UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abdolrahimi, M., M. Seifi, dan M. H. Ramezanzadeh. 2018. Study the effect of acetic acid on structural, optical and mechanical properties of PVA/chitosan/MWCNT films. Chinese Journal of Physics. Vol. 56 No. 1: 221-230.

Amanda, H., A. Baehaki, dan S. D. Lestari. 2017. Karakteristik edible film gelatin-kitosan dengan tambahan ekstrak genjer (Limnocharis flava) dan aplikasi pada pempek. Jurnal FishtecH.

Amaral, P. J., G. Gebremariam, F. Drudi, A. C. De Aguiar Saldanha Pinheiro, S. Romani, P. Rocculi, dan M. Dalla Rosa. 2022. Rheological and viscoelastic properties of chitosan solutions prepared with different chitosan or acetic acid concentrations. Foods. Vol. 11 No. 17: 2692.

Amelia, A., K. Kusumiyati, dan F. Farida. 2023. Analisis kadar air, susut bobot, dan warna (L, a, dan b) pada paprika hijau (Capsicum annuum var. grossum) dengan jenis edible coating berbeda. Paspalum: Jurnal Ilmiah Pertanian. Vol. 11 No. 2: 294-301.

Andri, D. F. F. 2023. Karakteristik fisik hidrogel perekat jaringan berbasis kitosan-gelatin yang dinetralisasi dengan molaritas sodium hidroksida berbeda. Disertasi. Universitas Gadjah Mada.

Anggraini, L., D. F. Rosida, dan L. A. Wicaksono. 2022. Kemampuan laju transmisi uap dan biodegradasi edible straw dari pati umbi (ganyong, garut, kimpul) dan gelatin ikan. Journal of Tropical Agricultural Engineering and Biosystems-Jurnal Keteknikan Pertanian Tropis dan Biosistem. Vol. 10 No. 3: 226-235.

Antoniou, J., F. Liu, H. Majeed, dan F. Zhong. 2015. Characterization of tara gum edible films incorporated with bulk chitosan and chitosan nanoparticles: A comparative study. Food Hydrocolloids. Vol. 44: 309-319.

Apsya, S. P., Arinana, dan K. Yuniarti. 2025. Effect of drying methods on behaviour and quality of Tamiang bamboo (Schizostachyum blumei) for drinking straw application. International Journal of Design & Nature and Ecodynamics. Vol. 20 No. 5: 1059-1068.

Aranaz, I., A. R. Alcántara, M. C. Civera, C. Arias, B. Elorza, A. Heras Caballero, dan N. Acosta. 2021. Chitosan: An overview of its properties and applications. Polymers. Vol. 13 No. 19: 3256.

Arizal, V. P., Y. Darni, L. Lismeri, H. Utami, dan E. Azwar. 2017. Aplikasi rumput laut Eucheuma cottonii pada sintesis bioplastik berbasis sorgum dengan plasticizer gliserol. 32-39.

Awadhiya, A., D. Kumar, dan V. Verma. 2016. Crosslinking of agarose bioplastic using citric acid. Carbohydrate Polymers. Vol. 151: 60-67.

UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

A'yun, S. N., J. Triastuti, dan E. Saputra. 2021. Edible straw formulation from caragenant and gelatin as a solution in reducing plastic waste. IOP Conference Series: Earth and Environmental Science. Vol. 718 No. 1: 012007.

Ballesteros-Martinez, L., C. Pérez-Cervera, dan R. Andrade-Pizarro. 2020. Effect of glycerol and sorbitol concentrations on mechanical, optical, and barrier properties of sweet potato starch film. NFS Journal. Vol. 20: 1-9.

Bharti, B. M., T. Bhuvana, dan C. Chandraprakash. 2023. Burst and physicochemical characteristics of glycerol-added chitosan films for food packaging. ACS Food Science & Technology. Vol. 3 No. 4: 772-780.

Bhuvaneshwari, S., D. Sruthi, V. Sivasubramanian, N. Kalyani, dan J. Sugunabai. 2011. Development and characterization of chitosan film. International Journal of Engineering Research and Applications. Vol. 1 No. 2: 292-299.

Bilo, F., S. Pandini, L. Sartore, L. E. Depero, G. Gargiulo, A. Bonassi, S. Federici, dan E. Bontempi. 2018. A sustainable bioplastic obtained from *rice straw*. Journal of Cleaner Production. Vol. 200: 357-368.

