UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abdi, H., & Williams, L. J. (2010). Principal component analysis. *Wiley Interdisciplinary Reviews: Computational Statistics*, *2*(4), 433–459. https://doi.org/10.1002/WICS.101

Abeysuriya, H. I., Bulugahapitiya, V. P., & Jayatissa, L. P. (2024). Variation of vitamin C content and antioxidant capacities during the post-harvest storage of fresh fruits under different temperatures. *Journal of Stored Products Research*, *109*, 102426. https://doi.org/10.1016/J.JSPR.2024.102426

Acedo, A. L., & Einberger, K. (2010). *Vegetables Postharvest Simple techniques for increased income and market*. www.avrdc.org

Adams, C. A., Zimmerman, K., Fenstermacher, K., Thompson, M. G., Skyrud, W., Behie, S., & Pringle, A. (2020). Fungal seed pathogens of wild chili peppers possess multiple mechanisms to tolerate capsaicinoids. *Applied and Environmental Microbiology*, *86*(3). https://doi.org/10.1128/AEM.01697-19

Aglar, E. (2018). Effects of harpin and Modified Atmosphere Packaging (MAP) on quality traits and bioactive compounds of sweet cherry fruits throughout cold storage and shelf life. *Acta Scientiarum Polonorum Hortorum Cultus*, *17*(4), 61–71. https://doi.org/10.24326/ASPHC.2018.4.6

Aiemsaard, J., Aiumlamai, S., Aromdee, C., Taweechaisupapong, S., & Khunkitti, W. (2011). The effect of lemongrass oil and its major components on clinical isolate mastitis pathogens and their mechanisms of action on Staphylococcus aureus DMST 4745. *Research in Veterinary Science*, *91*(3), e31–e37. https://doi.org/10.1016/j.rvsc.2011.01.012

Ain A. Sonin. (2021). The physical basis of dimensional analysis. In *Mathematical Engineering* (2nd ed.). Department of Mechanical Engineering MIT. https://doi.org/10.1007/978-3-030-79217-6_1

Ait-Oubahou, a. (1999). Modified atmosphere packaging of tomato fruit. *Post-Harvest Losses of Perishable Horticultural Products in the Mediterranean Region*, *113*, 103–113.

Akomolafe, O. M., Omotosho, T. A., & Oluwasina, O. O. (2024). Effect of

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

lemongrass and chili pepper oils on the quality of ripe tomato fruits stored under tropical ambient temperature. *Ceylon Journal of Science*, *53*(4), 491–502. https://doi.org/10.4038/cjs.v53i4.8173

Al-Dairi, M., & Pathare, P. B. (2021). Kinetic modeling of quality changes of tomato during storage. *Agricultural Engineering International: CIGR Journal*, *23*(1), 183–193.

Al-Samarrai, G., Singh, H., & Syarhabil, M. (2012). Evaluating eco-friendly botanicals (natural plant extracts) as alternatives to synthetic fungicides. *Annals of Agricultural and Environmental Medicine*, *19*(4), 673–676.

Al Fata, N., Georgé, S., André, S., & Renard, C. M. G. C. (2017). Determination of reaction orders for ascorbic acid degradation during sterilization using a new experimental device: The thermoresistometer Mastia®. *Lwt*, *85*, 487–492. https://doi.org/10.1016/j.lwt.2016.08.043

Alhamdan, A. M., Elkhair, D. O., & Ehmed, K. A. (2015). modeling of respiration rate of fresh date fruits (Barhi cultivar) under aerobic conditions. *Journal of Advanced Agricultural Technologies*, *2*(2). https://doi.org/10.12720/joaat.2.2.120-124

Ali, A., Muhammad, M. T. M., Sijam, K., & Siddiqui, Y. (2011). Effect of chitosan coatings on the physicochemical characteristics of Eksotika II papaya (Carica papaya L.) fruit during cold storage. *Food Chemistry*, *124*(2), 620–626. https://doi.org/10.1016/J.FOODCHEM.2010.06.085

Ali, A., Noh, N. M., & Mustafa, M. A. (2015). Antimicrobial activity of chitosan enriched with lemongrass oil against anthracnose of bell pepper. *Food Packaging and Shelf Life*, *3*, 56–61. https://doi.org/10.1016/j.fpsl.2014.10.003

Ali, A., Ong, M. K., & Forney, C. F. (2014). Effect of ozone pre-conditioning on quality and antioxidant capacity of papaya fruit during ambient storage. *Food Chemistry*, *142*, 19–26. https://doi.org/10.1016/j.foodchem.2013.07.039

Ali, E., El-, M., Azam, M., El-kom, S., & Sciences, F. (2023). *The kinetics of strawberry quality changes during the shelf-life*. *10*(1), 11–21. https://doi.org/10.18488/cras.v10i1.3304

Angane, M., Swift, S., Huang, K., Butts, C. A., & Quek, S. Y. (2022). Essential oils

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

and their major components: an updated review on antimicrobial activities, mechanism of action and their potential application in the food industry. *Foods 2022, Vol. 11, Page 464*, *11*(3), 464. https://doi.org/10.3390/FOODS11030464

Anoraga, S. B., & Bintoro, N. (2022). Kinetics of changes in the quality parameters of fresh snake fruit (Salacca edulis Rainw) during storage . *Proceedings of the 2nd International Conference on Smart and Innovative Agriculture (ICoSIA 2021)*, *19*(ICoSIA 2021), 230–235. https://doi.org/10.2991/absr.k.220305.035

Aros, D., Orellana, K., & Escalona, V. (2017). Modified Atmosphere Packaging as a method to extend postharvest life of tulip flowers. *New Zealand Journal of Crop and Horticultural Science*, *45*(3), 202–215. https://doi.org/10.1080/01140671.2017.1296872/ASSET/0CBC1EC3-C753-4AFC-81BB-50AFA0387D2C/ASSETS/IMAGES/TNZC_A_1296872_F0006_B.GIF

Asgar, A. (2017). Pengaruh suhu penyimpanan dan jumlah perforasi kemasan terhadap karakteristik fisik dan kimia brokoli (*Brassica oleracea var. Royal* G) Fresh-Cut. *Jurnal Hortikultura*, *27*(1), 127. https://doi.org/10.21082/jhort.v27n1.2017.p127-136

ASTM-E96/E96M. (2016). *Standard test methods for water vapor transmission of materials*, *West Conshohocken*. *October*, 14p.

Badillo, G. M., & Segura-Ponce, L. A. (2020). Classic and reaction-diffusion models used in Modified Atmosphere Packaging (MAP) of Fruit and Vegetables. *Food Engineering Reviews*, *12*(2), 209–228. https://doi.org/10.1007/s12393-020-09214-3

Bajaj, K., Kumar, A., Gill, P. P. S., Jawandha, S. K., & Kaur, N. (2024). Xanthan gum coatings augmented with lemongrass oil preserve postharvest quality and antioxidant defence system of Kinnow fruit under low-temperature storage. *International Journal of Biological Macromolecules*, *262*(Pt 1). https://doi.org/10.1016/J.IJBIOMAC.2024.129776

Batziakas, K. G., Singh, S., Ayub, K., Kang, Q., Brecht, J. K., Rivard, C. L., &

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Pliakoni, E. D. (2020). Reducing postharvest losses of spinach stored at nonoptimum temperatures with the implementation of Passive Modified Atmosphere Packaging. *HortScience*, *55*(3), 326–335. https://doi.org/10.21273/HORTSCI14732-19

Bayogan, E. R., Salvilla, R., Carmela Majomot, A. M., & Acosta, J. (2017). Shelf life of two sweet pepper (capsicum annuum) cultivars stored at ambient and evaporative cooling conditions. *South-Western Journal of Horticulture, Biology and Environment*, *8*(1), 1–15.

