DAFTAR PUSTAKA

Abdelmonem, B. H., Kamal, L. T., Elbaz, R. M., Khalifa, M. R., & Abdelnaser, A. (2025). From contamination to detection: The growing threat of heavy metals. *Heliyon*, *11*(1), e41713. https://doi.org/10.1016/j.heliyon.2025.e41713

Abidin, A. Z., Susanto, G., Sastra, N. M. T., & Puspasari, T. (2018). Sintesis dan karakterisasi polimer superabsorban dari akrilamida. *Jurnal Teknik Kimia Indonesia*, *11*(2), 84. https://doi.org/10.5614/jtki.2012.11.2.5

Adlim, M., Zarlaida, F., Rahmayani, R. F. I., & Wardani, R. (2019). Nutrient release properties of a urea–magnesium–natural rubber composite coated with chitosan. *Environmental Technology & Innovation*, *16*, 100442. https://doi.org/10.1016/j.eti.2019.100442

Ai, F., Zhang, Y., Fan, X., Li, Y., Zhang, H., Jiao, Y., Zhang, Q., Yong, C., Zhao, J., Petracchini, F., Paolini, V., & Zhang, Z. (2022). Clean Style Recovery and Utilization of Residual Nutrients in Effluents From Biohydrogen Production: In Situ Immobilization Based on Sodium Alginate. *Frontiers in Bioengineering and Biotechnology*, *10*. https://doi.org/10.3389/fbioe.2022.906968

Al-Amin, K., Kawsar, M., Mamun, M. T. R. B., & Sahadat Hossain, M. (2025). Fourier transform infrared spectroscopic technique for analysis of inorganic materials: a review. *Nanoscale Advances*, 6677–6702. https://doi.org/10.1039/d5na00522a

Anderson, R. J., & Bendell, D. J. Groundwater, P. W. (2004). *Organic Spectroscopic Analysis* (R. J. Anderson, D. J. Bendell, & P. W. Groundwater, Ed.; hlm. 7–23). The Royal Society of Chemistry.

Ansyahri, A. (2021). Pengaruh Pupuk Kascing Dan NPK Mutiara 16:16:16 Terhadap Pertumbuhan Serta Hasil Sawi Pagoda (Brassica narinosa). *Jurnal Artikel Diajukan Sebagai Salah Satu Syarat Untuk Memperoleh Gelar Sarjana Pertanian*, 1–50.

Ariadi Lusiana, R., Widiarti Mariyono, P., Muhtar, H., Edi Cahyaningrum, S., Abdillah Natsir, T., & Efiyanti, L. (2024). Environmentally friendly slow-release urea fertilizer based on modified chitosan membrane. *Environmental Nanotechnology, Monitoring and Management*, *22*(August), 100996. https://doi.org/10.1016/j.enmm.2024.100996

Arif Novan, & Maharani, D. K. (2017). Kajian Daya Serap Air (Swelling) Pupuk Urea Slow Release Fertilizer (Srf) Menggunakan Matriks Kitosan-Zeolit Swelling Studying Of Urea Slow Release Fertilizer (SRF) Using Chitosan-Zeolite Matrix Arif Novan * dan Dina Kartika Maharani Departement of. *UNESA Journal of Chemistry*, *6*(2), 91–93.

Armedi, J., & Angela, R. (2011). *Sintesis Dan Karakterisasi Membran Hibrid PMMA / TEOT : Pengaruh Konsentrasi Polimer*. 1–7.

Bajpai, A. K., Vishwakarma, A., & Bajpai, J. (2019). Synthesis and characterization of amoxicillin loaded poly (vinyl alcohol)-g-poly (acrylamide) (PVA-g-PAM) hydrogels and study of swelling triggered release of antibiotic drug. *Polymer Bulletin*, *76*(7), 3269–3295. https://doi.org/10.1007/s00289-018-2536-2

Bandehali, S., Sanaeepur, H., Ebadi Amooghin, A., Shirazian, S., & Ramakrishna, S. (2021). Biodegradable polymers for membrane separation. *Separation and Purification Technology*, *269*, 118731. https://doi.org/10.1016/j.seppur.2021.118731

Blindheim, F. H., & Ruwoldt, J. (2023). The Effect of Sample Preparation Techniques on Lignin Fourier. *Polymers*, *15*, 2901. https://doi.org/10.3390/polym15132901