Boakes, R. A., dan H. Hemberger. 2012. Odour-modulation of taste ratings by chefs. Food Quality and Preference. Vol. 25 No. 2: 81-86.

Cano, A., A. Jiménez, M. Cháfer, C. González, dan A. Chiralt. 2014. Effect of amylose:amylopectin ratio and rice bran addition on starch films properties. Carbohydrate Polymers. Vol. 111: 543-555.

Chang, W., F. Liu, H. R. Sharif, Z. Huang, H. D. Goff, dan F. Zhong. 2019. Preparation of chitosan films by neutralization for improving their preservation effects on chilled meat. Food Hydrocolloids. Vol. 90: 50-61.

Chen, H., J. Wang, Y. Cheng, C. Wang, H. Liu, H. Bian, Y. Pan, J. Sun, dan W. Han. 2019. Application of protein-based films and coatings for food packaging: A review. Polymers. Vol. 11 No. 12: 2039.

Chen, M., T. Runge, L. Wang, R. Li, J. Feng, X.-L. Shu, dan Q.-S. Shi. 2018. Hydrogen bonding impact on chitosan plasticization. Carbohydrate Polymers. Vol. 200: 115-121.

Chen, Y., L. Liu, L. Cai, G. Mu, T. Ju, dan M. Wei. 2024. High-performance wet adhesion of wood with chitosan. ACS Sustainable Chemistry & Engineering. Vol. 12 No. 12: 4946-4956.

Cheng, Y., W. Wang, H. Hou, dan B. Cui. 2024. A highly hydrophobic sustainable starch/gelatin-beeswax biodegradable film: Easy to industrial scale-up, recyclable, and suitable for multiple packaging application scenarios. ACS Sustainable Chemistry & Engineering. Vol. 12 No. 19: 7351-7362.

Chicea, D., dan Nicolae-Maranciuc, A. 2024. A review of chitosan-based materials for biomedical, food, and water treatment applications. *Materials, 17*(23), 5770.

UNIVERSITAS
GADJAH MADA
**Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw
Kitosan-Gelatin**
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Choi, I., B. Y. Lee, S. Kim, S. Imm, Y. Chang, dan J. Han. 2023. Comparison of chitosan and gelatin-based films and application to antimicrobial coatings enriched with grapefruit seed extract for cherry tomato preservation. Food Science and Biotechnology. Vol. 32 No. 8: 1067-1077.

Clark, H. M., C. C. Anderson, dan F. Hietpas. 2014. Volumes of discrete sips from straws of varying internal diameters. American Journal of Speech-Language Pathology. Vol. 23 No. 1: 84-89.

Darni, Y., H. Lestari, L. Lismeri, H. Utami, dan E. Azwar. 2018. Aplikasi mikrofibril selulosa dari batang sorgum sebagai bahan pengisi pada sintesis film bioplastik. Jurnal Rekayasa Kimia & Lingkungan. Vol. 13 No. 1: 15-23.

Dewi, A. P. 2025. Karakteristik fisik bioplastik kitosan dengan penambahan gelatin ikan. Disertasi. Universitas Gadjah Mada.

Dias, A. B., C. M. O. Müller, F. D. S. Larotonda, dan J. B. Laurindo. 2010. Biodegradable films based on rice starch and rice flour. Journal of Cereal Science. Vol. 51 No. 2: 213-219.

Divers Clean Action. 2018. Dalam satu hari, ada 93 juta sampah sedotan plastik di Indonesia. https://www.merdeka.com/. Diakses 26 Agustus 2025.

Djekic, I., T. Petrovic, N. Smigic, B. Udovicki, dan N. Tomic. 2024. Confronting various quality perspectives of paper straws—Case study with Generation Z. Applied Sciences. Vol. 14 No. 23: 11189.

Dong, T., W. Chen, C. Cai, F. Bai, Z. Zhou, J. Wang, dan X. Li. 2023. Water-stable, strong, biodegradable lignocellulose straws replacement for plastic straws. Chemical Engineering Journal. Vol. 451: 138970.

Drake, M. A., M. E. Watson, dan Y. Liu. 2023. Sensory analysis and consumer preference: Best practices. Annual Review of Food Science and Technology. Vol. 14: 427-448.

Fan, W., Zhao, J., Zong, H., & Li, Q. 2022. Effect of chitosan concentration on physicochemical properties of starch-based biodegradable drinking straws by extrusion. Green Materials. Vol. 11 No. 2.