Beaudry, R. M. (2000). Responses of horticultural commodities to low oxygen: Limits to the expanded use of Modified Atmosphere Packaging. *HortTechnology*, *10*(3), 491–500. https://doi.org/10.21273/horttech.10.3.491

Beaulieu, J. C., & Lea, J. M. (2003). Volatile and quality changes in fresh-cut mangos prepared from firm-ripe and soft-ripe fruit, stored in clamshell containers and passive MAP. *Postharvest Biology and Technology*, *30*(1), 15–28. https://doi.org/10.1016/S0925-5214(03)00081-4

Bhanushree, L., Vasudeva, K., Suresha, G., Sadananda, G., H, M. T., & Halesh, G. (2018). Influence of chitosan on postharvest behavior of papaya (Carica papaya L .) *Journal of Pharmacognosy and Phytochemistry*, *7*(January), 2010–2014.

Bhat, R., Alias, A. K., & Paliyath, G. (2012). Progress in food preservation. https://doi.org/10.1002/9781119962045

Bhat, R., Ameran, S. B., Voon, H. C., Karim, A. A., & Tze, L. M. (2011). Quality attributes of starfruit (Averrhoa carambola L.) juice treated with ultraviolet radiation. *Food Chemistry*, *127*(2), 641–644. https://doi.org/10.1016/J.FOODCHEM.2011.01.042

Bickelhaupt, F. M., & Houk, K. N. (2017). Analyzing Reaction Rates with the Distortion/Interaction-Activation Strain Model. *Angewandte Chemie - International Edition*, *56*(34), 10070–10086. https://doi.org/10.1002/anie.201701486

Bodbodak, S., & Moshfeghifar, M. (2016). Advances in controlled atmosphere storage of fruits and vegetables. In *Eco-Friendly Technology for Postharvest*

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Produce Quality. Elsevier Inc. https://doi.org/10.1016/B978-0-12-804313-4.00002-5

Borgnakke, C., & Sonntag, R. E. (2008). Fundamentals of classical thermodynamics. In *University of Michigan* (Seven Edit). John Wiley & Sons, Inc. https://doi.org/10.1021/ed043pa472.1

BPS. (2024). *Produksi tanaman sayuran dan buah-buahan semusim menurut provinsi dan jenis tanaman , 2024 - tabel statistik - badan pusat statistik indonesia*. https://www.bps.go.id/id/statistics-table/3/ZUhFd1JtZzJWVVpqWTJsV05XTllhVmhRSzFoNFFUMDkjMw==/produksi-tanaman-sayuran-dan-buah-buahan-semusim-menurut-provinsi-dan-jenis-tanaman----2023.html?year=2024

BPTP. (2015). *Panen dan pasca panen cabai rawit*. Agro Inovasi. https://www.researchgate.net/profile/Grace_Murilla/publication/10691154_Resistance_to_trypanocidal_drugs--suggestions_from_field_survey_on_drug_use_in_Kwale_district_Kenya/links/0a85e531dfcb78f928000000.pdf

Braga, T. R., Pereira, R. C. A., Silveira, M. R. S., Silva, L. R., Silva, A. R., & Oliveira, M. M. T. (2013). Caracterização físico-química de progênies de pimentas cultivadas em Paraipaba-CE. *Scientia Plena*, *9*(5), 9–14.

Bulut, L., & Kilic, M. (2009). Kinetics of hydroxymethylfurfural accumulation and color change in honey during storage in relation to moisture content. *Journal of Food Processing and Preservation*, *33*(1), 22–32. https://doi.org/10.1111/J.1745-4549.2008.00233.X

Burt, S. (2004). Essential oils: their antibacterial properties and potential applications in foods—a review. *International Journal of Food Microbiology*, *94*(3), 223–253. https://doi.org/10.1016/J.IJFOODMICRO.2004.03.022

Caleb, O. J., Herppich, W. B., & Mahajan, P. V. (2016). The Basics of Respiration for Horticultural Products. In *Reference Module in Food Science*. Elsevier. https://doi.org/10.1016/b978-0-08-100596-5.21003-2

Caleb, O. J., Mahajan, P. V., Al-Said, F. A. J., & Opara, U. L. (2013). Modified Atmosphere Packaging Technology of Fresh and Fresh-cut Produce and the

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Microbial Consequences-A Review. *Food and Bioprocess Technology*, *6*(2), 303–329. https://doi.org/10.1007/s11947-012-0932-4

Caleb, O. J., Mahajan, P. V., Opara, U. L., & Witthuhn, C. R. (2012). Modelling the respiration rates of pomegranate fruit and arils. *Postharvest Biology and Technology*, *64*(1), 49–54. https://doi.org/10.1016/j.postharvbio.2011.09.013

Caleb, O. J., Opara, U. L., Mahajan, P. V., Manley, M., Mokwena, L., & Tredoux, A. G. J. (2013). Effect of Modified Atmosphere Packaging and storage temperature on volatile composition and postharvest life of minimally-processed pomegranate arils (cvs. "Acco" and 'Herskawitz'). *Postharvest Biology and Technology*, *79*, 54–61. https://doi.org/10.1016/j.postharvbio.2013.01.006

Calo, J. R., Crandall, P. G., O'Bryan, C. A., & Ricke, S. C. (2015). Essential oils as antimicrobials in food systems - A review. *Food Control*, *54*, 111–119. https://doi.org/10.1016/j.foodcont.2014.12.040

Caner, C., Aday, M. S., & Demir, M. (2008). Extending the quality of fresh strawberries by equilibrium modified atmosphere packaging. *European Food Research and Technology*, *227*(6), 1575–1583. https://doi.org/10.1007/s00217-008-0881-3

Cantwell, M. (2009). *Chile pepper, postharvest research and extension center*. UC Davis, Department of Plant Sciences Logo. University of California. https://postharvest.ucdavis.edu/produce-facts-sheets/chile-pepper

Casquete, R., Velazquez, R., Hernandez, A., de Guia Cordoba, M., Aranda, E., Bartolome, T., & Martin, A. (2021). Evaluation of the quality and shelf-life of cayenne (Capsicum spp.). *LWT*, *145*, 111338. https://doi.org/10.1016/J.LWT.2021.111338

Cefola, M., Amodio, M. L., & Colelli, G. (2016). Extending postharvest life of ready-to-use zucchini flowers: Effects of the atmosphere composition. *Acta Horticulturae*, *1141*, 123–130. https://doi.org/10.17660/ACTAHORTIC.2016.1141.13

Celina, A., Rahmawati, D., & Permana, T. (2019). Application of Lemongrass Essential Oil as a natural preservative agent for pineapple juice. *Iconiet*

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Proceeding, *2*(2), 69–78. https://doi.org/10.33555/iconiet.v2i2.14

Chaturani, D. G. D., Gunaratne, M. D. N., Somachandra, K. P., & Abeykoon, A. J. M. A. (2013). Statistical analysis of repeated measures. *Proceedings of International Forestry and Environment Symposium*, *18*(0). https://doi.org/10.31357/FESYMPO.V18I0.1988

Chauhan, O. P., Raju, P. S., Ravi, N., Singh, A., & Bawa, A. S. (2011). Effectiveness of ozone in combination with controlled atmosphere on quality characteristics including lignification of carrot sticks. *Journal of Food Engineering*, *102*(1), 43–48. https://doi.org/10.1016/j.jfoodeng.2010.07.033

