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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

# DAFTAR PUSTAKA

Alexandru, L. *et al.* (2013) 'Ultrasound-assisted extraction of clove buds using batch- and flow-reactors: A comparative study on a pilot scale', *Innovative Food Science & Emerging Technologies*, 20, pp. 167–172. Available at: https://doi.org/10.1016/j.ifset.2013.07.011.

Aminzare, M. *et al.* (2022) 'Evaluation of antioxidant and antibacterial interactions between resveratrol and eugenol in carboxymethyl cellulose biodegradable film', *Food Science & Nutrition*, 10(1), pp. 155–168. Available at: https://doi.org/10.1002/fsn3.2656.

Ancos, B., Sánchez-Moreno, C. and González-Aguilar, G.A. (2017) 'Pineapple composition and nutrition', in *Handbook of Pineapple Technology*. Wiley, pp. 221–239. Available at: https://doi.org/10.1002/9781118967355.ch12.

Anthon, G.E., LeStrange, M. and Barrett, D.M. (2011) 'Changes in pH, acids, sugars and other quality parameters during extended vine holding of ripe processing tomatoes', *Journal of the Science of Food and Agriculture*, 91(7), pp. 1175–1181. Available at: https://doi.org/10.1002/jsfa.4312.

AOAC (1998) *Official Methods of Analysis of AOAC International, in: Official Methods of Analysis of AOAC International, fourteenth ed*. Washington, DC, USA: Association of Official Analytical Chemistry.

Artetxe-Arrate, I. *et al.* (2019) 'Otolith microchemistry: a useful tool for investigating stock structure of yellowfin tuna (Thunnus albacares) in the Indian Ocean', *Marine and Freshwater Research*, 70(12), p. 1708. Available at: https://doi.org/10.1071/MF19067.

Azarakhsh, N. *et al.* (2014) 'Effects of Gellan-Based *Edible coating* on the Quality of Fresh-Cut Pineapple During Cold Storage', *Food and Bioprocess Technology*, 7(7), pp. 2144–2151. Available at: https://doi.org/10.1007/s11947-014-1261-6.

Aziza, I.N., Darmanto, Y.S. and Kurniasih, R.A. (2019) 'The Effect of Gelatin from Different Fish Skin on Physical and Sensory Characteristics of Marsmallow', *Jurnal Perikanan Universitas Gadjah Mada*, 21(1), p. 17. Available at: https://doi.org/10.22146/jfs.42739.

Baldwin Elizabeth A, Hagenmaier Robert and Bai Jinhe (2011) *Edible coatings and Films to Improve Food Quality*. Edited by E.A. Baldwin, R. Hagenmaier, and J. Bai. CRC Press. Available at: https://doi.org/10.1201/b11082.

Banker, G.S. (1966) 'Film Coating Theory and Practice', *Journal of Pharmaceutical Sciences*, 55(1), pp. 81–89. Available at: https://doi.org/10.1002/jps.2600550118.

UNIVERSITAS GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap Kualitas Buah Nanas Potong Selama Penyimpanan**
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Basaglia, R.R. *et al.* (2021) 'Effect of edible chitosan and cinnamon essential oil coatings on the shelf life of minimally processed pineapple (Smooth cayenne)', *Food Bioscience*, 41, p. 100966. Available at: https://doi.org/10.1016/j.fbio.2021.100966.

Benítez, S. *et al.* (2014) 'Combined Effect of a Low Permeable Film and *Edible coating*s or Calcium Dips on the Quality of Fresh-Cut Pineapple', *Journal of Food Process Engineering*, 37(2), pp. 91–99. Available at: https://doi.org/10.1111/jfpe.12063.

Bierhals, V.S., Chiumarelli, M. and Hubinger, M.D. (2011) 'Effect of Cassava Starch Coating on Quality and Shelf Life of Fresh-Cut Pineapple ( *Ananas Comosus* L. Merril cv "Pérola")', *Journal of Food Science*, 76(1). Available at: https://doi.org/10.1111/j.1750-3841.2010.01951.x.

Bizura Hasida, M.R. *et al.* (2013) 'QUALITY EVALUATION OF FRESH-CUT "JOSAPINE" PINEAPPLE COATED WITH HYDROCOLLOID BASED *EDIBLE COATING* USING GELATIN', *Acta Horticulturae*, (1012), pp. 1037–1041. Available at: https://doi.org/10.17660/ActaHortic.2013.1012.140.

Brody, A.L., Strupinsky, E.P. and Kline, L.R. (2001) *Active Packaging for Food Applications*. CRC Press. Available at: https://doi.org/10.1201/9780367801311.

Cervera, M.F. *et al.* (2004) 'Solid-state and mechanical properties of aqueous chitosan-amylose starch films plasticized with polyols', *AAPS PharmSciTech*, 5(1), pp. 109–114. Available at: https://doi.org/10.1208/pt050115.

Chiabrando, V. and Giacalone, G. (2017) 'Quality evaluation of blueberries coated with chitosan and sodium alginate during postharvest storage', *International Food Research Journal*, 24(4), pp. 1553–1561.