Burdet, P., Croxall, S. A., & Midgley, P. A. (2015). Enhanced quantification for 3D SEM–EDS: Using the full set of available X-ray lines. *Ultramicroscopy*, *148*(22), 158–167. https://doi.org/10.1016/j.ultramic.2014.10.010

Cahyaningrum, S. E., Lusiana, R. A., Natsir, T. A., Muhaimin, F. I., Wardana, A. P., Purnamasari, A. P., & Misran, M. Bin. (2024). Synthesis and characterization of chitosan-modified membrane for urea slow-release fertilizers. *Heliyon*, *10*(15), e34981. https://doi.org/10.1016/j.heliyon.2024.e34981

Chen, M., Li, Z., Huang, P., Li, X., Qu, J., Yuan, W., & Zhang, Q. (2018). Mechanochemical transformation of apatite to phosphoric slow-release fertilizer and soluble phosphate. *Process Safety and Environmental Protection*, *114*, 91–96. https://doi.org/10.1016/j.psep.2017.12.008

Chen, Y., Zou, C., Mastalerz, M., Hu, S., Gasaway, C., & Tao, X. (2015). Applications of micro-fourier transform infrared spectroscopy (FTIR) in the geological sciences—A Review. *International Journal of Molecular Sciences*, *16*(12), 30223–30250. https://doi.org/10.3390/ijms161226227

Chiaregato, C. G., França, D., Messa, L. L., dos Santos Pereira, T., & Faez, R. (2022). A review of advances over 20 years on polysaccharide-based polymers applied as enhanced efficiency fertilizers. *Carbohydrate Polymers*, *279*, 119014. https://doi.org/10.1016/J.CARBPOL.2021.119014

Chiaregato, C. G., Souza, C. F., & Faez, R. (2023). In-situ evaluation of chitosan-based materials containing fertilizer by time-domain reflectometry (TDR) technique. *Energy Nexus*, *11*, 100216. https://doi.org/10.1016/j.eti.2021.101417

Dabare, S., Munaweera, I., & Diyabalanage, S. (2026). Sustainable mechanochemical activation of rock phosphate with oxalic acid for high-efficiency phosphorus fertilizers. *RSC Advances*, *16*(16), 14135–14158. https://doi.org/10.1039/d5ra09011c

Djafaripetroudy, S., Fatehi, P., El Idrissi, A., Kang, K., Abidi, N., & McLaren, B. (2025). Advancing agricultural efficiency and sustainability: Bio-inspired superabsorbent hydrogels for slow and controlled release fertilizers. *Science of the Total Environment*, *977*(January), 179366. https://doi.org/10.1016/j.scitotenv.2025.179366

Dunlap, M., & Adaskaveg, J. E. (1997). Introduction to the scanning electron microscope. *Theory, practice, & procedures. Facility for Advance Instrumentation. UC Davis*, *52*.

Eddarai, E. M., El Mouzahim, M., Ragaoui, B., El Addaoui, S., Boussen, R., Warad, I., Bellaouchou, A., & Zarrouk, A. (2023). Chitosan/kaolinite clay biocomposite as a sustainable and environmentally eco-friendly coating material for slow release NPK fertilizers: Effect on soil nutrients and tomato growth. *International Journal of Biological Macromolecules*, *242*, 125019. https://doi.org/10.1016/j.ijbiomac.2023.125019

El Assimi, T., Blažic, R., Vidović, E., Raihane, M., El Meziane, A., Baouab, M. H. V., Khouloud, M., Beniazza, R., Kricheldorf, H., & Lahcini, M. (2021). Polylactide/cellulose acetate biocomposites as potential coating membranes for controlled and slow nutrients release from water-soluble fertilizers. *Progress in Organic Coatings*, *156*, 106255. https://doi.org/10.1016/J.PORGCOAT.2021.106255

Elaf, R., Ben Ali, A., Saad, M., Hussein, I. A., Nimir, H., & Bai, B. (2023). Biodegradable Preformed Particle Gel (PPG) Made of Natural Chitosan Material for Water Shut-Off Application. *Polymers*, *15*(8). https://doi.org/10.3390/polym15081961

Ferreira, S. L. C., Bezerra, M. A., Santos, A. S., dos Santos, W. N. L., Novaes, C. G., de Oliveira, O. M. C., Oliveira, M. L., & Garcia, R. L. (2018). Atomic absorption spectrometry – A multi element technique. *TrAC Trends in Analytical Chemistry*, *100*, 1–6. https://doi.org/10.1016/j.trac.2017.12.012