Cheng, P., Yun, X., Xu, C., Yang, Y., Han, Y., & Dong, T. (2019). Use of poly(ε-caprolactone)-based films for equilibrium-Modified Atmosphere Packaging to extend the postharvest shelf life of garland chrysanthemum. *Food Science & Nutrition*, *7*(6), 1946. https://doi.org/10.1002/FSN3.909

Cheng, Y., Gao, C., Luo, S., Yao, Z., Ye, Q., Wan, H., Zhou, G., & Liu, C. (2023). Effects of storage temperature at the early postharvest stage on the firmness, bioactive substances, and amino acid compositions of chili pepper (Capsicum annuum L.). *Metabolites*, *13*(7), 820. https://doi.org/10.3390/METABO13070820/S1

Chien, P. J., Sheu, F., & Yang, F. H. (2007). Effects of edible chitosan coating on quality and shelf life of sliced mango fruit. *Journal of Food Engineering*, *78*(1), 225–229. https://doi.org/10.1016/J.JFOODENG.2005.09.022

Chitravathi, K., Chauhan, O. P., & Raju, P. S. (2015a). Influence of Modified Atmosphere Packaging on shelf-life of green chillies (Capsicum annuum L.). *Food Packaging and Shelf Life*, *4*, 1–9. https://doi.org/10.1016/j.fpsl.2015.02.001

Chitravathi, K., Chauhan, O. P., & Raju, P. S. (2015b). Influence of Modified Atmosphere Packaging on shelf-life of green chillies (Capsicum annuum L.). *Food Packaging and Shelf Life*, *4*, 1–9. https://doi.org/10.1016/J.FPSL.2015.02.001

Choosuk, N., Meesuk, P., Renumarn, P., Phungamngoen, C., & Jakkranuhwat, N. (2022). Kinetic Modeling of Quality Changes and Shelf Life Prediction of

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Dried Coconut Chips. *Processes*, *10*(7), 1–11. https://doi.org/10.3390/pr10071392

Christie, G. B. Y., Macdiarmid, J. I., Schliephake, K., & Tomkins, R. B. (1995). Determination of film requirements and respiratory behaviour of fresh produce in modified atmosphere packaging. *Postharvest Biology and Technology*, *6*(1–2), 41–54. https://doi.org/10.1016/0925-5214(94)00053-U

Cia, P., Benato, E. A., Sigrist, J. M. M., Sarantopóulos, C., Oliveira, L. M., & Padula, M. (2006). Modified atmosphere packaging for extending the storage life of "Fuyu" persimmon. *Postharvest Biology and Technology*, *42*(3), 228–234. https://doi.org/10.1016/j.postharvbio.2006.06.016

Corzo, O., & Álvarez, C. (2014). Color change kinetics of mango at different maturity stages during air drying. *Journal of Food Processing and Preservation*, *38*(1), 508–517. https://doi.org/10.1111/J.1745-4549.2012.00801.X

Costa, J., Rodríguez, R., Garcia-Cela, E., Medina, A., Magan, N., Lima, N., Battilani, P., & Santos, C. (2019). Overview of fungi and mycotoxin contamination in capsicum pepper and in its derivatives. *Toxins*, *11*(1), 1–16. https://doi.org/10.3390/toxins11010027

Cruz-Tirado, J. P., Oliveira, M., De, M., Filho, J., Teixeira Godoy, H., Amigo, J. M., & Fernandes Barbin, D. (2021). Shelf life estimation and kinetic degradation modeling of chia seeds (Salvia hispanica) using principal component analysis based on NIR-hyperspectral imaging. *Food Control*, *123*, 107777. https://doi.org/10.1016/j.foodcont.2020.107777

da Silva Martins, L. H., da Silva, S. B., Filho, A. F., Komesu, A., de Oliveira, J. A. R., & Moreira, D. K. T. (2024). Essential oils used to inhibit bacterial growth in food. *Essential Oils: Extraction Methods and Applications*, 31–47. https://doi.org/10.1002/9781119829614.CH2

De Azevedo-Meleiro, C. H., & Rodriguez-Amaya, D. B. (2009). Qualitative and quantitative differences in the carotenoid composition of yellow and red peppers determined by HPLC-DAD-MS. *Journal of Separation Science*, *32*(21), 3652–3658. https://doi.org/10.1002/JSSC.200900311

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

de Melo, A. M., Barbi, R. C. T., Almeida, F. L. C., de Souza, W. F. C., Cavalcante, A. M. de M., de Souza, H. J. B., Botrel, D. A., Borges, S. V., Costa, R. G., Quirino, M. R., & de Sousa, S. (2022). Effect of microencapsulation on chemical composition and antimicrobial, antioxidant and cytotoxic properties of lemongrass (Cymbopogon flexuosus) essential oil. *Food Technology and Biotechnology*, *60*(3), 386–395. https://doi.org/10.17113/ftb.60.03.22.7470

Demirhan, E., & Özbek, B. (2009). Color change kinetics of microwave-dried basil. *Drying Technology*, *27*(1), 156–166. https://doi.org/10.1080/07373930802566101

Demirhan, E., & Özbek, B. (2011). Color change kinetics of celery leaves undergoing microwave heating. *Chemical Engineering Communications*, *198*(10), 1189–1205. https://doi.org/10.1080/00986445.2010.525106

Desai, A. P., & Desai, S. (2019). UV spectroscopic method for determination of vitamin c (ascorbic acid) content in different fruits in South Gujarat Region. *International Journal of Environmental Sciences & Natural Resources*, *21*(2), 1–4. https://doi.org/10.19080/IJESNR.2019.21.556056

Devgan, K., Kaur, P., Kumar, N., & Kaur, A. (2019). Active modified atmosphere packaging of yellow bell pepper for retention of physico-chemical quality attributes. *Journal of Food Science and Technology*, *56*(2), 878–888. https://doi.org/10.1007/s13197-018-3548-5

Díaz-Mula, H. M., Serrano, M., & Valero, D. (2012). Alginate coatings preserve fruit quality and bioactive compounds during storage of sweet cherry fruit. *Food Bioprocess Technol*, *5*, 2990–2997. https://doi.org/10.1007/s11947-011-0599-2

E Buckingham. (1914). *On Physically Similar Systems; Illustratio of The Use of Dimensional Equatios*. *4*(4).

Elansari, A. M., Yahia, E. M., & Siddiqui, W. (2019). Storage systems. In *Postharvest Technology of Perishable Horticultural Commodities* (pp. 401–437). 2019 Elsevier Inc. All rights reserved. https://doi.org/10.1016/B978-0-12-813276-0.00012-2

Emine Yalçınöz, Ş. and E. (2017). *Heat-induced degradation kinetics of monomeric*

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

anthocyanins and color of pomegranate (punica granatum L.) Concentrate. *5*, 471–483. https://www.mendeley.com/catalogue/85763d7f-0da4-3ac5-b451-921798e29c38/?utm_source=desktop&utm_medium=1.19.8&utm_campaign=open_catalog&userDocumentId=%7B9ed26311-dccf-4340-9a98-eb246edbc1f3%7D

Ernest, E., Onyeka, O., A.C., O., & R.O., O. (2017). Comparative assessment of the effect of ripening stage on the vitamin c contents of selected fruits grown within nsukka axis of enugu state. *International Journal of Environment, Agriculture and Biotechnology*, *2*(2), 712–714. https://doi.org/10.22161/ijeab/2.2.19