Farikha, I. N., C. Anam, dan E. Widowati. 2013. Pengaruh jenis dan konsentrasi bahan penstabil alami terhadap karakteristik fisikokimia sari buah naga merah (Hylocereus polyrhizus) selama penyimpanan. Jurnal Teknosains Pangan. Vol. 2 No. 1: 30-38.

Fatnasari, A., K. A. Nocianitri, dan I. P. Suparthana. 2018. Pengaruh konsentrasi gliserol terhadap karakteristik edible film pati ubi jalar (Ipomoea batatas L.). Scientific Journal of Food Technology. Vol. 5 No. 1: 27-35.

UNIVERSITAS
GADJAH MADA
**Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw
Kitosan-Gelatin**
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Fitriyah, D., M. Ubaidillah, dan F. Oktaviani. 2020. Analisis kandungan gizi beras dari beberapa galur padi transgenik Pac Nagdong/Ir36. ARTERI: Jurnal Ilmu Kesehatan. Vol. 1 No. 2: 154-160.

Gao, A. L., dan Y. Wan. 2022. Life cycle assessment of environmental impact of disposable drinking straws: A trade-off analysis with marine litter in the United States. Science of The Total Environment. Vol. 817: 153016.

Ghazali, J. N., A. W. Royals, H. Jameel, R. A. Venditti, dan L. Pal. 2019. Evaluation of paper straws versus plastic straws: Development of a methodology for testing and understanding challenges for paper straws. BioResources. Vol. 14 No. 4: 8345-8363.

Gutierrez, J. N., A. W. Royals, H. Jameel, R. A. Venditti, dan L. Pal. 2019. Evaluation of paper straws versus plastic straws: Development of a methodology for testing and understanding challenges for paper straws. BioResources. Vol. 14 No. 4: 8345-8363.

Gómez-Guillén, F. Fernández-Martín, dan P. Montero. 2011. Effects of gelatin origin, bovine-hide and tuna-skin, on the properties of compound gelatin–chitosan films. Food Hydrocolloids. Vol. 25 No. 6: 1461-1469.

Harrazi, N., H. N. Özbek, D. K. Yanık, I. Zaghbib, dkk. 2024. Development and characterization of gelatin-based biodegradable films incorporated with pistachio shell hemicellulose. Journal of Food Science and Technology. Vol. 61: 1919-1929.

Hassan, F., B. Mu, dan Y. Yang. 2024. Natural polysaccharides and proteins-based films for potential food packaging and mulch applications: A review. International Journal of Biological Macromolecules. Vol. 261: 129628.

He, X., J. Shen, M. Ma, Z. Zhang, M. Li, X. Liu, dan Q. Sun. 2025. Insights into the preparation of starch-based straws: Starch sources and application assessments. International Journal of Biological Macromolecules. 145034.

Hermanto, S., M. R. Hudzaifah, dan A. Muawanah. 2014. Karakteristik fisikokimia gelatin kulit ikan sapu-sapu (Hyposarcus pardalis) hasil ekstraksi asam. Jurnal Kimia Valensi. Vol. 4 No. 2: 109-120.

Hidayat, J. P., H. A. Romadhona., N. M. Sholihah., dan S, Munfarida. 2023. Karakteristik edible coating gel Aloe vera dengan fortifikasi bawang putih sebagai antimikroba. Agrointek: Jurnal Teknologi Industri Pertanian, 17(3); 493-501.

Huang, Y. L., dan D. M. Wang. 2023. Characterization of composite film of gelatin and squid pen chitosan obtained by high hydrostatic pressure. Polymers. Vol. 15 No. 7: 1608.

Hwang, H. J.. H. Kim, S.-A. Park, M. Lee, M. Jang, S. B. Park, S. Y., Kim, H. Jeon, J. M. Koo, J. Park, dan D. X. Oh. 2016. Biodegradable, water-resistant, anti-fizzing,

UNIVERSITAS
GADJAH MADA
**Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw
Kitosan-Gelatin**
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

polyester nanocellulose composite paper straws. Advanced Science. Vol. 10 No. 1: 2205554.

Imanuella, N. 2025. Pengaruh konsentrasi kitosan-karagenan terhadap sifat fisik *biodegradable straw*. Skripsi. Universitas Gadjah Mada.

Jia, Y., Y.-I. Hsu, dan H. Uyama. 2023. A starch-based, crosslinked blend film with seawater-specific dissolution characteristics. Carbohydrate Polymers. Vol. 299: 120181.