Cipta Ismaya, F., Fithriyah, N.H. and Hendrawati, T.Y. (2021) 'PEMBUATAN DAN KARAKTERISASI EDIBLE FILM DARI NATA DE COCO DAN GLISEROL', 13(1). Available at: https://doi.org/10.24853/jurtek.13.1.81-88.

Dalimartha, S. (2001) *Atlas Tumbuhan Obat Indonesia Jilid 2 Nanas*. Jakarta: TrubusAgriwidya.

Das, S. *et al.* (2020) 'Sodium alginate-based *edible coating* containing nanoemulsion of Citrus sinensis essential oil eradicates planktonic and sessile cells of food-borne pathogens and increased quality attributes of tomatoes', *International Journal of Biological Macromolecules*, 162, pp. 1770–1779. Available at: https://doi.org/10.1016/j.ijbiomac.2020.08.086.

Dou, L. *et al.* (2018) 'Physical properties and antioxidant activity of gelatin-sodium alginate edible films with tea polyphenols', *International Journal of Biological*

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

*Macromolecules*, 118, pp. 1377–1383. Available at: https://doi.org/10.1016/j.ijbiomac.2018.06.121.

Ebrahimzadeh, S. *et al.* (2023) 'Incorporation of essential oils in edible seaweed-based films: A comprehensive review', *Trends in Food Science & Technology*, 135, pp. 43–56. Available at: https://doi.org/10.1016/j.tifs.2023.03.015.

Egidio, V. *et al.* (2009) 'Evaluation of shelf-life of fresh-cut pineapple using FT-NIR and FT-IR spectroscopy', *Postharvest Biology and Technology*, 54(2), pp. 87–92. Available at: https://doi.org/10.1016/j.postharvbio.2009.06.006.

Emragi, E., Kalita, D. and Jayanty, S.S. (2022) 'Effect of *edible coating* on physical and chemical properties of potato tubers under different storage conditions', *LWT*, 153, p. 112580. Available at: https://doi.org/10.1016/j.lwt.2021.112580.

Fahrullah, F. (2021) 'PENGGUNAAN MINYAK CENGKEH DALAM APLIKASI EDIBLE FILM WHEY TERHADAP KARAKTERISTIK KIMIAWI DAN MIKROBIOLOGIS KEJU GOUDA', *AGROINTEK*, 15(2), pp. 592–600. Available at: https://doi.org/10.21107/agrointek.v15i2.10060.

Falguera, V. *et al.* (2011) 'Edible films and coatings: Structures, active functions and trends in their use', *Trends in Food Science & Technology*, 22(6), pp. 292–303. Available at: https://doi.org/10.1016/j.tifs.2011.02.004.

Gao, X. *et al.* (2020) 'Adsorption of heavy metal ions by sodium alginate based adsorbent-a review and new perspectives', *International Journal of Biological Macromolecules*, 164, pp. 4423–4434. Available at: https://doi.org/10.1016/j.ijbiomac.2020.09.046.

García, M.A., Martino, M.N. and Zaritzky, N.E. (1998) *Plasticized Starch-Based Coatings To Improve Strawberry (Fragaria × Ananassa) Quality and Stability*. Available at: https://pubs.acs.org/sharingguidelines.

Ghanbarzadeh, B. *et al.* (2006) 'Investigation of water vapour permeability, hydrophobicity and morphology of zein films plasticized by polyols', *Iranian Polymer Journal (English Edition)*, 15(9), pp. 691–700.

Ghasemlou, M. *et al.* (2011) 'Development and characterisation of a new biodegradable edible film made from kefiran, an exopolysaccharide obtained from kefir grains', *Food Chemistry*, 127(4), pp. 1496–1502. Available at: https://doi.org/10.1016/j.foodchem.2011.02.003.

Gómez, P.L. *et al.* (2012) 'Effect of pulsed light combined with an antibrowning pretreatment on quality of fresh cut apple', *Innovative Food Science & Emerging Technologies*, 16, pp. 102–112. Available at: https://doi.org/10.1016/j.ifset.2012.05.011.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Gómez-Guillén, M.C. *et al.* (2009) 'Fish gelatin: a renewable material for developing active biodegradable films', *Trends in Food Science & Technology*, 20(1), pp. 3–16. Available at: https://doi.org/10.1016/j.tifs.2008.10.002.

González-Aguilar, G.A. *et al.* (2010) 'Preserving quality of fresh-cut products using safe technologies', *Journal fur Verbraucherschutz und Lebensmittelsicherheit*, 5(1), pp. 65–72. Available at: https://doi.org/10.1007/s00003-009-0315-6.

Guerreiro, A.C. *et al.* (2025) '*Edible coating*s Enhance Storability and Preserve Quality of Kiwiberry (Actinidia arguta L.) cv. Ken's Red', *Horticulturae*, 11(1), p. 105. Available at: https://doi.org/10.3390/horticulturae11010105.