Everitt, B. S. (2014). Repeated Measures Analysis of Variance. *Wiley StatsRef: Statistics Reference Online*. https://doi.org/10.1002/9781118445112.STAT06585

FAO. (2019). The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. In *Soil Science* (Vol. 95, Issue 4). CC BY-NC-SA 3.0 IGO. https://doi.org/10.1097/00010694-196304000-00017

Fatharani, A., & Bintoro, N. (2019). Kinetics analysis of the effect of storage room temperature and packaging films characteristics on the rate of change of Sugar Palm Fruit (Arenga pinata) quality in A Modified Atmospheric Packaging (MAP). *IOP Conference Series: Earth and Environmental Science*, *355*(1). https://doi.org/10.1088/1755-1315/355/1/012035

Fatharani, A., Bintoro, N., Saputro, A. D., Pertanian, J. T., Pertanian, F., Bengkulu, U., Supratman, J. W. R., & Limun Bengkulu, K. (2023). Analisis matematis perubahan kualitas kolang-kaling (A*renga pinnata*) pada penyimpanan Modified Atmosphere Packaging (MAP). *Jurnal Ilmiah Rekayasa Pertanian Dan Biosistem*, *11*(1), 1–14. https://doi.org/10.29303/JRPB.V11I1.455

Fonseca, S. C., Oliveira, F. A. R., & Brecht, J. K. (2002). Modelling respiration rate of fresh fruits and vegetables for modified atmosphere packages: A review. In *Journal of Food Engineering*. https://doi.org/10.1016/S0260-8774(01)00106-6

Gambacorta, L., Magistá, D., Perrone, G., Murgolo, S., Logrieco, A. F., &

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Solfrizzo, M. (2018). Co-occurrence of toxigenic moulds, aflatoxins, ochratoxin A, Fusarium and Alternaria mycotoxins in fresh sweet peppers (Capsicum annuum) and their processed products. *World Mycotoxin Journal*, *11*(1), 159–173. https://doi.org/10.3920/WMJ2017.2271

García-García, P., López-López, A., & Garrido-Fernández, A. (2008). Study of the shelf life of ripe olives using an accelerated test approach. *Journal of Food Engineering*, *84*(4), 569–575. https://doi.org/10.1016/j.jfoodeng.2007.06.023

Giannakourou, M. C., Gogou, E., & Taoukis, P. S. (2021). Reaction kinetics in food-processing engineering. *Engineering Principles of Unit Operations in Food Processing: Unit Operations and Processing Equipment in the Food Industry*, 443–470. https://doi.org/10.1016/B978-0-12-818473-8.00010-4

Gómez-García, M. del R., & Ochoa-Alejo, N. (2013). Biochemistry and molecular biology of carotenoid biosynthesis in chili peppers (Capsicum spp.). *International Journal of Molecular Sciences 2013, Vol. 14, Pages 19025-19053*, *14*(9), 19025–19053. https://doi.org/10.3390/IJMS140919025

Gontard, N., Guilbert, S., & Cuq, J. L. L. (1993). Water and glycerol as plasticizers affect mechanical and water vapor barrier properties of an edible wheat gluten film. *Journal of Food Science*, *58*(1), 206–211. https://doi.org/10.1111/j.1365-2621.1993.tb03246.x

González-Aguilar, G. A., Ayala-Zavala, J. F., Ruiz-Cruz, S., Acedo-Félix, E., & Díaz-Cinco, M. E. (2004). Effect of temperature and Modified Atmosphere Packaging on overall quality of fresh-cut bell peppers. *Lwt*, *37*(8), 817–826. https://doi.org/10.1016/j.lwt.2004.03.007

Govindarajan, V. S., Rajalakshmi, D., & Chand, N. (2009). Capsicum — Production, technology, chemistry, and quality. Part IV. Evaluation of quality. *Http://Dx.Doi.Org/10.1080/10408398709527453*, *25*(3), 185–282. https://doi.org/10.1080/10408398709527453

Grané, A., & Jach, A. (2013). Applications of principal component analysis (PCA) in food science and technology. *Mathematical and Statistical Methods in Food Science and Technology*, 55–86. https://doi.org/10.1002/9781118434635.CH05

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Greengrass, J. (1993). Principles and Applications of Modified Atmosphere Packaging of Foods. In *Principles and Applications of Modified Atmosphere Packaging of Foods* (pp. 63–100). https://doi.org/10.1007/978-1-4757-6252-5

Grewal, P. S., Kumar, A., & Singla, M. (2018). Estimation of respiratory dynamics of fresh green chilli (Capsicum annuum L.). *Int. J. Pure App. Biosci*, *6*(2), 920–928. https://doi.org/10.18782/2320-7051.5480

Gross, K. C., Wang, C. Y., & Saltveit, M. E. (eds). (2016). The commercial storage of Fruits, Vegetables, and Florist and Nursery Stocks. *Agricultural Research Service, United States Department of Agriculture, Wahington DC*, *66*(66), 68–70. www.ntis.gov.

Gupta, A. K., Muhury, R., & Ganjewala, D. (2016). A study on antimicrobial activities of essential oils of different cultivars of lemongrass (Cymbopogon flexuosus). *Pharmaceutical Sciences*, *22*(3), 164–169. https://doi.org/10.15171/PS.2016.26

Gutiérrez, L., Batlle, R., Andújar, S., Sánchez, C., & Nerín, C. (2011). Evaluation of antimicrobial active packaging to increase shelf life of gluten-free sliced bread. *Packaging Technology and ScienceTechnology and Science*, *24*(May), 485–494. https://doi.org/10.1002/pts

Han, Q., Gao, H., Chen, H., Fang, X., & Wu, W. (2017). Precooling and ozone treatments affects postharvest quality of black mulberry (Morus nigra) fruits. *Food Chemistry*, *221*, 1947–1953. https://doi.org/10.1016/j.foodchem.2016.11.152

Hanifah, N., Purwanto, Y. A., & Sugiarto, A. T. (2024). Efek perlakuan cold plasma terhadap umur simpan cabai rawit (Capsicum frutescens L .). *Jurnal Ilmiah Rekayasa Pertanian Dan Biosistem*, *12*(2), 205–221. https://doi.org/10.29303/jrpb.v12i2.657

Hasbullah, R., Niam, A. G., Pujantoro, L., & Mardjan, S. (2018). Pengaruh Suhu Terhadap Permeabilitas Gas Pada Plastik Film Untuk Pengemasan Secara Atmosfir Termodifikasi. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, *7*(3), 133. https://doi.org/10.23960/jtep-l.v7i3.133-

ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum
frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Hasbullah, R., Rubbi, R. T., Pujantoro, L., & Nelwan, L. O. (2024). Modified atmosphere packaging for minimallyprocessed papaya (Carica papaya L.). *ICATES-2023IOP Conf. Series: Earth and Environmental Science*, 1–10. https://doi.org/10.1088/1755-1315/1290/1/012018

Hou, B. Z., Li, C. L., Han, Y. Y., & Shen, Y. Y. (2018). Characterization of the hot pepper (Capsicum frutescens) fruit ripening regulated by ethylene and ABA. *BMC Plant Biology*, *18*(1), 1–12. https://doi.org/10.1186/S12870-018-1377-3/FIGURES/6

Iqbal, Q., Amjad, M., Asi, M. R., Ariño, A., Ziaf, K., Nawaz, A., & Ahmad, T. (2015). Stability of capsaicinoids and antioxidants in dry hot peppers under different packaging and storage temperatures. *Foods 2015, Vol. 4, Pages 51-64*, *4*(2), 51–64. https://doi.org/10.3390/FOODS4020051