Fertahi, S., Ilsouk, M., Zeroual, Y., Oukarroum, A., & Barakat, A. (2021). Recent trends in organic coating based on biopolymers and biomass for controlled and slow release fertilizers. *Journal of Controlled Release*, *330*, 341–361. https://doi.org/10.1016/J.JCONREL.2020.12.026

Flórez, M., Guerra-Rodríguez, E., Cazón, P., & Vázquez, M. (2022). Chitosan for food packaging: Recent advances in active and intelligent films. *Food Hydrocolloids*, *124*. https://doi.org/10.1016/j.foodhyd.2021.107328

Gaabour, L. H. (2017). Spectroscopic and thermal analysis of polyacrylamide/chitosan (PAM/CS) blend loaded by gold nanoparticles. *Results in Physics*, *7*, 2153–2158. https://doi.org/10.1016/j.rinp.2017.06.027

Gierszewska, M., & Ostrowska-Czubenko, J. (2016). Chitosan-based membranes with different ionic crosslinking density for pharmaceutical and industrial applications. *Carbohydrate Polymers*, *153*, 501–511. https://doi.org/10.1016/j.carbpol.2016.07.126

Haydar, S., Ghosh, D., & Roy, S. (2024). Plant Nano Biology Slow and controlled release nanofertilizers as an efficient tool for sustainable agriculture : Recent understanding and concerns. *Plant Nano Biology*, *7*(December 2023), 100058. https://doi.org/10.1016/j.plana.2024.100058

Hérnandez Vázquez, C. I., Draczyński, Z., Borkowski, D., & Kaźmierczak, D. (2024). Enhancing Chitosan Fibers: A Dual Approach with Tripolyphosphate and Ursolic Acid. *Polymers*, *16*(4). https://doi.org/10.3390/polym16040461

Hidaka, M., Kojima, M., Sakai, S., & Delattre, C. (2024). Characterization of Chitosan Hydrogels Obtained through Phenol and Tripolyphosphate Anionic Crosslinking. *Polymers*, *16*(9). https://doi.org/10.3390/polym16091274

Hou, X., Lv, S., Chen, Z., & Xiao, F. (2018). Applications of Fourier transform infrared spectroscopy technologies on asphalt materials. *Measurement*, *121*, 304–316. https://doi.org/10.1016/j.measurement.2018.03.001

Idaryani; Wahid, A. (2019). Efektivitas Pupuk Majemuk SRF NPK 20-6-10 Terhadap Pertumbuhan dan Hasil Tanaman Jagung. *Jurnal Agrisistem*, *15*, 50–59.

Ikhsan, T. N., Khabibi, & Retno Ariadi Lusiana. (2024). Sintesis Membran Kitosan Tertaut Silang Tripolifosfat dengan Paduan Polivinil Alkohol untuk Permeasi Kreatinin. *Journal of Environmental Chemistry*, *4*(1).

Islam, M. M., Shahruzzaman, M., Biswas, S., Nurus Sakib, M., & Rashid, T. U. (2020). Chitosan based bioactive materials in tissue engineering applications-A review. *Bioactive Materials*, *5*(1), 164–183. https://doi.org/10.1016/j.bioactmat.2020.01.012

Jumaeri, Sumarni, W., Rahayu, L. W. N., & Rahayu, E. F. (2020). Using of low grade zeolite based fly ash as slow release agent for Zea mays growth Using of low grade zeolite based fly ash as slow release agent for Zea mays growth. *Journal of Physics: Conference Series*. https://doi.org/10.1088/1742-6596/1567/2/022036

Kombongkila, O., Taunaumang, H., & Tumimomor, F. (2024). *Analisis Struktur Film Tipis Disperse Orange-3 Hasil FTIR*. *5*(1), 45–50.

Kusuma, A. T., Effendi, N., Abidin, Z., & Awaliah, S. S. (2019). Analisis kandungan logam berat timbal (Pb) dan raksa (Hg) pada cat rambut yang beredar di Kota Makassar dengan metode Spektrofotometri Serapan Atom (SSA). *Celebes Environmental Science*, *1*(1), 6–12.