Haro-González, J.N. *et al.* (2021) 'Clove Essential Oil (Syzygium aromaticum L. Myrtaceae): Extraction, Chemical Composition, Food Applications, and Essential Bioactivity for Human Health', *Molecules*, 26(21), p. 6387. Available at: https://doi.org/10.3390/molecules26216387.

Haryati, D., Nadhifa, L. and Nurlaila Abdullah, dan (2019) 'EKSTRAKSI DAN KARAKTERISASI GELATIN KULIT IKAN BARONANG (Siganus canaliculatus) DENGAN METODE ENZIMATIS MENGGUNAKAN ENZIM BROMELIN (Extraction and Characterization of Gelatin from Baronang's (Siganus canaliculatus) Skin with Enzimatic Methode Using Bromelin Enzyme)', *Canrea Journal*, 2(1).

Huda, M., Djayasinga, R. and Ningsih, D.S. (2018) 'EFEKTIVITAS EKSTRAK BUNGA CENGKEH (Eugenia Aromatica) TERHADAP PERTUMBUHAN BAKTERI Staphylococcus aureus', *Jurnal Analis Kesehatan*, 7(1), p. 710. Available at: https://doi.org/10.26630/jak.v7i1.934.

Isroi, I. *et al.* (2018) 'Biodegradability of Cassava Edible Bioplastics in Landfill Soil and Plantation Soil', *Jurnal Kimia dan Kemasan*, 40(2), p. 129. Available at: https://doi.org/10.24817/jkk.v40i2.3596.

Jafari, R., Zandi, M. and Ganjloo, A. (2022) 'Effect of gelatin–alginate coating containing anise ( *Pimpinella anisum* L.) essential oil on physicochemical and visual properties of zucchini ( *Cucurbita pepo* L.) fruit during storage', *Journal of Food Processing and Preservation*, 46(8). Available at: https://doi.org/10.1111/jfpp.16756.

Jafarzadeh, S. *et al.* (2021) 'Application of bio-nanocomposite films and *edible coating*s for extending the shelf life of fresh fruits and vegetables', *Advances in Colloid and Interface Science*, 291, p. 102405. Available at: https://doi.org/10.1016/j.cis.2021.102405.

Jitareerat, P. *et al.* (2007) 'Effect of chitosan on ripening, enzymatic activity, and disease development in mango ( *mangifera indica* ) fruit', *New Zealand Journal*

UNIVERSITAS GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap Kualitas Buah Nanas Potong Selama Penyimpanan**
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

*of Crop and Horticultural Science*, 35(2), pp. 211–218. Available at: https://doi.org/10.1080/01140670709510187.

Jouki, M. *et al.* (2013) 'Effect of glycerol concentration on edible film production from cress seed carbohydrate gum', *Carbohydrate Polymers*, 96(1), pp. 39–46. Available at: https://doi.org/10.1016/j.carbpol.2013.03.077.

Jurwita, M., Nasir, M. and Haji, A.G. (2020) 'Analisis Kadar Vitamin C Bawang Putih dan Hitam dengan Metode Spektrofotometri UV-Vis', *KOVALEN: Jurnal Riset Kimia*, 6(3), pp. 252–261. Available at: https://doi.org/10.22487/kovalen.2020.v6.i3.15289.

Karim, A.A. and Bhat, R. (2008) 'Gelatin alternatives for the food industry: recent developments, challenges and prospects', *Trends in Food Science & Technology*, 19(12), pp. 644–656. Available at: https://doi.org/10.1016/j.tifs.2008.08.001.

Kementrian Pertanian (2023) *Outlook Komoditas Pertanian Subsektor Holtikultura Nanas*. Jakarta.

Kocira, A. *et al.* (2021) 'Polysaccharides as Edible Films and Coatings: Characteristics and Influence on Fruit and Vegetable Quality—A Review', *Agronomy*, 11(5), p. 813. Available at: https://doi.org/10.3390/agronomy11050813.

Kusrini, E. *et al.* (2015) 'Improvement of Quality of Carica papaya L. with Clove Oil as Preservative in *Edible coating* Technology', *Makara Journal of Technology*, 19(3), p. 148. Available at: https://doi.org/10.7454/mst.v19i3.3047.

Lacroix, M. and Vu, K.D. (2014) '*Edible coating* and Film Materials', in *Innovations in Food Packaging*. Elsevier, pp. 277–304. Available at: https://doi.org/10.1016/B978-0-12-394601-0.00011-4.

Lakshan, N.D., Senanayake, C.M., Liyanage, T., dan Lankanayaka, A. (2024). Clove essential oil emulsions-loaded arrowroot starch-beeswax-based *edible coating* extends the shelf life and preserves the postharvest quality of fresh tomatoes (*Solanum lycopersicum* L.) stored at room temperature, *Suistainable Food Technology, 4.*

Liao, X. *et al.* (2023) 'Effect of Composite *Edible coating*s Combined with Modified Atmosphere Packaging on the Storage Quality and Microbiological Properties of Fresh-Cut Pineapple', *Foods*, 12(6), p. 1344. Available at: https://doi.org/10.3390/foods12061344.