Iqbal, T., Rodrigues, F. A. S., Mahajan, P. V., & Kerry, J. P. (2009). Mathematical modelling of O2 consumption and CO_2 production rates of whole mushrooms accounting for the effect of temperature and gas composition. *International Journal of Food Science and Technology*, *44*(7), 1408–1414. https://doi.org/10.1111/j.1365-2621.2009.01971.x

Irtwange, S. V. (2006). Application of modified atmosphere packaging and related technology in postharvest handling of fresh fruits and vegetables. *Agricultural Engineering International: The CIGR Ejournal*, *3*(4), 319–324. https://ecommons.cornell.edu/handle/1813/10565

Isharyadi, F., Kristiningrum, E., Darmayanti, N. T. E., Supono, I., Fuad, N. M., Ghozali, M., Rezqi, K., Kunharyanto, S. A., Rahmadi, I., & Wijayanti, S. P. (2023). Modified Atmosphere Packaging Technology for Indonesian food products: the latest developments and potentials. *Evergreen*, *10*(3), 1616–1632. https://doi.org/10.5109/7151710

Iwanami, H., Moriya-Tanaka, Y., Hanada, T., Baba, T., & Sakamoto, D. (2024). Factors explaining variations in soluble solids content of apples during ripening and storage. *Horticulture Journal*, *93*(2), 135–142. https://doi.org/10.2503/hortj.QH-105

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Jahan, N., & Khalil-ur-Rahman. (2020). Cold pressed capia pepper (Capsicum annuum L.) seed oil. In *Cold Pressed Oils*. Elsevier Inc. https://doi.org/10.1016/b978-0-12-818188-1.00039-6

Jollife, I. T., & Cadima, J. (2016). Principal component analysis: A review and recent developments. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *374*(2065). https://doi.org/10.1098/RSTA.2015.0202/ASSET/88569AF9-873E-4D6D-B3C3-FF4B9B12DD31/ASSETS/GRAPHIC/RSTA20150202F04.JPEG

Kader, A. A. (2001). Biologia y tecnologia de postcosecha: una revision general. In *Postharvest Technology of Horticultural Crops Univ. California* (Vol. 3311, p. (311-324)). http://www.ecofisiohort.com.ar/wp-content/uploads/2010/04/Biolog?a-y-Tecnolog?a-de-Postcosecha-Abel-Kader.pdf

Kader, A. A. (2003). A summary of CA requirements and recommendations for fruits other than apples and pears. *Acta Horticulturae*, *600*, 737–740. https://doi.org/10.17660/ActaHortic.2003.600.112

Kader, A. A. (2013). Postharvest technology of horticultural crops-an overview from farm to fork. *J. Appl. Sci. Technol. (Special Issue*, *1*, 1–8.

Kader, A. A., Cook, R. L., Bruhn, C. M., Reid, M. S., & Thompson, J. F. (2002). *Postharvest technology of horticulture crops* (A. A. Kader (ed.); 3rd ed., Issue 530, p. 535). Postharvest Technology Center UC DAVIS – Department of Plant Sciences One Shields Avenue, Davis.

Kader, A. A., Zagory, D., & Kerbel, E. L. (1989). Modified Atmosphere Packaging of fruits and vegetables. *Critical Reviews in Food Science & Nutrition*, *28*(1), 1–30. https://doi.org/10.1080/10408398909527490

Kandasamy, P. (2022). Respiration rate of fruits and vegetables for Modified Atmosphere Packaging: a mathematical approach. *Journal of Postharvest Technology*, *10*(February), 88–102. www.jpht.in

Kantar, M. B., Anderson, J. E., Lucht, S. A., Mercer, K., Bernau, V., Case, K. A., Le, N. C., Frederiksen, M. K., DeKeyser, H. C., Wong, Z. Z., Hastings, J. C., & Baumler, D. J. (2016). Vitamin variation in capsicum spp. provides

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

opportunities to improve nutritional value of human diets. *PLOS ONE*, *11*(8), e0161464. https://doi.org/10.1371/JOURNAL.PONE.0161464

Kasim, R., Bintoro, N., Rahayoe, S., & Pranoto, Y. (2022). Effect of temperature and relative humidity on the respiration rate of coated banana (Musa acuminata). *IOP Conference Series: Earth and Environmental Science*, *1083*(1). https://doi.org/10.1088/1755-1315/1083/1/012026

Keshri, N., Truppel, I., Herppich, W. B., Geyer, M., Weltzien, C., & Mahajan, P. V. (2020). In-situ measurement of fresh produce respiration using a modular sensor-based system. *Sensors 2020, Vol. 20, Page 3589*, *20*(12), 3589. https://doi.org/10.3390/S20123589

Khater, E., & Afify, M. (2021). Quality characteristics and shelf life of pepper fruits as influenced by storage conditions and pepper varieties. *Misr Journal of Agricultural Engineering*, *0*(0), 0–0. https://doi.org/10.21608/mjae.2021.89464.1039

Kirtil, E., Kilercioglu, M., & Oztop, M. H. (2016). Modified Atmosphere Packaging of foods. In *Reference Module in Food Science* (pp. 1–6). Elsevier. https://doi.org/10.1016/b978-0-08-100596-5.03218-2

Kolbeck, S., Reetz, L., Hilgarth, M., & Vogel, R. F. (2019). Quantitative oxygen consumption and respiratory activity of meat spoiling bacteria upon high oxygen Modified Atmosphere. *Frontiers in Microbiology*, *10*, 486673. https://doi.org/10.3389/FMICB.2019.02398/BIBTEX

Komalasari, W. B., Sabarella, Manurung, M., Sehusman, Supriyati, Y., Rinawati, Seran, K., Naruri, M. D., & Amara, V. D. (2024). Statistik konsumsi pangan 2024. In *Pusat Data dan Sistem Informasi Pertanian*.

Kontominas, M. G. (2014). Packaging: Modified Atmosphere Packaging of foods. In *Encyclopedia of Food Microbiology: Second Edition* (Second Edi, Vol. 2). Elsevier. https://doi.org/10.1016/B978-0-12-384730-0.00432-8

Kubík, L., & Zeman, S. (2013). Determination of oxygen permeability of polyethylene and polypropylene nonwoven fabric foils. *Research in Agricultural Engineering*, *59*(3), 105–113. https://doi.org/10.17221/31/2012-rae

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Kumar, S., Kumar, R., & Singh, J. (2006). Cayenne/American pepper. In *Handbook of Herbs and Spices* (Vol. 3). Woodhead Publishing Limited. https://doi.org/10.1533/9781845691717.3.299

Lakakul, R., Beaudry, R. M., & Hernandez, R. J. (1999). Modeling respiration of apple slices in modified-atmosphere packages. *Journal of Food Science*, *64*(1), 105–110. https://doi.org/10.1111/j.1365-2621.1999.tb09870.x

Lamona, A., Purwanto, Y. A., & Sutrisno, S. (2015). Effect of different packaging and low temperature storage on the quality changes of fresh red curly chili. *Jurnal Keteknikan Pertanian*, *03*(2), 1–8. https://doi.org/10.19028/jtep.03.2.145-152

Lee, S. K., & Kader, A. A. (2000). Preharvest and postharvest factors influencing vitamin C content of horticultural crops. *Postharvest Biology and Technology*, *20*(3), 207–220. https://doi.org/10.1016/S0925-5214(00)00133-2