Laftah, W. & Hashim, S. (2014). Synthesis, optimization, characterization, and potential agricultural application of polymer hydrogel composites based on cotton microfiber. *Chemical Papers, 68(6), 798-808.*

Lakshani, N., Wijerathne, H. S., Sandaruwan, C., Kottegoda, N., & Karunarathne, V. (2023). Release Kinetic Models and Release Mechanisms of Controlled-Release and Slow-Release Fertilizers. Dalam *ACS Agricultural Science and*

Technology (Vol. 3, Nomor 11, hlm. 939–956). American Chemical Society. https://doi.org/10.1021/acsagscitech.3c00152

Laksono, H., Kurniati, M., Sari, Y. W., & Winarti, C. (2021). The Effect of Variation of Raw Material Ratio on Hydrogel Based on K-Carrageean - Acrylamide as a Carrier of Ammonium Nitrate Fertilizer. *Reaktor*, *21*(3), 103–108. https://doi.org/10.14710/reaktor.21.3.103-108

Lawrencia, D., Wong, S. K., Low, D. Y. S., Goh, B. H., Goh, J. K., Ruktanonchai, U. R., Soottitantawat, A., Lee, L. H., & Tang, S. Y. (2021). Controlled release fertilizers: A review on coating materials and mechanism of release. *Plants*, *10*(2), 1–26. https://doi.org/10.3390/plants10020238

L.C. Passos, M., & M.F.S. Saraiva, M. L. (2019). Detection in UV-visible spectrophotometry: Detectors, detection systems, and detection strategies. *Measurement: Journal of the International Measurement Confederation*, *135*, 896–904. https://doi.org/10.1016/j.measurement.2018.12.045

Lusiana, R. A., Ahmad Suseno, Khabibi, & Cahyaning Gesti Faradina. (2021). Pengaruh Tripolifosfat sebagai Agen Taut Silang pada Membran Kitosan Terhadap Karakter Fisikokimia dan Kemampuan Permeasi. *Greensphere: Journal of Environmental Chemistry*, *1*(1), 19–24.

Lusiana, R. A., Cahyaningrum, S. E., Natsir, T. A., Efiyanti, L., & Muhtar, H. (2025). A slow-release urea prepared via sandwich with degradable chitosan: Formulation and release mechanisms. *Biocatalysis and Agricultural Biotechnology*, *67*(December 2024), 103626. https://doi.org/10.1016/j.bcab.2025.103626

Lyu, Y., Baharum, A., Yu, L. J., Yan, Z., & Badri, K. H. (2025). Development of bio polyurethane coated-urea for controlled release fertilizer. *Arabian Journal of Chemistry*, *18*, 222025. https://doi.org/10.25259/ajc_22_2025

Ma, C., Dou, Y., Li, R., Zhang, L., Zhou, Z., Guo, S., Wang, R., Tao, K., Liu, Y., & Yang, X. (2024a). Carboxymethyl chitosan/polyacrylamide double network hydrogels based on hydrogen bond cross-linking as potential wound dressings for skin repair. *International Journal of Biological Macromolecules*, *280*, 135735. https://doi.org/10.1016/j.ijbiomac.2024.135735

Ma, C., Dou, Y., Li, R., Zhang, L., Zhou, Z., Guo, S., Wang, R., Tao, K., Liu, Y., & Yang, X. (2024b). Carboxymethyl chitosan/polyacrylamide double network hydrogels based on hydrogen bond cross-linking as potential wound dressings for skin repair. *International Journal of Biological Macromolecules*, *280*(P2), 135735. https://doi.org/10.1016/j.ijbiomac.2024.135735

Madni, A., Kousar, R., Naeem, N., & Wahid, F. (2021). Recent advancements in applications of chitosan-based biomaterials for skin tissue engineering. *Journal of Bioresources and Bioproducts*, *6*(1), 11–25. https://doi.org/10.1016/j.jobab.2021.01.002

Mallakpour, S., & Rashidimoghadam, S. (2020). Microscopic characterization techniques for layered double hydroxide polymer nanocomposites. *Layered Double Hydroxide Polymer Nanocomposites*, 157–203. https://doi.org/10.1016/B978-0-08-101903-0.00004-0

Mäntele, W., & Deniz, E. (2017). UV–VIS absorption spectroscopy: Lambert-Beer reloaded. *Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy*, *173*, 965–968. https://doi.org/10.1016/j.saa.2016.09.037

Marliyana D, & Soeryana. (2016). Uji Performa Spektrofotometer Serapan Atom Thermo Ice 3000 Terhadap Logam Pb Menggunakan CRM 500 dan CRM 697 di UPT Laboratorium Terpadu UNS. *Journal of Laboratory Issn*, *4*(2), 4887.