Kahar, A., M. Busyairi, E. Siswoyo, A. Wijaya, dan D. Nurcahya. 2022. Pemanfaatan limbah rajungan (Portunus pelagicus) untuk memproduksi pupuk organik cair kitosan sebagai growth promotor. Jurnal Sains & Teknologi Lingkungan. Vol. 14 No. 2: 122-135.

Karakoyun, O., dan S. O. Keskin. 2023. Effects of gelatin concentration and co-plasticizer type on physical, mechanical and microstructural properties of corn starch-gelatin composite edible films. The Annals of the University Dunarea de Jos of Galati. Fascicle VI - Food Technology. Vol. 47 No. 1: 140-153.

Karim, A. A., dan R. Bhat. 2008. Fish gelatin: Properties, challenges, and prospects as an alternative to mammalian gelatins. Food Hydrocolloids. Vol. 23: 563-576; 656.

Krishna, M., C. I. Nindo, dan S. C. Min. 2012. Development of fish gelatin edible films using extrusion and compression molding. Journal of Food Engineering. Vol. 108 No. 2: 337-344.

Kusumawati, D. H., dan D. R. P. Widya. 2013. Karakteristik fisik dan kimia edible film pati jagung yang diinkorporasi dengan perasan temu hitam. Jurnal Pangan dan Agroindustri. Vol. 1 No. 1: 90-100.

Kwak, H., H. Kim, S.-A. Park, M. Lee, M. Jang, S. B. Park, S. Y. Hwang, H. J. Kim, H. Jeon, J. M. Koo, J. Park, dan D. X. Oh. 2023. Biodegradable, water-resistant, anti-fizzing, polyester nanocellulose composite paper straws. Advanced Science. Vol. 10 No. 1: 2205554.

Laaraibi, A., F. Moughaoui, F. Damiri, A. Ouakit, I. Charhouf, S. Hamdouch, dan M. Berrada. 2018. Chitosan-clay based (CS-NaBNT) biodegradable nanocomposite films for potential utility in food and environment. Chitin-Chitosan-Myriad Functionalities in Science and Technology.

Lestari, I., D. F. Rosida, L. A. Wicaksono, V. J. Timur, dan P. N. V. J. Timur. 2018. Kajian kualitas fisik edible straw dari pati ubi jalar kuning (Ipomoea batatas L.). Jurnal Pangan dan Agroindustri. Vol. 11 No. 2: 53-60.

Leuenberger, B. H. 1991. Investigation of viscosity and gelation properties of different mammalian and fish gelatins. Food Hydrocolloids. Vol. 5 No. 4: 353-361.

UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Liang, J., dan R. D. Ludescher. 2015. Effects of glycerol on the molecular mobility and hydrogen bond network in starch matrix. Carbohydrate Polymers. Vol. 115: 401-407.

Liang, Y., J. He, M. Zhuang, F. Chen, K. Yang, dan J. Ma. 2023. Bio-based alternatives to plastic drinking straws: Are they more environmentally benign and consumer preferred? Carbon Research. Vol. 2: 28.

Lin, J., D. Pan, Y. Sun, C. Ou, Y. Wang, dan J. Cao. 2019. The modification of gelatin films: Based on various cross-linking mechanisms of glutaraldehyde at acidic and alkaline conditions. Food Science & Nutrition. Vol. 7 No. 12: 4140-4146.

Liu, Y., N. Li, X. Zhang, T. Wei, M. Ma, Q. Sun, dan F. Xie. 2024. Eco-friendly drinking straws: Navigating challenges and innovations. Trends in Food Science & Technology. 104511.

Liu, Y., T. Wei, W. Xie, Y. Yuan, Y. Wang, Y. Qin, M. Ma, Q. Sun, M. Li, dan F. Xie. 2023. Preparation of green and degradable seaweed-based straws by directional diffusion assembly as a plastic substitute. ACS Sustainable Chemistry & Engineering. Vol. 11 No. 45: 16310-16321.

Lu, S., X. Song, D. Cao, Y. Chen, dan K. Yao. 2004. Preparation of water-soluble chitosan. Journal of Applied Polymer Science. Vol. 91 No. 6: 3497-3503.

Ly, T. B., G. T. C. Tran, H. C. Nguyen, dan P. K. Le. 2024. Fabrication and characterization of chitosan-gelatin composite film. Journal of Science & Technology, Dong Nai University of Technology. Special Issue 2024: 89-98.