Licodiedoff, S. *et al.* (2016) *Conservation of physalis by edible coating of gelatin and calcium chloride*, *International Food Research Journal*.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
Kualitas Buah Nanas Potong Selama Penyimpanan**
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Liñán-Atero, R. *et al.* (2024) 'Clove Essential Oil: Chemical Profile, Biological Activities, Encapsulation Strategies, and Food Applications', *Antioxidants*, 13(4), p. 488. Available at: https://doi.org/10.3390/antiox13040488.

Lisdiana, W.S. (1997) *Budidaya nanas, pengolahan, dan pemasaran*. Solo: aneka.

López-Córdoba, A. and Aldana-Usme, A. (2019) '*Edible coating*s based on sodium alginate and ascorbic acid for application on fresh-cut pineapple (Ananas comosus (L.) Merr)', *Agronomía Colombiana*, 37(3), pp. 317–322. Available at: https://doi.org/10.15446/agron.colomb.v37n3.76173.

Lv, L.C. *et al.* (2019) 'Fish gelatin: The novel potential applications', *Journal of Functional Foods*. Elsevier Ltd. Available at: https://doi.org/10.1016/j.jff.2019.103581.

Ma, X. *et al.* (2021) 'An Active Gelatin Coating Containing Eugenol and Vacuum Delays the Decay of Chinese Seabass (Lateolabrax maculatus) Fillets during Cold Storage: A Microbiome Perspective', *Coatings*, 11(2), p. 147. Available at: https://doi.org/10.3390/coatings11020147.

Mafazah, E.M., Pranoto, Y. and Rohman, A. (2018) 'Extracting of yellowfin tuna ( *Thunnus albacares* ) fish skin gelatin as influenced by alkaline concentration and extraction times', *IOP Conference Series: Earth and Environmental Science*, 139, p. 012047. Available at: https://doi.org/10.1088/1755-1315/139/1/012047.

Maftoonazad, N., Ramaswamy, H.S. and Marcotte, M. (2008) 'Shelf-life extension of peaches through sodium alginate and methyl cellulose *edible coating*s', *International Journal of Food Science & Technology*, 43(6), pp. 951–957. Available at: https://doi.org/10.1111/j.1365-2621.2006.01444.x.

Manthou, E. *et al.* (2021) 'Evolution of fungal community associated with ready-to-eat pineapple during storage under different temperature conditions', *Food Microbiology*, 97, p. 103736. Available at: https://doi.org/10.1016/j.fm.2021.103736.

Mantilla, N. *et al.* (2013) 'Multilayered antimicrobial *edible coating* and its effect on quality and shelf-life of fresh-cut pineapple (Ananas comosus)', *LWT*, 51(1), pp. 37–43. Available at: https://doi.org/10.1016/j.lwt.2012.10.010.

Matinong, A.M.E. *et al.* (2022) 'Collagen Extraction from Animal Skin', *Biology*, 11(6), p. 905. Available at: https://doi.org/10.3390/biology11060905.

Maulida *et al.* (2018) 'Utilization of mango seed starch in manufacture of bioplastic reinforced with microparticle clay using glycerol as plasticizer', *IOP Conference Series: Materials Science and Engineering*, 309, p. 012068. Available at: https://doi.org/10.1088/1757-899X/309/1/012068.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Milovanovic, I. and Hayes, M. (2018) 'Marine Gelatine from Rest Raw Materials', *Applied Sciences*, 8(12), p. 2407. Available at: https://doi.org/10.3390/app8122407.

Misir, J., H. Brishti, F. and M. Hoque, M. (2014) 'Aloe vera gel as a Novel *Edible coating* for Fresh Fruits: A Review', *American Journal of Food Science and Technology*, 2(3), pp. 93–97. Available at: https://doi.org/10.12691/ajfst-2-3-3.

Miteluț, A.C. *et al.* (2021) 'Latest Developments in *Edible coating*s on Minimally Processed Fruits and Vegetables: A Review', *Foods*, 10(11), p. 2821. Available at: https://doi.org/10.3390/foods10112821.

Mohd Ali, M. *et al.* (2020) 'Pineapple (Ananas comosus): A comprehensive review of nutritional values, volatile compounds, health benefits, and potential food products', *Food Research International*, 137, p. 109675. Available at: https://doi.org/10.1016/j.foodres.2020.109675.

Morillon, V. *et al.* (2002) 'Factors Affecting the Moisture Permeability of Lipid-Based Edible Films: A Review', *Critical Reviews in Food Science and Nutrition*, 42(1), pp. 67–89. Available at: https://doi.org/10.1080/10408690290825466.

Morsy, N.E. and Rayan, A.M. (2019) 'Effect of different *edible coating*s on biochemical quality and shelf life of apricots (Prunus armenica L. cv Canino)', *Journal of Food Measurement and Characterization*, 13(4), pp. 3173–3182. Available at: https://doi.org/10.1007/s11694-019-00240-2.