Li, L., Li, X., Gao, G., Yan, Y., Wang, X., Tang, Y., Jiang, Y., & Li, X. (2022). A kinetic model for predicting shelf-life of fresh extruded rice-shaped kernels (FER). *Grain and Oil Science and Technology*, *5*(4), 187–193. https://doi.org/10.1016/j.gaost.2022.09.001

Li, R., Rosado-Souza, L., Sampathkumar, A., & Fernie, A. R. (2024). The relationship between cell wall and postharvest physiological deterioration of fresh produce. *Plant Physiology and Biochemistry*, *210*, 108568. https://doi.org/10.1016/J.PLAPHY.2024.108568

Li, Y., Ding, S., & Wang, Y. (2022). Shelf life predictive model for postharvest shiitake mushrooms. *Journal of Food Engineering*, *330*(March). https://doi.org/10.1016/j.jfoodeng.2022.111099

Li, Y., Fabiano-Tixier, A.-S., & Farid Chemat. (2015). *Essential Oil as reagents in green chemistry* (Vol. 245, Issue 8). http://dx.doi.org/10.1016/j.crci.2015.08.011%5

Li, Z., Zhao, X., Wang, D., Wang, P., Zhao, S., Chen, H., Han, Y., & Zhao, W. (2025). Different packaging films regulate textural quality of fresh-cut chili peppers by regulating reactive oxygen species and membrane lipid metabolisms. *LWT*, *220*, 117596. https://doi.org/10.1016/J.LWT.2025.117596

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Liantoni, F., & Annisa, F. N. (2018). Fuzzy k-nearest neighbor pada klasifikasi kematangan cabai berdasarkan fitur hsv citra. *JIPI (Jurnal Ilmiah Penelitian Dan Pembelajaran Informatika)*. https://doi.org/10.29100/jipi.v3i2.851

Lim, S. M., Law, H., & Lee, S. S. (2023). Consumers' quality perception and acceptance of suboptimal food: an online survey in Selangor and Kuala Lumpur, Malaysia. *Foods*, *12*(15), 2824. https://doi.org/10.3390/FOODS12152824/S1

Lix, L. M., & Keselman, H. J. (2018). Analysis of Variance: Repeated-Measures Designs. *The Reviewer's Guide to Quantitative Methods in the Social Sciences: Second Edition*, 15–28. https://doi.org/10.4324/9781315755649-2

López Camelo, A. F., & Gómez, P. A. (2004). Comparison of color indexes for tomato ripening. *Horticultura Brasileira*, *22*(3), 534–537. https://doi.org/10.1590/s0102-05362004000300006

López Pacheco, M. A., Báez Rojas, J. J., Castro-Ramos, J., Villa Manríquez, J. F., & Esmonde-White, K. (2021). Optical study to identify and quantify capsaicin in optical window. *Heliyon*, *7*(3), e05797. https://doi.org/10.1016/j.heliyon.2020.e05797

Luang-In, V., Saengha, W., Karirat, T., Senakun, C., & Siriamornpun, S. (2024). Phytochemical profile of Cymbopogon citratus (DC.) Stapf Lemongrass Essential Oil from Northeastern Thailand and its antioxidant and antimicrobial attributes and cytotoxic effects on HT-29 human colorectal adenocarcinoma cells. *Foods 2024, Vol. 13, Page 2928*, *13*(18), 2928. https://doi.org/10.3390/FOODS13182928

Lutfi, M., Prasetyo, J., Pujianti, I. P., & Maharani, D. M. (2019). Pengaruh aplikasi blower dan tipe pengemasan terhadap mutu cabai rawit segar (Capsicum frutescens linn) selama Transportasi. *Jurnal Teknotan*. https://doi.org/10.24198/jt.vol13n1.4

Mahajan, P. V., & Caleb, O. J. (2017). Modeling MAP of fruits and vegetables. In *Reference Module in Food Science*. Elsevier. https://doi.org/10.1016/b978-0-08-100596-5.21461-3

Mahajan, P. V., Oliveira, F. A. R., & Macedo, I. (2008). Effect of temperature and

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

humidity on the transpiration rate of the whole mushrooms. *Journal of Food Engineering*, *84*(2), 281–288. https://doi.org/10.1016/J.JFOODENG.2007.05.021

Mahajan, P. V., Oliveira, F. A. R., Montanez, J. C., & Frias, J. (2007). Development of user-friendly software for design of Modified Atmosphere Packaging for fresh and fresh-cut produce. *Innovative Food Science and Emerging Technologies*, *8*(1), 84–92. https://doi.org/10.1016/j.ifset.2006.07.005

Majewska, E., Kozlowska, M., Gruczynska-Sekowska, E., Kowalska, D., & Tarnowska, K. (2019). Lemongrass (Cymbopogon citratus) essential oil: extraction, composition, bioactivity and uses for food preservation – a Review. *Polish Journal of Food and Nutrition Sciences*, *69*(4), 327–341. https://doi.org/10.31883/PJFNS/113152

Malakar, S., Kumar, N., Sarkar, S., & Mohan, R. J. (2020). Influence of Modified Atmosphere Packaging on the shelf life and postharvest quality attributes of King Chili (Capsicum chinense Jacq.) during Storage. *Journal of Biosystems Engineering*, *45*(4), 213–222. https://doi.org/10.1007/s42853-020-00057-8

Mangaraj, S., Goswami, T. K., & Mahajan, P. V. (2009). Applications of plastic films for Modified Atmosphere Packaging of fruits and vegetables: A Review. *Food Engineering Reviews*, *1*(2), 133–158. https://doi.org/10.1007/S12393-009-9007-3

Manolopoulou, E., & Varzakas, T. (2016). Effect of temperature in color changes of green vegetables. *Current Research in Nutrition and Food Science*, *4*(SpecialIssue2), 10–17. https://doi.org/10.12944/CRNFSJ.4.Special-Issue-October.02

Manzocco, L., & Nicoli, M. C. (2015). Surface processing: existing and potential applications of ultraviolet light. *Critical Reviews in Food Science and Nutrition*, *55*(4), 469–484. https://doi.org/10.1080/10408398.2012.658460

Maskey, B., Bhattarai, R., Bhattarai, G., & Shrestha, N. K. (2021). Post-harvest quality of fresh akabare chili (Capsicum chinese) as affected by hydrocooling, package modification and storage temperature. *24*(1), 163–173. https://doi.org/10.1080/10942912.2020.1865399

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Matei, N., Birghila, S., Popescu, V., Dobrinas, S., Soceanu, A., Oprea, C., & Magearu, V. (2008). Kinetic study of vitamin C degradation from pharmaceutical products. *Romanian Reports of Physics*, *53*(1–2), 343–351. https://doi.org/10.5958/0973-9130.2017.00174.8

McGuire, R. G. (2019). Reporting of Objective Color Measurements. *HortScience*, *27*(12), 1254–1255. https://doi.org/10.21273/hortsci.27.12.1254

McHugh, T. H., Avena Bustillos, R., & Krochta, J. M. (1993). Hydrophilic Edible Films: Modified Procedure for Water Vapor Permeability and Explanation of Thickness Effects. *Journal of Food Science*, *58*(4), 899–903. https://doi.org/10.1111/j.1365-2621.1993.tb09387.x

Meneses, S. M. O., & Valenzuela, J. R. C. (2008). Modified atmosphere: an alternative for food preservation. *REVISTA LASALLISTA DE INVESTIGACIÓN*, *5*(2), 112–123.

Minh, N. P. (2019). Combination of chitosan and lemongrass (Cymbopogon citratus) essential oil as edible coating to cantaloupe (Cucumis melo L) quality and shelf life during storage. *Journal of Global Pharma Technology*, *11*(4), 12–24.