Ma, C., H. Tao, C. Tan, S. Gao, Z. Wu, L. Guo, B. Cui, F. Yuan, F. Zou, P. Liu, dan L. Lu. 2023. Effects of polyols with different hydroxyl numbers on the structure and properties of starch straws. Carbohydrate Polymers. Vol. 321: 121297.

Macías-Naranjo, M., M. Sánchez-Domínguez, J. F. Rubio-Valle, C. A. Rodríguez, J. E. Martín-Alfonso, E. García-López, dan E. Vazquez-Lepe. 2024. A study of PLA thin film on SS 316L coronary stents using a dip coating technique. Polymers. Vol. 16 No. 2: 284.

Mali, S., M. V. E. Grossmann, M. A. García, M. N. Martino, dan N. E. Zaritzky. 2005. Mechanical and thermal properties of yam starch films. Food Hydrocolloids. Vol. 19 No. 1: 157-164.

Mao, J., S. Kondu, H.-F. Ji, dan M. J. McShane. 2006. Study of the near-neutral pH-sensitivity of chitosan/gelatin hydrogels by turbidimetry and microcantilever deflection. Biotechnology and Bioengineering. Vol. 95 No. 3: 333-341.

Maulana, M. 2026. Pengaruh konsentrasi kitosan-gelatin-gliserol terhadap sifat fisik *biodegradable straw*. Skripsi. Universitas Gadjah Mada.

UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Melro, E., F. E. Antunes, G. J. da Silva, I. Cruz, P. E. Ramos, F. Carvalho, dan L. Alves. 2021. Chitosan films in food applications: Tuning film properties by changing acidic dissolution conditions. Polymers. Vol. 13 No. 1.

Mottalib, M. A., Islam, M. H., Dhar, M. C., Akhtar, K., & Goni, M. A. (2024). Preparation and characterization of new biodegradable packaging materials based on gelatin extracted from *Tenualosa ilisha* fish scales with cellulose nanocrystals. *ACS Omega, 9*(52), 51175–51190.

Mustaqim, 2025. Pemanfaatan selulosa dari kulit singkong sebagai bahan dasar pembuatan sedotan ramah lingkungan. Jurnal Kimia. Vol. 19 No. 1: 27-41.

Nairfana, I., dan M. Ramdhani. 2021. Karakteristik fisik edible film pati jagung (Zea mays L.) termodifikasi kitosan dan gliserol. Jurnal Sains Teknologi & Lingkungan. Vol. 7 No. 1: 91-102.

Nasution, Z., H. Agusnar, Z. Alfian, dan B. Wirjosentono. 2013. Pengaruh viskositas kitosan dari berbagai berat molekul terhadap pembuatan kitosan nanopartikel menggunakan ultrasonic bath. Jurnal Teknologi Kimia Unimal. Vol. 2 No. 2: 68-79.

Ndruru, Y., A. Rukmini, dan D. T. Laswati. 2025. Pengaruh konsentrasi gliserol terhadap karakteristik fisik dan kimia edible film dari pati ubi jalar ungu (Ipomoea batatas L. Poir). AGROTECH: Jurnal Ilmiah Teknologi Pertanian. Vol. 7 No. 2: 23-32.

Ningsih, S. H. 2015. Pengaruh plasticizer gliserol terhadap karakteristik edible film campuran whey dan agar. Disertasi, Universitas Hasanuddin.

Nugrahanto, A. D., A. Kurniawati, dan Y. Erwanto. 2021. Karakteristik fisis bioplastik yang dibuat dari kombinasi pati tapioka dan kasein susu apkir. Majalah Kulit, Karet, dan Plastik. Vol. 37 No. 2: 103-114.

Nurfitasari, 2018. Pengaruh penambahan kitosan dan gelatin terhadap kualitas biodegradable foam berbahan baku pati biji nangka (Artocarpus heterophyllus). Repository UIN Alauddin Makassar.

Nurwati, N., dan M. Hasdar. 2021. Sifat organoleptik kue brownies dengan penambahan rumput laut (Eucheuma cottonii). Journal of Food Technology and Agroindustry. Vol. 3 No. 2: 69-75.

Patil, T. D., dan K. K. Gaikwad. 2026. Mechanistic and structural engineering of millet-based edible straws via green crosslinking and hydrocolloid integration: pH- and temperature-dependent functional performance. Journal of Food Engineering. Vol. 384: 113194.