Nair, M.S. *et al.* (2020) 'Enhancing the functionality of chitosan- and alginate-based active *edible coating*s/films for the preservation of fruits and vegetables: A review', *International Journal of Biological Macromolecules*, 164, pp. 304–320. Available at: https://doi.org/10.1016/j.ijbiomac.2020.07.083.

Nasution, I.S. (2012) *EFFECT OF APPLICATION EDIBLE COATING, CALCIUM CHLORIDE, AND PLASTIC PACKAGING TO THE QUALITY OF MINIMALLY PROCESSED OF PINEAPPLE*. Available at: https://www.researchgate.net/publication/321824399.

Neveu, V. *et al.* (2010) 'Phenol-Explorer: an online comprehensive database on polyphenol contents in foods', *Database*, 2010(0), pp. bap024–bap024. Available at: https://doi.org/10.1093/database/bap024.

Newton, R., Telfer, T. and Little, D. (2014) 'Perspectives on the Utilization of Aquaculture Coproduct in Europe and Asia: Prospects for Value Addition and Improved Resource Efficiency', *Critical Reviews in Food Science and Nutrition*, 54(4), pp. 495–510. Available at: https://doi.org/10.1080/10408398.2011.588349.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Ngibad, K. *et al.* (2019) *Comparison of Measurement The Vitamin C Level using UV-Vis Spetrophotometry at Uv and Visible Wavelength*, *Borneo Journal Of Medical Laboratory Technology*.

Ningrum, A. *et al.* (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). Available at: https://doi.org/10.1111/jfpp.15701.

Nisah, K. (2019) 'EFEK *EDIBLE COATING* PADA KUALITAS ALPOKAT (PERSEA AMERICA MILL ) SELAMA PENYIMPANAN', *AMINA*, 1(1), pp. 11–17. Available at: https://doi.org/10.22373/amina.v1i1.9.

Oliveira, M.A. de *et al.* (2011) 'Microbiological quality of ready-to-eat minimally processed vegetables consumed in Brazil', *Food Control*, 22(8), pp. 1400–1403. Available at: https://doi.org/10.1016/j.foodcont.2011.02.020.

Oms-Oliu, G. *et al.* (2010) 'Recent approaches using chemical treatments to preserve quality of fresh-cut fruit: A review', *Postharvest Biology and Technology*, 57(3), pp. 139–148. Available at: https://doi.org/10.1016/j.postharvbio.2010.04.001.

Oms-Oliu, G., Soliva-Fortuny, R. and Martín-Belloso, O. (2008) '*Edible coating*s with antibrowning agents to maintain sensory quality and antioxidant properties of fresh-cut pears', *Postharvest Biology and Technology*, 50(1), pp. 87–94. Available at: https://doi.org/10.1016/j.postharvbio.2008.03.005.

Pan, Y., Zhu, J. and Shouying, L. (2015) 'Effects of pure oxygen and reduced oxygen modified atmosphere packaging on the quality and microbial characteristics of fresh-cut pineapple', *Fruits*, 70(2), pp. 101–108. Available at: https://doi.org/10.1051/fruits/2015003.

Pandey, V.K. *et al.* (2022) 'A comprehensive review on the application of essential oils as bioactive compounds in Nano-emulsion based *edible coating*s of fruits and vegetables', *Applied Food Research*, 2(1), p. 100042. Available at: https://doi.org/10.1016/j.afres.2022.100042.

Pandey, V.K. *et al.* (2023) 'Effects of clove essential oil (Caryophyllus aromaticus L.) nanoemulsion incorporated *edible coating* on shelf-life of fresh cut apple pieces', *Journal of Agriculture and Food Research*, 14, p. 100791. Available at: https://doi.org/10.1016/j.jafr.2023.100791.

Pattanasiri, T., Taparhudee, W. and Suppakul, P. (2017) 'Anaesthetic efficacy of clove oil-coated LDPE bag on improving water quality and survival in the Siamese fighting fish, Betta splendens, during transportation', *Aquaculture International*, 25(1), pp. 197–209. Available at: https://doi.org/10.1007/s10499-016-0022-0.

UNIVERSITAS
GADJAH MADA
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Petriccione, M. *et al.* (2015) 'The Effect of Chitosan Coating on the Quality and Nutraceutical Traits of Sweet Cherry During Postharvest Life', *Food and Bioprocess Technology*, 8(2), pp. 394–408. Available at: https://doi.org/10.1007/s11947-014-1411-x.

Phuoc Minh, N. *et al.* (2019) 'Quality and Shelf Life of Processed Pineapple by Different *Edible coating*s', *J. Pharm. Sci. & Res*, 11(4), pp. 1441–1446.

Pizato, S. *et al.* (2013) 'Effects of Different *Edible coating*s in Physical, Chemical and Microbiological Characteristics of Minimally Processed Peaches ( *<scp>P</scp> runus persica* <scp>L</scp> . *<scp>B</scp> atsch* )', *Journal of Food Safety*, 33(1), pp. 30–39. Available at: https://doi.org/10.1111/jfs.12020.