Mohd Ali, M., Hashim, N., Abd Aziz, S., & Lasekan, O. (2022). Shelf Life Prediction and Kinetics of Quality Changes in Pineapple (Ananas comosus) Varieties at Different Storage Temperatures. *Horticulturae*, *8*(11). https://doi.org/10.3390/horticulturae8110992

Moore-Neibel, K., Gerber, C., Patel, J., Friedman, M., & Ravishankar, S. (2012). Antimicrobial activity of lemongrass oil against Salmonella enterica on organic leafy greens. *Journal of Applied Microbiology*, *112*(3), 485–492. https://doi.org/10.1111/j.1365-2672.2011.05222.x

Munarso, S. J., Kailaku, S. I., bin Arif, A., Budiyanto, A., Mulyawanti, I., Sasmitaloka, K. S., Setyawan, N., Dewandari, K. T., & Widayanti, S. M. (2020). Quality analysis of chili treated with aqueous ozone treatment and improved transportation and handling technology. *International Journal of Technology*, *11*(1), 37–47. https://doi.org/10.14716/ijtech.v11i1.3213

Munekata, P. E. S., Pateiro, M., Rodríguez-Lázaro, D., Domínguez, R., Zhong, J.,

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

& Lorenzo, J. M. (2020). The Role of Essential Oils against Pathogenic Escherichia coli in Food Products. *Microorganisms 2020, Vol. 8, Page 924*, *8*(6), 924. https://doi.org/10.3390/MICROORGANISMS8060924

Murtiwulandari, M., Archery, D. T. M., Haloho, M., Kinasih, R., Tanggara, L. H. S., Hulu, Y. H., Agaperesa, K., Khristanti, N. W., Kristiyanto, Y., Pamungkas, S. S., Handoko, Y. A., & Anarki, G. D. Y. (2020). Pengaruh suhu penyimpanan terhadap kualitas hasil panen komoditas Brassicaceae. *Teknologi Pangan : Media Informasi Dan Komunikasi Ilmiah Teknologi Pertanian*, *11*(2), 136–143. https://doi.org/10.35891/tp.v11i2.2168

Muttalib, S., Bintoro, N., Karyadi, J. N., & Saputro, A. D. (2025). Principal Component Analysis in the animal products precooling process using compressive type plate cooler. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, *14*(1), 182–193. https://doi.org/10.23960/JTEP-L.V14I1.182-193

Ni, H., Aktaruzzaman, M., Wei, Y., Ouyang, Z., Zhang, G.-C., Yang, J., Y-x, W., Y-d, Z., D-d, W., Q-m, L., Y-z, C., G-c, Z., Wu, Y.-X., Zhang, Y.-D., Li, N., Wu, D.-D., Li, Q.-M., & Chen, Y.-Z. (2022). Inhibitory effect and mechanism of action of juniper essential oil on gray mold in cherry tomatoes. *Frontiers in Microbiology*, *13*, 1000526–1000526. https://doi.org/10.3389/FMICB.2022.1000526

Nugraha, R., Juliana, A. Z., Lilis, S., Nana, K., Nur, M., Nur, S., Nasution, H., Rianti, N., Suci, T., Afrilia, W., Ikhsyauti, A., Sri, I., Hilmi, H. M., Tria, A., Solehah, M., & Husyaini, B. (2017). *Filsafat ilmu*.

Nurdjannah, R., Purwanto, Y. A., & Sutrisno, S. (2017). Pengaruh jenis kemasan dan penyimpanan dingin terhadap mutu fisik cabai merah. *Jurnal Penelitian Pascapanen Pertanian*, *11*(1), 19. https://doi.org/10.21082/jpasca.v11n1.2014.19-29

Nuridayat, N., Sabahannur, S., & Alimuddin, S. (2022). Pengaruh suhu dan jenis kemasan terhadap umur simpan dan mutu cabai rawit (Capsicum frutescens L.). *AGrotekMAS Jurnal Indonesia: Jurnal Ilmu Peranian*, *3*(2), 37–46. https://doi.org/10.33096/agrotekmas.v3i2.245

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Ogunlade, I., Alebiosu, A. A., & Osasona, A. I. (2012). Proximate, mineral composition, antioxidant activity, and total phenolic content of some pepper varieties (Capsicum species). *International Journal of Biological and Chemical Sciences*, *6*(5), 2221–2227. https://doi.org/10.4314/IJBCS.V6I5.28

Opara, U. L., Caleb, O. J., & Belay, Z. A. (2019). Modified Atmosphere Packaging for food preservation. *Food Quality and Shelf Life*, 235–259. https://doi.org/10.1016/B978-0-12-817190-5.00007-0

Owen R. Fennema. (1996). Food Chemistry. In O. R. Fennema (Ed.), *University of Wisconsin-Madison* (3rd ed.). Marcel Dekker, Inc. https://doi.org/10.1007/978-981-19-0872-9_6

ÖZTÜRK, B., & AĞLAR, E. (2019). The Influence of Modified Atmosphere Packaging on quality properties of kiwifruits during cold storage and shelf life. *Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, *9*(2), 614–625. https://doi.org/10.21597/jist.452662

Pandey, A. K., Kumar, P., Singh, P., Tripathi, N. N., & Bajpai, V. K. (2017). Essential oils: sources of antimicrobials and food preservatives. *Frontiers in Microbiology*, *7*(JAN), 2161. https://doi.org/10.3389/FMICB.2016.02161

Parera, J., Nubatonis, L. M., & Malelak, Z. (2021). Optimasi suhu dan waktu penyimpanan terhadap kualitas cabai rawit (Capsicum frutescens l.) jenis cakra. *Prosiding Seminar Nasional Pengabdian Kepada Masyarakat Fakultas Bahasa Asing Universitas Mahasaraswati Denpasar (Senadiba) 2021*, 191–197. https://e-journal.unmas.ac.id/index.php/senadiba/article/view/3240

Park, E. J., Jung, S. Y., Kim, S. C., Lee, D. S., & An, D. S. (2023). Modified Atmosphere Packaging of flounder fillet: Modelling of package conditions and comparison of different flushing atmospheres for quality preservation. *International Food Research Journal*, *30*(6), 1519–1527. https://doi.org/10.47836/ifrj.30.6.14

Parlapani, F. F., Mallouchos, A., Haroutounian, S. A., & Boziaris, I. S. (2014). Microbiological spoilage and investigation of volatile profile during storage of sea bream fillets under various conditions. *International Journal of Food Microbiology*, *189*, 153–163.