Petaloti, A.-I., dan D. S. Achilias. 2025. Hybrid biocomposites based on chitosan/gelatin with coffee silverskin extracts as promising biomaterials for advanced applications. Polymers. Vol. 17 No. 23: 3194.

Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw
Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Putri, A. K., H. P. Widayat, M. I. Sulaiman, E. M. Yusup, dan E. Indarti. 2025. Production of edible straw based on banana flour and breadfruit flour binding with tapioca starch. IOP Conference Series: Earth and Environmental Science. Vol. 1476 No. 1: 012055.

Qiao, C., X. Ma, X. Wang, dan L. Liu. 2021. Structure and properties of chitosan films: Effect of the type of solvent acid. LWT. Vol. 135: 109984.

Qiao, C., X. Ma, J. Zhang, dan J. Yao. 2017. Molecular interactions in gelatin/chitosan composite films. Food Chemistry. Vol. 235: 45-50.

Qin, L., Z. Liu, T. Liu, S. Liu, J. Zhang, J. Wu, dan X. Liang. 2022. A bioinspired, strong, all-natural, superhydrophobic cellulose-based straw. International Journal of Biological Macromolecules. Vol. 220: 910-919.

Qin, Y., Y. Wang, Z. Tang, K. Chen, Z. Wang, G. Cheng, H. Chi, dan T. Soteyome. 2024. A pH-sensitive film based on chitosan/gelatin and anthocyanin from Zingiber striolatum Diels for monitoring fish freshness. Food Chemistry: X. Vol. 23: 101639.

Rai, R., R. Ranjan, C. Kant, dan P. Dhar. 2023. Biodegradable, eco-friendly, and hydrophobic drinking straws based on delignified phosphorylated bamboo-gelatin composites. Chemical Engineering Journal. Vol. 471: 144047.

Ramadhan, W., J. Santoso, Uju, R. G. L. Dewangga, M. Natanael, M. A. Luthfiansyah, A. Y. Rachmawati, dan Z. A. Santosa. 2025. Investigation of polymer blend formulation and homogenization dynamics in the development of biodegradable, hydrophobic, and heat-resistant seaweed-based bioplastic straws. Sustainable Food Technology. Vol. 3: 2282-2296.

Riani, N. I., A. Lostari, dan M. A. Wahyudi. 2023. The effect of pipe diameter and valve opening variations on Osborne Reynolds apparatus test. R.E.M. (Rekayasa Energi Manufaktur).

Riski dan Harmani. 2016. Adsorpsi ion logam nikel (II) oleh kitosan termodifikasi tripolifosfat. Jurnal Kimia Sains dan Aplikasi. Vol. 19 No. 1: 21-26.

Rohim, M., L. Destiarti, dan T. A. Zaharah. 2015. Uji organoleptis produk tahu tersalut kitosan (tahu-edible coating kitosan). Jurnal Kimia Khatulistiwa. Vol. 4 No. 3.

Roy, P., A. K. Mohanty, dan M. Misra. 2021. Evolution of drinking straws and their environmental, economic and societal implications. Journal of Cleaner Production. Vol. 316: 128234.

Said, N. S., dan N. M. Sarbon. 2022. Physical and mechanical characteristics of gelatin-based films as a potential food packaging material: A review. Membranes. Vol. 12 No. 5: 442.

Sangsuwan, J., N. Rattanapanone, dan I. Pongsirikul. 2015. Development of active chitosan films incorporating potassium sorbate or vanillin to extend the shelf life

UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

of butter cake. International Journal of Food Science & Technology. Vol. 50 No. 2: 323-330.

Sari, A. R., Y. Martono, dan F. S. Rondonuwu. 2020. Identifikasi kualitas beras putih (Oryza sativa L.) berdasarkan kandungan amilosa dan amilopektin di pasar tradisional dan "selepan" Kota Salatiga. Titian Ilmu: Jurnal Ilmiah Multi Sciences. Vol. 12 No. 1: 24-30.

Sari, S. M., T. Anggraini, dan F. Azima. 2026. Properties of bioplastic straws made from arrowroot starch with chitosan additions. Jurnal Ilmu Pertanian Indonesia. Vol. 31 No. 2: 319-325.

Schrieber, R., dan H. Gareis. 2007. Gelatine handbook: Theory and industrial practice. Wiley-VCH.

