), e13160. <https://doi.org/10.1016/j.helijon.2023.e13160>
- Tamat, S. R., Wikanta, T., & Maulina, L. S. (2007). Aktivitas Antioksidan dan Toksisitas Senyawa Bioaktif dari Ekstrak Rumput Laut Hijau *Ulva reticulata Forsskal*. *Jurnal Ilmu Kefarmasian Indonesia*, 5(1), 31–36.
- Teixeira, D. M., Patão, R. F., Coelho, A. V., & Da Costa, C. T. (2006). Comparison between sample disruption methods and solid-liquid extraction (SLE) to extract phenolic compounds from *Ficus carica* leaves. *Journal of Chromatography A*, 1103(1), 22–28. <https://doi.org/10.1016/j.chroma.2005.11.047>
- Tesfay, S. Z., & Magwaza, L. S. (2017). Evaluating the efficacy of moringa leaf extract, chitosan and carboxymethyl cellulose as edible coatings for enhancing quality and extending postharvest life of avocado (*Persea americana* Mill.)



- fruit. *Food Packaging and Shelf Life*, 11, 40–48. <https://doi.org/10.1016/j.fpsl.2016.12.001>
- Tessaro, L., Luciano, C. G., Quinta Barbosa Bittante, A. M., Lourenço, R. V., Martelli-Tosi, M., & José do Amaral Sobral, P. (2021). Gelatin and/or chitosan-based films activated with “Pitanga” (*Eugenia uniflora L.*) leaf hydroethanolic extract encapsulated in double emulsion. *Food Hydrocolloids*, 113(August 2020). <https://doi.org/10.1016/j.foodhyd.2020.106523>
- Thivya, P., Bhosale, Y. K., Anandakumar, S., Hema, V., & Sinija, V. R. (2022). Study on the characteristics of gluten/alginate-cellulose/onion waste extracts composite film and its food packaging application. *Food Chemistry*, 390(November 2021), 133221. <https://doi.org/10.1016/j.foodchem.2022.133221>
- Tian, T., Kang, Y., Liu, L., & Wang, X. (2022). The effect of super-chilled preservation on shelf life and quality of beef during storage. *Food Science and Technology (Brazil)*, 42, 1–6. <https://doi.org/10.1590/fst.73222>
- Tkachenko, H. M., Buyun, L. I., Osadowski, Z., Honcharenko, V. I., & Prokopiv, A. I. (2017). Antimicrobial screening of the ethanolic leaves extract of *Ficus carica L.* (Moraceae) – an ancient fruit plant. *Introduction of Plants*, 1(1), 78–87. <https://doi.org/10.5281/zenodo.2283589>
- Tong, C., Wu, Z., Sun, J., Lin, L., Wang, L., Guo, Y., Huang, Z., Wu, C., & Pang, J. (2020). Effect of carboxylation cellulose nanocrystal and grape peel extracts on the physical, mechanical and antioxidant properties of konjac glucomannan films. *International Journal of Biological Macromolecules*, 156(April), 874–884. <https://doi.org/10.1016/j.ijbiomac.2020.04.051>
- Tsaniy, A. N. (2019). *Efektivitas Ekstrak Daun Tin (*Ficus carica L.*) dengan Pelarut Metanol terhadap Pertumbuhan *Trichophyton rubrum* Secara In Vitro*. Universitas Pembangunan Nasional “Veteran” Jakarta.
- Ucak, I., Abuibaid, A. K. M., Aldawoud, T. M. S., Galanakis, C. M., & Montesano, D. (2021). *Antioxidant and antimicrobial effects of gelatin films incorporated with citrus seed extract on the shelf life of sea bass (*Dicentrarchus labrax*) fillets. October 2020*, 1–9. <https://doi.org/10.1111/jfpp.15304>
- Ul Rehman, W., Majeed, A., Mehra, R., Bhushan, S., Rani, P., Saini, K. C., & Bast, F. (2016). Gelatin: A comprehensive report covering its indispensable aspects. *Natural Polymers: Derivatives, Blends and Composites, Volume I*, September, 209–222.
- Villasante, J., Martin-Lujano, A., & Almajano, M. P. (2020). Characterization and application of gelatin films with pecan walnut and shell extract (*Carya illinoiensis*). *Polymers*, 12(6). <https://doi.org/10.3390/polym12061424>
- Vlachos, N., Skopelitis, Y., Psaroudaki, M., Konstantinidou, V., Chatzilazarou, A., & Tegou, E. (2006). Applications of Fourier transform-infrared spectroscopy to edible oils. *Analytica Chimica Acta*, 573–574, 459–465. <https://doi.org/10.1016/j.aca.2006.05.034>
- Wahyudi, R., & Maharani, E. T. W. (2017). Profil Protein Pada Ikan Tenggiri Lama Penggaraman Dengan Menggunakan Metode Sds-Page. *Seminar Nasional Pendidikan, Sains Dan Teknologi Fakultas Matematika Dan Ilmu Pengetahuan Alam Universitas Muhammadiyah Semarang*, ISBN : 978, 34–



41.