Pizato, S. *et al.* (2019) 'Evaluation of the shelf-life extension of fresh-cut pineapple (Smooth cayenne) by application of different *edible coating*s', *British Food Journal*, 121(7), pp. 1592–1604. Available at: https://doi.org/10.1108/BFJ-11-2018-0780.

Pradana, A., Santosa, D. and Sulaiman, T.N.S. (2024) 'Potensi Cengkeh (Syzygium aromaticum (L.) Merr. & Perry) di Indonesia Sebagai Sumber Daya Alam dan Bahan Baku Obat Antibakteri dan Antijamur', *Majalah Farmaseutik*, 20(1), p. 70. Available at: https://doi.org/10.22146/farmaseutik.v20i1.86004.

Pradarameswari, K.A. *et al.* (2018) 'The physico-chemical properties of pangas catfish *(Pangasius pangasius)* skin gelatin', *IOP Conference Series: Earth and Environmental Science*, 137, p. 012067. Available at: https://doi.org/10.1088/1755-1315/137/1/012067.

Prakash, A., Baskaran, R. and Vadivel, V. (2020) 'Citral nanoemulsion incorporated *edible coating* to extend the shelf life of fresh cut pineapples', *LWT*, 118, p. 108851. Available at: https://doi.org/10.1016/j.lwt.2019.108851.

Prihatman, K. (2000) *Nanas (Ananas comosus)*. Jakarta: TTG Budidaya Pertanian.

Raghav, P.K., Agarwal, N. and Saini, M. (2016) '*EDIBLE COATING* OF FRUITS AND VEGETABLES: A REVIEW', *International Journal of Scientific Research and Modern Education (IJSRME)* [Preprint], (1). Available at: https://www.researchgate.net/publication/331298687.

Rocculi, P. *et al.* (2009) 'Effect of 1-MCP treatment and N2O MAP on physiological and quality changes of fresh-cut pineapple', *Postharvest Biology and Technology*, 51(3), pp. 371–377. Available at: https://doi.org/10.1016/j.postharvbio.2008.07.010.

Rodrigues, M.Á.V. *et al.* (2020) 'Chitosan and gelatin materials incorporated with phenolic extracts of grape seed and jabuticaba peel: Rheological, physicochemical, antioxidant, antimicrobial and barrier properties',

UNIVERSITAS GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap Kualitas Buah Nanas Potong Selama Penyimpanan**
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

*International Journal of Biological Macromolecules*, 160, pp. 769–779. Available at: https://doi.org/10.1016/j.ijbiomac.2020.05.240.

Rojas-Graü, M.A., Soliva-Fortuny, R. and Martín-Belloso, O. (2009) '*Edible coating*s to incorporate active ingredients to fresh-cut fruits: a review', *Trends in Food Science & Technology*, 20(10), pp. 438–447. Available at: https://doi.org/10.1016/j.tifs.2009.05.002.

Roldangutierrez, J., Ruizjimenez, J. and Luquedecastro, M. (2008) 'Ultrasound-assisted dynamic extraction of valuable compounds from aromatic plants and flowers as compared with steam distillation and superheated liquid extraction', *Talanta*, 75(5), pp. 1369–1375. Available at: https://doi.org/10.1016/j.talanta.2008.01.057.

Saha, T. *et al.* (2023) 'Quality and shelf life of fresh-cut pineapple (Ananas comosus) coated with aloe vera and honey in the refrigerated condition', *Journal of Agriculture and Food Research*, 14. Available at: https://doi.org/10.1016/j.jafr.2023.100709.

Saputra, R.H., Widistuti, I. and Supriadi, A. (2015) 'Karakteristik Fisik Dan Kimia Gelatin Kulit Ikan Patin (Pangasius Pangasius) Dengan Kombinasi Berbagai Asam Dan Suhu', *Fishtech*, 4(1), pp. 29–36.

Sekarina, A.S. *et al.* (2023) 'Effects of *edible coating*s of chitosan - fish skin gelatine containing black tea extract on quality of minimally processed papaya during refrigerated storage', *Carbohydrate Polymer Technologies and Applications*, 5. Available at: https://doi.org/10.1016/j.carpta.2023.100287.

Senturk Parreidt, T., Müller, K. and Schmid, M. (2018) 'Alginate-Based Edible Films and Coatings for Food Packaging Applications', *Foods*, 7(10), p. 170. Available at: https://doi.org/10.3390/foods7100170.

Shamsudin, R., Zulkifli, N.A. and Kamarul Zaman, A.A. (2020) 'Quality attributes of fresh pineapple-mango juice blend during storage', *International Food Research Journal*, 27(1), pp. 141–149.

Shan, B. *et al.* (2005) 'Antioxidant Capacity of 26 Spice Extracts and Characterization of Their Phenolic Constituents', *Journal of Agricultural and Food Chemistry*, 53(20), pp. 7749–7759. Available at: https://doi.org/10.1021/jf051513y.