Mendrofa, T. S., Sains, F., & Nias, U. (2025). *Pengaruh pupuk organik dan anorganik terhadap pertumbuhan pada tanaman*. *02*, 122–127.

Mohamed, M. H., & Mohyaldinn, M. E. (2025). Polyacrylamide-Based Solutions: A Comprehensive Review on Nanomaterial Integration, Supramolecular Design, and Sustainable Approaches for Integrated Reservoir Management. *Polymers*, *17*(16), 1–33. https://doi.org/10.3390/polym17162202

Murphy, D. B. ., & Davidson, M. W. . (2013). *Fundamentals of light microscopy and electronic imaging*. Wiley-Blackwell.

Nanda Onky Stefani, & Sari Edi Cahyaningrum. (2025). Using Of Chitosan-Polyvinyl Alcohol (PVA)-Calcium Carbonate As Matrix For Urea Slow-Release Fertilizer (SRF). *Journal of Chemistry Vol. 14, No. 1*, *14*, 1–7.

Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscope of organic material. *Indonesian Journal of Science and Technology*, *4*(1), 97–118. https://doi.org/10.17509/ijost.v4i1.15806

Nasir, M. (2020). *Spektrometri serapan atom*. Syiah Kuala University Press.

National Center for Biotechnology Information. (2026). *Calcium Chloride (Compound Summary)*. PubChem. https://pubchem.ncbi.nlm.nih.gov/compound/Calcium-Chloride

Natsir, T. A., Iknawati, A. M., Wanadri, I. D., Siswanta, D., Lusiana, R. A., & Cahyaningrum, S. E. (2025). Environmentally friendly membrane based on chitosan, citric acid, and calcium for slow-release fertilizer. *Heliyon*, *11*(1), e41378. https://doi.org/10.1016/j.heliyon.2024.e41378

Naz, M. Y., & Sulaiman, S. A. (2016). Slow release coating remedy for nitrogen loss from conventional urea: a review. *Journal of Controlled Release*, *225*, 109–120. https://doi.org/10.1016/J.JCONREL.2016.01.037

Newbury, D. E., & Ritchie, N. W. M. (2014). Performing elemental microanalysis with high accuracy and high precision by scanning electron microscopy/silicon drift detector energy-dispersive X-ray spectrometry (SEM/SDD-EDS).

Journal of Materials Science, *50*(2), 493–518. https://doi.org/10.1007/s10853-014-8685-2

Nguyen, D. M., Do, T. V. V., Grillet, A. C., Ha Thuc, H., & Ha Thuc, C. N. (2016). Biodegradability of polymer film based on low density polyethylene and cassava starch. *International Biodeterioration and Biodegradation*, *115*, 257–265. https://doi.org/10.1016/j.ibiod.2016.09.004

Nurhediana, S. D. (2025). *Teknik Preparasi Membran* (Adelia Savitri, Ed.). Penerbit Thalibul Ilmi Publishing & Education.

Olad, A., Zebhi, H., Salari, D., Mirmohseni, A., & Reyhani Tabar, A. (2018). Slow-release NPK fertilizer encapsulated by carboxymethyl cellulose-based nanocomposite with the function of water retention in soil. *Materials Science and Engineering C*, *90*(July 2017), 333–340. https://doi.org/10.1016/j.msec.2018.04.083

Padinjarathil, H., Mudradi, S., Balasubramanian, R., Drago, C., Dattilo, S., Kothurkar, N. K., & Ramani, P. (2023). Design of an Antibiotic-Releasing Polymer: Physicochemical Characterization and Drug Release Patterns. *Membranes*, *13*(1), 1–18. https://doi.org/10.3390/membranes13010102

Pimsen, R., Porrawatkul, P., Nuengmatcha, P., Ramasoot, S., & Chanthai, S. (2021). Efficiency enhancement of slow release of fertilizer using nanozeolite–chitosan/sago starch-based biopolymer composite. *Journal of Coatings Technology and Research*, *18*(5), 1321–1332. https://doi.org/10.1007/s11998-021-00495-9