- Wang, X., Yong, H., Gao, L., Li, L., Jin, M., & Liu, J. (2019). Preparation and characterization of antioxidant and pH-sensitive films based on chitosan and black soybean seed coat extract. *Food Hydrocolloids*, 89(August 2018), 56–66. <https://doi.org/10.1016/j.foodhyd.2018.10.019>
- Wang, X., Zhang, T., Yang, Y., Liu, L., Tian, T., Zhu, D., Ma, M., & Xie, S. (2023). Effects of different storage temperatures on microbial spoilage and bacterial community structure of fresh beef by high-throughput sequencing technology. *Food Science and Technology (Brazil)*, 43. <https://doi.org/10.1590/fst.100522>
- Warkoyo, Raharjo, B., Marseno, D. W., & Karyadi, J. N. W. (2014). Physical, Mechanical and Barrier Properties of *Xanthosoma sagittifolium* Starch-Based Edible Film Incorporated with Potassium Sorbate. *Agritech*, 34(01), 72–81.
- Weng, J. S., Yu, S. F., Lo, Y. S., Shiao, J. C., Lee, M. A., Liu, K. M., Huang, H. H., Wang, Y. C., & Wu, L. J. (2020). Reproductive biology of the narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the central Taiwan Strait, western Pacific. *Deep-Sea Research Part II: Topical Studies in Oceanography*, 175(February), 104755. <https://doi.org/10.1016/j.dsr2.2020.104755>
- Wibudi, A. (2006). *Mekanisme Kerja Sambiloto (Andrographis paniculata) sebagai Antidiabetes*. Institut Pertanian Bogor.
- Widyastuti, N., & Aminudin. (2013). Pengembangan Edible Coating Ekstrak Daun Randu dan Pengaruhnya terhadap Kualitas Mentimun. *Biosaintifika*, 5(2). <http://jurnal.unnes.ac.id/nju/index.php/biosaintifika>
- Wu, J., Chen, S., Ge, S., Miao, J., Li, J., & Zhang, Q. (2013). Preparation, properties and antioxidant activity of an active film from silver carp (*Hypophthalmichthys molitrix*) skin gelatin incorporated with green tea extract. *Food Hydrocolloids*, 32(1), 42–51. <https://doi.org/10.1016/j.foodhyd.2012.11.029>
- Wulansari, E. D., Lestari, D., & Khoirunissa, M. A. (2020). KANDUNGAN TERPENOID DALAM DAUN ARA (*Ficus carica L.*) SEBAGAI AGEN ANTIBAKTERI TERHADAP BAKTERI Methicillin-Resistant *Staphylococcus aureus*. *Pharmacon*, 9(2), 219. <https://doi.org/10.35799/pha.9.2020.29274>
- Xu, D., Chen, T., & Liu, Y. (2020). The physical properties , antioxidant and antimicrobial activity of chitosan – gelatin edible films incorporated with the extract from hop plant. *Polymer Bulletin*, 0123456789. <https://doi.org/10.1007/s00289-020-03294-1>
- Yanis, I. F., Alamsjah, F., Agustien, A., & Maideliza, T. (2020). Antibacterial Potency of Fresh Extract Leaves of Jamaican Cherry (*Muntingia calabura L.*) in Inhibiting the Growth of *Shigella dysenteriae*. *Jurnal Biologi UNAND*, 8(1), 14. <https://doi.org/10.25077/jbioua.8.1.14-19.2020>
- Yilmaz, P., Demirhan, E., & Ozbek, B. (2022). Development of *Ficus carica Linn* leaves extract incorporated chitosan films for active food packaging materials and investigation of their properties. *Food Bioscience*, 46(December 2021), 101542. <https://doi.org/10.1016/j.fbio.2021.101542>
- Yulianti, R., & Ginting, E. (2012). Perbedaan Karakteristik Fisik Edible Film dari



- Umbi-umbian yang Dibuat dengan Penambahan Plasticizer. *Jurnal Penelitian Pertanian Tanaman Pangan*, 31(2), 131–136.
<https://doi.org/10.21082/jpptp.v31n2.2012.p%p>
- Zhai, X., Li, Z., Zhang, J., Shi, J., Zou, X., Huang, X., Zhang, D., Sun, Y., Yang, Z., Holmes, M., Gong, Y., & Povey, M. (2018). Natural Biomaterial-Based Edible and pH-Sensitive Films Combined with Electrochemical Writing for Intelligent Food Packaging. *Journal of Agricultural and Food Chemistry*, 66(48), 12836–12846. <https://doi.org/10.1021/acs.jafc.8b04932>
- Zhang, S., Chen, X., Duan, X., Holman, B. W. B., Zhu, L., Yang, X., Hopkins, D. L., Luo, X., Sun, B., & Zhang, Y. (2023). The retail color characteristics of vacuum-packaged beef m. longissimus lumborum following long-term superchilled storage. *Meat Science*, 196(November 2022), 109050. <https://doi.org/10.1016/j.meatsci.2022.109050>
- Zhang, X., Do, M. D., Casey, P., Sulistio, A., Qiao, G. G., Lundin, L., Lillford, P., & Kosaraju, S. (2010). Chemical cross-linking gelatin with natural phenolic compounds as studied by high-resolution NMR spectroscopy. *Biomacromolecules*, 11(4), 1125–1132. <https://doi.org/10.1021/bm1001284>
- Zhang, X., Liu, Y., Yong, H., Qin, Y., Liu, J., & Liu, J. (2019). Development of multifunctional food packaging films based on chitosan, TiO₂ nanoparticles and anthocyanin-rich black plum peel extract. *Food Hydrocolloids*, 94, 80–92. <https://doi.org/10.1016/j.foodhyd.2019.03.009>
- Zhu, Y., Wang, W., Li, M., Zhang, J., Ji, L., Zhao, Z., Zhang, R., Cai, D., & Chen, L. (2022). Microbial diversity of meat products under spoilage and its controlling approaches. *Frontiers in Nutrition*, 9(4). <https://doi.org/10.3389/fnut.2022.1078201>
- Zou, J., Liu, X., Wang, X., Yang, H., Cheng, J., Lin, Y., & Tang, D. (2022). Influence of Gelatin-Chitosan-Glycerol Edible Coating Incorporated with Chlorogenic Acid, Gallic Acid, and Resveratrol on the Preservation of Fresh Beef. *Foods*, 11(23). <https://doi.org/10.3390/foods11233813>