Sharma, L., Singh Saini, C. and Sharma, H.K. (2018) 'Development of crosslinked sesame protein and pineapple extract-based bilayer coatings for shelf-life extension of fresh-cut pineapple', *Journal of Food Processing and Preservation*, 42(2), p. e13527. Available at: https://doi.org/10.1111/jfpp.13527.

Siburian, P. W., Falah, A. A. F., dan Manguwikarta, J. (2021). 'Alginate-Based *Edible coating*s Enriched with Cinnamon Essential Oil Extend Storability and Maintain

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

the Quality of Strawberries under Tropical Condition', *Journal of Agro Science,* 9 (1). Available at: https:// 10.18196/pt.v9i1.10368.

Silva, M.A. da, Bierhalz, A.C.K. and Kieckbusch, T.G. (2009) 'Alginate and pectin composite films crosslinked with Ca2+ ions: Effect of the plasticizer concentration', *Carbohydrate Polymers*, 77(4), pp. 736–742. Available at: https://doi.org/10.1016/j.carbpol.2009.02.014.

Singh, M., Saroj, R. and Kaur, D. (2024) 'Optimized chitosan *edible coating* for guava and its characterization', *Measurement: Food*, 14, p. 100145. Available at: https://doi.org/10.1016/j.meafoo.2024.100145.

Soedarya (2009) *Agribisnis Nanas*. Bandung: CV. Pustaka grafika.

Sudheer, K.P., Sankalpa, K.B. and Saranya, S. (2019) 'Effect of Preservatives and Temperature on Microbial and Physico-Chemical Attributes of Minimally Processed Pineapple', *International Journal of Current Microbiology and Applied Sciences*, 8(02), pp. 541–553. Available at: https://doi.org/10.20546/ijcmas.2019.802.062.

Suhag, R. *et al.* (2020) 'Film formation and deposition methods of *edible coating* on food products: A review', *Food Research International*, 136, p. 109582. Available at: https://doi.org/10.1016/j.foodres.2020.109582.

Suppakul, P. *et al.* (2006) 'Plasticizer and relative humidity effects on mechanical properties of cassava flour films', in *The 15th IAPRI World Conference on Packaging*. Tokyo,Japan.

Suriati, L. *et al.* (2020) 'Physicochemical Characteristics of Fresh-cut Tropical Fruit during Storage', 10(4).

Sutrisno, E. *et al.* (2021) 'Characterization of tuna (Thunnus albacares) skin gelatin edible film incorporated with clove and ginger essential oils and different surfactants', *Food Research*, 5(2), pp. 440–450. Available at: https://doi.org/10.26656/fr.2017.5(2).285.

Tapia, M.S. *et al.* (2007) 'Alginate- and Gellan-Based Edible Films for Probiotic Coatings on Fresh-Cut Fruits', *Journal of Food Science*, 72(4). Available at: https://doi.org/10.1111/j.1750-3841.2007.00318.x.

Tapia, M.S. *et al.* (2008) 'Use of alginate- and gellan-based coatings for improving barrier, texture and nutritional properties of fresh-cut papaya', *Food Hydrocolloids*, 22(8), pp. 1493–1503. Available at: https://doi.org/10.1016/j.foodhyd.2007.10.004.

Tekin, K., Akalın, M.K. and Şeker, M.G. (2015) 'Ultrasound bath-assisted extraction of essential oils from clove using central composite design', *Industrial Crops and*

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
Kualitas Buah Nanas Potong Selama Penyimpanan**
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

*Products*, 77, pp. 954–960. Available at: https://doi.org/10.1016/j.indcrop.2015.09.071.

Thu, H.-E. and Ng, S.-F. (2013) 'Gelatine enhances drug dispersion in alginate bilayer film via the formation of crystalline microaggregates', *International Journal of Pharmaceutics*, 454(1), pp. 99–106. Available at: https://doi.org/10.1016/j.ijpharm.2013.06.082.

Tiwari, V.K. and Chandra Verma, V. (2022) *Edible coating for postharvest management of fruits and vegetables*. Available at: http://www.thepharmajournal.com.

Tural, S., Sarıcaoğlu, F.T. and Turhan, S. (2017) 'Edible films and coatings: their production, application methods, functions and uses in muscle foods.', *Akademik Gida*, 15(1), pp. 84–94.

Ulanowska, M. and Olas, B. (2021) 'Biological Properties and Prospects for the Application of Eugenol—A Review', *International Journal of Molecular Sciences*, 22(7), p. 3671. Available at: https://doi.org/10.3390/ijms22073671.

Ulfa, L.R., Ningrum, A. and Supriyadi (2024) 'Effect of *edible coating* of gelatin-sodium alginate with the addition of green tea ( *Camellia sinensis* ) extract on the characteristics of star fruit ( *Averrhoa carambola L* .) during storage', *Journal of Food Science*, 89(10), pp. 6217–6231. Available at: https://doi.org/10.1111/1750-3841.17311.