Prajapati, D., Pal, A., Dimkpa, C., Harish, Singh, U., Devi, K. A., Choudhary, J. L., & Saharan, V. (2022). Chitosan nanomaterials: A prelim of next-generation fertilizers; existing and future prospects. *Carbohydrate Polymers*, *288*, 119356. https://doi.org/10.1016/j.carbpol.2022.119356

Priya, E., Sarkar, S., & Maji, P. K. (2024a). A review on slow-release fertilizer: Nutrient release mechanism and agricultural sustainability. *Journal of Environmental Chemical Engineering*, *12*(4), 113211. https://doi.org/10.1016/j.jece.2024.113211

Priya, E., Sarkar, S., & Maji, P. K. (2024b). A review on slow-release fertilizer: Nutrient release mechanism and agricultural sustainability. *Journal of Environmental Chemical Engineering*, *12*(4), 113211. https://doi.org/10.1016/j.jece.2024.113211

Qiu, X., & Hu, S. (2013). “Smart” materials based on cellulose: A review of the preparations, properties, and applications. *Materials*, *6*(3), 738–781. https://doi.org/10.3390/ma6030738

Raksun, A., Japa, L., & Mertha, I. G. (2019). Aplikasi Pupuk Organik Dan Npk Untuk Meningkatkan Pertumbuhan Vegetatif Melon (Cucumis melo L.). *Jurnal Biologi Tropis*, *19*(1), 19–24. https://doi.org/10.29303/jbt.v19i1.1003

Ramdani, N., Mariaulfa Mustam, & Hijrah Amaliah Azis. (2023). *BAHAN AJAR KIMIA INSTRUMENTASI*. Omera Pustaka.

Retno Sulistyo Dhamar Lestari, Jayanudin, Dandi Irawanto, Rozak, Reyonaldo, & Langgeng Adi Wardana, F. M. (2020). Starch and polyvinyl alcohol encapsulated biodegradable nanocomposites for environment friendly slow release of urea fertilizer. *Jurnal Integrasi Proses*, *Vol. 9, No*, 27–33. https://doi.org/10.1016/j.ceja.2021.100123

Riseh, R. S., Vazvani, M. G., & Kennedy, J. F. (2023). The application of chitosan as a carrier for fertilizer: A review. *International Journal of Biological Macromolecules*, *252*, 126483. https://doi.org/10.1016/j.ijbiomac.2023.126483

Román-doval, R., Torres-arellanes, S. P., Tenorio-barajas, A. Y., Gómez-sánchez, A., & Valencia-lazcano, A. A. (2023). *Chitosan : Properties and Its Application in Agriculture in Context of Molecular Weight*. 1–26.

S, T. Salim., Tarigan, D. M., & M.R, R. H. (2025). Pengaruh Pemberian Pupuk NPK 15:15:15 Terhadap Pertumbuhan Tanaman Selasih (Ocimum basilicum), Mint (Mentha spp) Dan Sambung Nyawa (Gynura procumbens). *Agrotek: Jurnal Ilmiah Ilmu Pertanian*, *9*(1), 66–81. https://doi.org/10.33096/agrotek.v9i1.713

Saad, E. M., Elshaarawy, R. F., Mahmoud, S. A., & El-Moselhy, K. M. (2021). New Ulva lactuca Algae Based Chitosan Bio-composites for Bioremediation of Cd(II) Ions. *Journal of Bioresources and Bioproducts*, *6*(3), 223–242. https://doi.org/10.1016/j.jobab.2021.04.002

Sacco, P., Seidy Pedroso-Santana, Yogesh Kumar, Nicolas Joly, Patrick Martin, & Patrizia Bocchetta. (2021). Ionotropic Gerlation of Chitosan Flat Structures and Potential Applications. *Molecules*, 28.