Septiani, I. N., B. Basito, dan E. Widowati. 2013. Pengaruh konsentrasi agar-agar dan karagenan terhadap karakteristik fisik, kimia, dan sensori selai lembaran jambu biji merah (Psidium guajava L.). Jurnal Teknologi Hasil Pertanian. Vol. 6 No. 1.

Setyaningsih, D., A. Apriyantono, dan M. P. Sari. 2010. Analisis sensori untuk industri pangan dan agro. IPB Press.

Shah, S. S., F. Niaz, M. A. Ehsan, H. T. Das, M. Younas, A. S. Khan, H. U. Rahman, S. M. A. Nayem, M. Oyama, dan M. A. Aziz. 2024. Advanced strategies in electrode engineering and nanomaterial modifications for supercapacitor performance enhancement: A comprehensive review. Journal of Energy Storage. Vol. 79: 110152.

Shi, Y., D. Pu, X. Zhou, dan Y. Zhang. 2022. Recent progress in the study of taste characteristics and the nutrition and health properties of organic acids in foods. Foods. Vol. 11 No. 21: 3408.

Silva, L. R. da, J. I. Velasco, dan F. M. Fakhouri. 2022. Bioactive films based on starch from white, red, and black rice to food application. Polymers. Vol. 14 No. 4: 835.

Simon, A., C. D. Nugraeni, R. T. Cahyani, H. B. N. Sajidah, D. P. Dewi, dan G. Salim. 2025. Pembuatan dan karakterisasi edible film dari semi-refined carrageenan Kappaphycus alvarezii dengan asam malat sebagai plasticizer. Jurnal Inovasi Teknik Kimia. Vol. 10 No. 2: 94-99.

Singh, V., dan K. Kumari. 2013. Rheological behaviour of chitosan-starch solution. Asian Journal of Chemistry. Vol. 25 No. 17: 9817-9821.

Song, J., B. Winkeljann, dan O. Lieleg. 2020. Biopolymer-based coatings: Promising strategies to improve the biocompatibility and functionality of materials used in biomedical engineering. Advanced Materials Interfaces. Vol. 7 No. 17: 2000850.

Sulaeman, dkk. 2024. Characterization of eco-friendly straw based on chitosan from pupae exuviae of black soldier fly (Hermetia illucens). AgriHealth. Vol. 5 No. 2: 92-100.

UNIVERSITAS
GADJAH MADA
Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Susilowati, E., dan A. E. Lestari. 2019. Pembuatan dan karakterisasi edible film kitosan pati biji alpukat (KIT-PBA). JKPK (Jurnal Kimia dan Pendidikan Kimia). Vol. 4 No. 3: 197-204.

Sutanti, S., dan C. K. Dewi. 2018. Karakterisasi bioplastik berbahan kolang-kaling dengan monogliserida dari minyak kelapa. Jurnal Inovasi Teknik Kimia. Vol. 3 No. 2: 48-53.

Sutharsan, J., C. A. Boyer, dan J. Zhao. 2023. Effect of molecular weight and drying temperature on the physicochemical properties of chitosan edible film. JSFA Reports. Vol. 3 No. 8: 387-396.

Takara, E. A., J. Marchese, dan N. A. Ochoa. 2015. NaOH treatment of chitosan films: Impact on macromolecular structure and film properties. Carbohydrate Polymers. Vol. 132: 25-30.

Tamiogy, W. R., A. Kardisa, H. Hisbullah, dan S. Aprilia. 2019. Pemanfaatan selulosa dari limbah kulit buah pinang sebagai bahan baku pembuatan bioplastik. Jurnal Rekayasa Kimia & Lingkungan. Vol. 14 No. 1: 63-71.

Tarique, J., S. M. Sapuan, dan A. Khalina. 2021. Effect of glycerol plasticizer loading on the physical, mechanical, thermal, and barrier properties of arrowroot (Maranta arundinacea) starch biopolymers. Scientific Reports. Vol. 11: 13900.

Tazwir, T., D. L. Ayudiarti, dan R. Peranginangin. 2007. Optimasi pembuatan gelatin dari tulang ikan kaci-kaci (Plectorhynchus chaetodonoides Lac.) menggunakan berbagai konsentrasi asam dan waktu ekstraksi. Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan. Vol. 2 No. 1: 35-43.

Tester, R. F., dan W. R. Morrison. 1990. *Swelling* and gelatinization of cereal starches. I. Effects of amylopectin, amylose, and lipids. Cereal Chemistry. Vol. 67 No. 6: 551-557.