Ulusoy, B.H., Yildirim, F.K. and Hecer, C. (2018) 'Edible Films and Coatings: A Good Idea From Past to Future Technology', *Journal of Food Technology Research*, 5(1), pp. 28–33. Available at: https://doi.org/10.18488/journal.58.2018.51.28.33.

Vital, A.C.P. *et al.* (2016) 'Effect of Edible and Active Coating (with Rosemary and Oregano Essential Oils) on Beef Characteristics and Consumer Acceptability', *PLOS ONE*, 11(8), p. e0160535. Available at: https://doi.org/10.1371/journal.pone.0160535.

Wang, H. *et al.* (2021) 'Edible films from chitosan-gelatin: Physical properties and food packaging application', *Food Bioscience*, 40, p. 100871. Available at: https://doi.org/10.1016/j.fbio.2020.100871.

Wang, Q., Zhang, L. and Ding, W. (2020) 'Eugenol nanocapsules embedded with gelatin-chitosan for chilled pork preservation', *International Journal of Biological Macromolecules*, 158, pp. 837–844. Available at: https://doi.org/10.1016/j.ijbiomac.2020.04.182.

Ward, I.M. and Hadley, D.W. (1993) *An Introduction on the Mechanical Properties of Solid Polymers*. NewYork: Wiley.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Warriner, K. *et al.* (2009) 'Chapter 4 Recent Advances in the Microbial Safety of Fresh Fruits and Vegetables', in, pp. 155–208. Available at: https://doi.org/10.1016/S1043-4526(09)57004-0.

Wasana, W.L.N. and Kariyawasam, H.K.P.P. (2020) *A Review on Minimal Processing of Fruits and Vegetables*, *European Modern Studies Journal*. Available at: https://doi.org/ISSN2522-9400.

Xu, J.-G. *et al.* (2016) 'Chemical Composition, Antibacterial Properties and Mechanism of Action of Essential Oil from Clove Buds against Staphylococcus aureus', *Molecules*, 21(9), p. 1194. Available at: https://doi.org/10.3390/molecules21091194.

Xue, W. *et al.* (2023) 'Permeability of biodegradable film comprising biopolymers derived from marine origin for food packaging application: A review', *Trends in Food Science & Technology*, 136, pp. 295–307. Available at: https://doi.org/10.1016/j.tifs.2023.05.001.

Yang, Z. *et al.* (2024) 'Gelatin/sodium alginate-based biodegradable films functionalized by persimmon pectin/ovalbumin-stabilized neem essential oil Pickering emulsion: Application for cherry tomato preservation', *Progress in Organic Coatings*, 192, p. 108448. Available at: https://doi.org/10.1016/j.porgcoat.2024.108448.

Yong, Y.Y. *et al.* (2022) 'Alginate and Aloe vera gel-based *edible coating* for the storage stability enhancement of fresh-cut MD2 pineapple', *Food Research*, 6(5), pp. 380–389. Available at: https://doi.org/10.26656/fr.2017.6(5).628.

Yousuf, B., Qadri, O.S. and Srivastava, A.K. (2018) 'Recent developments in shelf-life extension of fresh-cut fruits and vegetables by application of different *edible coating*s: A review', *LWT*, 89, pp. 198–209. Available at: https://doi.org/10.1016/j.lwt.2017.10.051.

Yousuf, B. and Srivastava, A.K. (2019) 'Impact of honey treatments and soy protein isolate-based coating on fresh-cut pineapple during storage at 4 °C', *Food Packaging and Shelf Life*, 21, p. 100361. Available at: https://doi.org/10.1016/j.fpsl.2019.100361.

Yun, J. *et al.* (2015) 'Natural surface coating to inactivate Salmonella enterica serovar Typhimurium and maintain quality of cherry tomatoes', *International Journal of Food Microbiology*, 193, pp. 59–67. Available at: https://doi.org/10.1016/j.ijfoodmicro.2014.10.013.

Zdrojewicz, Z. *et al.* (2018) 'Health-promoting properties of pineapple', *Pediatria i Medycyna Rodzinna*, 14(2), pp. 133–142. Available at: https://doi.org/10.15557/PiMR.2018.0013.

UNIVERSITAS
GADJAH MADA
**Pengaruh Edible Coating Berbasis Gelatin-Sodium Alginat Dengan Penambahan Ekstrak Cengkeh Terhadap
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**Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/**

Zeni, J. *et al.* (2011) 'Screening of Pectinase-Producing Microorganisms with Polygalacturonase Activity', *Applied Biochemistry and Biotechnology*, 163(3), pp. 383–392. Available at: https://doi.org/10.1007/s12010-010-9046-5.

Zhu, L. *et al.* (2022) 'Eugenol treatment delays the flesh browning of fresh-cut water chestnut (Eleocharis tuberosa) through regulating the metabolisms of phenolics and reactive oxygen species', *Food Chemistry: X*, 14, p. 100307. Available at: https://doi.org/10.1016/j.fochx.2022.100307.