Saktiyono. (2004). *IPA BIOLOGI : - Jilid 1* (1 ed.). Esis. https://books.google.co.id/books?id=pFCjM3FTWdgC

Salerno, S., De Santo, M. P., Drioli, E., & De Bartolo, L. (2021). Nano-and micro-porous chitosan membranes for human epidermal stratification and differentiation. *Membranes*, *11*(6), 1–13. https://doi.org/10.3390/membranes11060394

Salimi, M., Channab, B. eddine, El Idrissi, A., Zahouily, M., & Motamedi, E. (2023). A comprehensive review on starch: Structure, modification, and applications in slow/controlled-release fertilizers in agriculture. *Carbohydrate Polymers*, *322*, 121326. https://doi.org/10.1016/j.carbpol.2023.121326

Sanchez-Salvador, J. L., Balea, A., Monte, M. C., Negro, C., & Blanco, A. (2021). Chitosan grafted/cross-linked with biodegradable polymers: A review. *International Journal of Biological Macromolecules*, *178*, 325–343. https://doi.org/10.1016/j.ijbiomac.2021.02.200

Sannino, A., Demitri, C., & Madaghiele, M. (2009). Biodegradable cellulose-based hydrogels: Design and applications. *Materials*, *2*(2), 353–373. https://doi.org/10.3390/ma2020353

Sari, S. A. (2023). *Kimia Instrumentasi* (Eddiyanto, Ed.). UMSU Press.

Savana, R. T., & Maharani, D. K. (2018). *Analisis Komposisi Unsur Pupuk Lepas Lambat Kitosan-Silika- Glutaraldehid Element Composition Analysis Chitosan-Silica-Glutaraldehyde Slow Release Fertilizer*. *7*(1).

Shen, Y., Wang, H., Li, W., Liu, Z., Liu, Y., Wei, H., & Li, J. (2020). Synthesis and characterization of double-network hydrogels based on sodium alginate and halloysite for slow release fertilizers. *International Journal of Biological Macromolecules*, *164*, 557–565. https://doi.org/10.1016/j.ijbiomac.2020.07.154

Skoog, D. A., West, D. M., Holler, F. J., & Crouch, S. R. (2013). *Fundamentals of Analytical Chemistry*. Cengage Learning. https://books.google.co.id/books?id=8bIWAAAAQBAJ

Song, Y., Ma, L., Duan, Q., Xie, H., Dong, X., Zhang, H., & Yu, L. (2024). Development of Slow-Release Fertilizers with Function of Water Retention Using Eco-Friendly Starch Hydrogels. *Molecules*, *29*(20). https://doi.org/10.3390/molecules29204835

Sulistyo, R., Lestari, D., Irawanto, D., Wardana, L. A., Muhammad, F., Kimia, J. T., Teknik, F., Sultan, U., & Tirtayasa, A. (2020). *Jurnal Integrasi Proses Website : http://jurnal.untirta.ac.id/index.php/jip SEBAGAI MATRIK PUPUK UREA 2 Magister Teknik Kimia , Universitas Sultan Ageng Tirtayasa Jl . Raya Jakarta Km 4 Serang-Indoensia 3 PUI-PT Ketahanan Pangan , Universitas Sultan Ageng*. *9*(2), 27–33.

Sultan, M., & Taha, G. (2024). Sustained-release nitrogen fertilizer delivery systems based on carboxymethyl cellulose-grafted polyacrylamide: Swelling and release kinetics. *International Journal of Biological Macromolecules*, *266*(P2), 131184. https://doi.org/10.1016/j.ijbiomac.2024.131184

Tanan, W., Panichpakdee, J., Suwanakood, P., & Saengsuwan, S. (2021). Biodegradable hydrogels of cassava starch-g-polyacrylic acid/natural rubber/polyvinyl alcohol as environmentally friendly and highly efficient coating material for slow-release urea fertilizers. *Journal of Industrial and Engineering Chemistry*, *101*, 237–252. https://doi.org/10.1016/j.jiec.2021.06.008

Tissue, B. M. (2012). Infrared Spectroscopy. Dalam *Characterization of Materials*. John Wiley & Sons, Inc. https://doi.org/10.1002/0471266965.com059.pub2

Vajová, I., Vizárová, K., Tiňo, R., Králik, M., Nosko, M., Múčka, P., Rudinská, D., & Katuščák, S. (2025). Choosing between energy-dispersive or wavelength-dispersive SEM spectroscopy methods for elemental distribution in deacidified paper. *Cellulose*, *32*(16), 9231–9243. https://doi.org/10.1007/s10570-025-06771-w

Vo, P. T., Nguyen, H. T., Trinh, H. T., Nguyen, V. M., Le, A. T., Tran, H. Q., & Nguyen, T. T. T. (2021). The nitrogen slow-release fertilizer based on urea incorporating chitosan and poly(vinyl alcohol) blend. *Environmental Technology & Innovation*, *22*, 101528. https://doi.org/10.1016/j.eti.2021.101528