Torres, C., O. Valerio, R. T. Mendonça, dan M. Pereira. 2024. Influence of chitosan protonation degree in nanofibrillated cellulose/chitosan composite films and their morphological, mechanical, and surface properties. International Journal of Biological Macromolecules. Vol. 267 No. Part 1: 131587.

Varela, A. I., M. Aymerich, D. Nieto García, Y. Castro Martín, P. A. A. de Beule, E. Álvarez, C. Bao-Varela, dan M. T. Flores-Arias. 2017. Sol-gel glass coating synthesis for different applications: Active gradient-index materials, microlens arrays and biocompatible channels. Dalam Recent applications in sol-gel synthesis. 231-252. IntechOpen.

Voron'ko, N. G., S. R. Derkach, Y. A. Kuchina, dan N. I. Sokolan. 2016. The chitosan-gelatin (bio)polyelectrolyte complexes formation in an acidic medium. Carbohydrate Polymers. Vol. 138: 265-272.

Wardojo, W. W., R. Nadilah, S. M. Rasya, P. A. Whakhid, D. A. B. Nabhan, G. N. Maharani, dan E. D. Octavi. 2024. Pelatihan pembuatan edible drinking straw

Pengaruh Penurunan Konsentrasi Asam Asetat terhadap Sifat Fisik dan Sensoris Biodegradable Straw
Kitosan-Gelatin
Fata Nurzaman, Dr. Prihati Sih Nugraheni, S.Pi., M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

berbasis tepung beras merah di Kelurahan Gilingan untuk mengurangi penggunaan plastik sekali pakai. Jurnal Pengabdian Masyarakat Inovasi Indonesia. Vol. 2 No. 6: 643-650.

Widiatmono, B. R., A. A. Sulianto, dan C. Debora. 2021. Biodegradabilitas bioplastik berbahan dasar limbah cair tahu dengan penguat kitosan dan plasticizer gliserol. Jurnal Sumberdaya Alam dan Lingkungan. Vol. 8 No. 1: 21-27.

Widodo, L. 2019. Pembuatan edible film dari labu kuning dan kitosan dengan gliserol sebagai plasticizer. Jurnal Teknologi Pangan. Vol. 13 No. 1: 59-65.

Winayu, I. J., N. Ekantari, I. D. Puspita, W. Budhijanto, dan P. S. Nugraheni. 2019. The effect of reduced acetic acid concentration on nano-chitosan formulation as fish preservative. IOP Conference Series: Materials Science and Engineering. Vol. 633 No. 1: 012040. IOP Publishing.

Wu, H., Y. Lei, J. Lu, R. Zhu, D. Xiao, C. Jiao, R. Xia, Z. Zhang, G. Shen, Y. Liu, S. Li, dan M. Li. 2019. Effect of citric acid-induced crosslinking on the structure and properties of potato starch/chitosan composite films. Food Hydrocolloids. Vol. 97: 105208.

Xu, J., K. Liu, W. Chang, B.-S. Chiou, M. Chen, dan F. Liu. 2022. Regulating the physicochemical properties of chitosan films through concentration and neutralization. Foods. Vol. 11 No. 11: 1657.

Yavagal, P. S., P. A. Kulkarni, N. M. Patil, N. S. Salimath, A. Y. Patil, R. S. Savadi, dan B. B. Kotturshettar. 2020. Cleaner production of edible straw as replacement for thermoset plastic. Materials Today: Proceedings. Vol. 32: 492-497.

Yulianto, W. 2025. Sifat mekanik edible film berbasis protein dengan penggunaan konsentrasi plasticizer sorbitol yang berbeda. Lombok Journal of Microbiology, Biotechnology and Conservation. Vol. 1 No. 1: 34-40.

Zhang, J., H. Tao, C. Tan, F. Yuan, L. Guo, B. Cui, Y. Zhu, S. Gao, Z. Wu, F. Zou, P. Liu, dan L. Lu. 2023. Effects of biomass additives on mechanical strength and water resistance of corn starch straws. Industrial Crops and Products. Vol. 205: 117584.

Zhang, Y., Y. Wan, dan W. Liu. 2022. Research state of disposable non-plastic straws. Paper and Biomaterials. Vol. 7 No. 4: 34-43.

Zhang, Z., F. Peng, dan K. G. Kornev. 2022. The thickness and structure of dip-coated polymer films in the liquid and solid states. Micromachines. Vol. 13 No. 7: 982.