Wang, C., Luo, D., Zhang, X., Huang, R., Cao, Y., Liu, G., Zhang, Y., & Wang, H. (2022). Biochar-based slow-release of fertilizers for sustainable agriculture: A mini review. *Environmental Science and Ecotechnology*, *10*, 100167. https://doi.org/10.1016/j.ese.2022.100167

Wang, Q., Dong, F., Dai, J., Zhang, Q., Jiang, M., & Xiong, Y. (2019). Recycled-oil-based polyurethane modified with organic silicone for controllable release of coated fertilizer. *Polymers*, *11*(3). https://doi.org/10.3390/polym11030454

Wang, Q., Zhou, C., Zhang, H., Zhang, X., Wen, X., Bai, J., & Mao, H. (2024). Preparation of Low-Molecular-Weight Polyacrylamide as the Delayed Crosslinking Plugging Agent for Drilling Fluid. *Gels*, *10*(2). https://doi.org/10.3390/gels10020112

Wang, Y., Li, J., & Yang, X. (2022). The diffusion model of nutrient release from membrane pore of controlled release fertilizer. *Environmental Technology and Innovation*, *25*, 102256. https://doi.org/10.1016/j.eti.2021.102256

Watanabe, E. (2024). Application of fourier transform infrared (FTIR) spectroscopy in sample preparation: Material characterization and mechanism investigation. *Advances in Sample Preparation*, *11*, 100122. https://doi.org/10.1016/j.chroma.2021.462042

Wenten;, I. G., Nurul F. Himma, Sofiatun Anisah, & Nicholaus Prasetya. (2015). *MEMBRAN SUPERHIDROFOBIK*.

Wronska, N., Nadia Katir, Marta Nowak-Lange, Abdelkrim El Kadib, & Katarzyna Lisowska. (2023). Biodegradable Chitosan-Based Films as an Alternative to Plastic Packaging. *British Food Journal*, *12(18)*(3519), 12. https://doi.org/10.1108/eb011552

Wu, J., Xiao, M., Quezada-Renteria, J. A., Hou, Z., & Hoek, E. M. V. (2024). Sample preparation matters: Scanning electron microscopic characterization of polymeric membranes. *Journal of Membrane Science Letters*, *4*(1), 100073. https://doi.org/10.1016/j.memlet.2024.100073

Yang, Z., Peng, H., Wang, W., & Liu, T. (2010). Crystallization behavior of poly(ε-caprolactone)/layered double hydroxide nanocomposites. *Journal of Applied Polymer Science*, *116*(5), 2658–2667. https://doi.org/10.1002/app

Ye, H. M., Li, H. F., Wang, C. S., Yang, J., Huang, G., Meng, X., & Zhou, Q. (2020). Degradable polyester/urea inclusion complex applied as a facile and environment-friendly strategy for slow-release fertilizer: Performance and mechanism. *Chemical Engineering Journal*, *381*, 122704. https://doi.org/10.1016/j.cej.2019.122704

Yulianto, M. F. S. P., & Suprapto, S. (2025). Modifikasi Polimer Hidroksipropil Metil Selulosa Dan Sodium Tripolifosfat Dengan Metode Taut Silang. *Usadha Journal of Pharmacy*, *4*(1), 91–101. https://doi.org/10.23917/ujp.v4i2.527

Zhang, L., Shen, B., Zheng, C., Huang, Y., Liang, Y., Fei, P., Chen, J., & Lai, W. (2024). Chitosan/oxidized sodium alginate/Ca2+ hydrogels: Synthesis, characterization and adsorption properties. *Food Hydrocolloids*, *156*(May), 110368. https://doi.org/10.1016/j.foodhyd.2024.110368

Zhang, X., Liu, Y., Lu, P., & Zhang, M. (2020). Preparation and properties of hydrogel based on sawdust cellulose for environmentally friendly slow release fertilizers. *Green Processing and Synthesis*, *9*(1), 139–152. https://doi.org/10.1515/gps-2020-0015

Zhong, Y., Chen, H., Chen, X., Zhang, B., Chen, W., & Lu, W. (2022). Abiotic degradation behavior of polyacrylonitrile-based material filled with a composite of TiO2 and g-C3N4 under solar illumination. *Chemosphere*, *299*, 134375. https://doi.org/10.1016/j.chemosphere.2022.134375