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

https://doi.org/10.1016/J.IJFOODMICRO.2014.08.006

Paulus, D., Ferreira, S. B., & Becker, D. (2021). Preservation and post-harvest quality of okra using low density polyethylene. *AIMS Agriculture and Food*, *6*(1), 321–336. https://doi.org/10.3934/agrfood.2021020

Perdana, M. I., Ruamcharoen, J., Panphon, S., & Leelakriangsak, M. (2021). Antimicrobial activity and physical properties of starch/chitosan film incorporated with lemongrass essential oil and its application. *Lwt*, *141*(November 2020), 110934. https://doi.org/10.1016/j.lwt.2021.110934

Peron, D. V., Fraga, S., & Antelo, F. (2017). Thermal degradation kinetics of anthocyanins extracted from juçara (Euterpe edulis Martius) and "Italia" grapes (Vitis vinifera L.), and the effect of heating on the antioxidant capacity. *Food Chemistry*, *232*, 836–840. https://doi.org/10.1016/J.FOODCHEM.2017.04.088

PIHPS. (2025). *Perkembangan harga pangan berdasarkan komoditas*. https://www.bi.go.id/hargapangan/TabelHarga/PasarTradisionalKomoditas

Pinheiro, J., Alegria, C., Abreu, M., Gonçalves, E. M., & Silva, C. L. M. (2013). Kinetics of changes in the physical quality parameters of fresh tomato fruits (Solanum lycopersicum, cv. 'Zinac') during storage. *Journal of Food Engineering*, *114*(3), 338–345. https://doi.org/10.1016/J.JFOODENG.2012.08.024

Plasquy, E., Florido, M. C., Sola-Guirado, R. R., García Martos, J. M., & García Martín, J. F. (2021). Effect of temperature and time on oxygen consumption by olive fruit: empirical study and simulation in a non-ventilated container. *Fermentation 2021, Vol. 7, Page 200*, *7*(4), 200. https://doi.org/10.3390/FERMENTATION7040200

Prakash, A., Baskaran, R., Paramasivam, N., & Vadivel, V. (2018). Essential oil based nanoemulsions to improve the microbial quality of minimally processed fruits and vegetables: A review. *Food Research International*, *111*(May), 509–523. https://doi.org/10.1016/j.foodres.2018.05.066

Pratik, P. (2020). Chemical analysis and pharmacological activities of some important medicinal aromatic plants : A Review. *International Journal of*

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Multidisciplinary Educational Research, *9*(5(8)), 62–81.

Primasari, V. S., & Syaharani, C. F. (2023). Potensi minyak esensial serai terhadap bakteri patogen periodontal. *E-GiGi*, *11*(1), 86–92. https://doi.org/10.35790/EG.V11I1.44465

Purbasari, D., & Sari, E. F. (2022). Physical quality of fresh cayenne pepper (Capsicum frutescens L.) with different types of packaging during low temperature storage. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, *11*(3), 378. https://doi.org/10.23960/jtep-l.v11i3.378-395

Rahman, M. M., Moniruzzaman, M., Ahmad, M. R., Sarker, B. C., & Khurshid Alam, M. (2016). Maturity stages affect the postharvest quality and shelf-life of fruits of strawberry genotypes growing in subtropical regions. *Journal of the Saudi Society of Agricultural Sciences*, *15*(1), 28–37. https://doi.org/10.1016/j.jssas.2014.05.002

Rahman, M. S., & Velez-Ruiz, J. F. (2020). Food Preservation by Freezing. *Handbook of Food Preservation*, 659–680. https://doi.org/10.1201/9780429091483-44

Ranjitha, K., Sudhakar Rao, D. V., Shivashankara, K. S., & Roy, T. K. (2015). Effect of pretreatments and modified atmosphere packaging on the shelf life and quality of fresh- cut green bell pepper. *Journal of Food Science and Technology*, *52*(12), 7872–7882. https://doi.org/10.1007/s13197-015-1928-7

Rinaldi, M. M., Benedetti, B. C., & Moretti, C. L. (2010). Respiration rate, ethylene production and shelf life of minimally processed cabbage under controlled atmosphere. *Acta Horticulturae*, *876*, 279–286. https://doi.org/10.17660/ACTAHORTIC.2010.876.37

Riscahyani, N. M., Ekawati, E. R., & Ngibad, K. (2019). Identification of ascorbic acid content in Carica papaya L. using iodimetry and uv-vis spectrophotometry. *Indonesian Journal of Medical Laboratory Science and Technology*, *1*(2), 58–64. https://doi.org/10.33086/IJMLST.V1I2.1291

Roberts, J. S., Kidd, D. R., & Padilla-Zakour, O. (2008). Drying kinetics of grape seeds. *Journal of Food Engineering*, *89*(4), 460–465.

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

https://doi.org/10.1016/j.jfoodeng.2008.05.030

Robertson, G. L. (2016). Food packaging: principles and practice, Third Edition., 1–688. https://doi.org/10.1201/B21347/FOOD-PACKAGING-GORDON-ROBERTSON/RIGHTS-AND-PERMISSIONS

Rodriguez-Aguilera, R., & Oliveira, J. C. (2009). Review of design engineering methods and applications of active and modified atmosphere packaging systems. *Food Engineering Reviews*, *1*(1), 66–83. https://doi.org/10.1007/s12393-009-9001-9

Rojas-Graü, M. A., Avena-Bustillos, R. J., Olsen, C., Friedman, M., Henika, P. R., Martín-Belloso, O., Pan, Z., & McHugh, T. H. (2007). Effects of plant essential oils and oil compounds on mechanical, barrier and antimicrobial properties of alginate-apple puree edible films. *Journal of Food Engineering*, *81*(3), 634–641. https://doi.org/10.1016/j.jfoodeng.2007.01.007

Sabarella, Komalasari, W. B., Manurung, M., Saida, M. D. N., Seran, K., & Supriyati, A. (2024). Buletin Konsumsi Pangan. *Pusat Data Dan Sistem Informasi Pertanian*, *15*(1).

Sabır, A., Sabir, F. K., & Kara, Z. (2011). Effects of Modified Atmosphere Packing and honey dip treatments on quality maintenance of minimally processed grape cv. Razaki (V. vinifera L.) during cold storage. *Journal of Food Science and Technology*, *48*(3), 312–318. https://doi.org/10.1007/s13197-011-0237-z

Saladié, M., Cañizares, J., Phillips, M. A., Rodriguez-Concepcion, M., Larrigaudière, C., Gibon, Y., Stitt, M., Lunn, J. E., & Garcia-Mas, J. (2015). Comparative transcriptional profiling analysis of developing melon (Cucumis melo L.) fruit from climacteric and non-climacteric varieties. *BMC Genomics*, *16*(1), 1–20. https://doi.org/10.1186/S12864-015-1649-3/FIGURES/9

Saltelli, A., Ratto, M., Andres, T., Campolongo, F., Cariboni, J., Gatelli, D., Saisana, M., & Tarantola, S. (2008). Global Sensitivity Analysis: The Primer. In *International Statistical Review* (Vol. 76, Issue 3). John Wiley & Sons, Ltd. https://doi.org/10.1111/j.1751-5823.2008.00062_17.x

Sandhya. (2010). Modified atmosphere packaging of fresh produce: Current status and future needs. *LWT - Food Science and Technology*, *43*(3), 381–392.

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

https://doi.org/10.1016/j.lwt.2009.05.018

Sapei, L., & Hwa, L. (2014). Study on the kinetics of vitamin C degradation in fresh strawberry juices. *Procedia Chemistry*, *9*, 62–68. https://doi.org/10.1016/j.proche.2014.05.008

Sari, S. M. E., Suparto, I. H., & Wahyuni, W. T. (2024). Application of Lemongrass Oil in chitosan as antimicrobial during storage of crystal guava fruit. *Jurnal Ilmu Pertanian Indonesia*, *30*(1), 131–139. https://doi.org/10.18343/jipi.30.1.131

Schober, P., & Schwarte, L. A. (2018). Correlation coefficients: appropriate use and interpretation. *Anesthesia and Analgesia*, *126*(5), 1763–1768. https://doi.org/10.1213/ANE.0000000000002864

Selvaraj, P., Sanjeevirayar, A., Shanmugam, A., Selvaraj, P., Sanjeevirayar, A., & Shanmugam, A. (2023). Application of Principal Component Analysis as properties and sensory assessment tool for legume milk chocolates. *American Journal of Computational Mathematics*, *13*(1), 136–152. https://doi.org/10.4236/AJCM.2023.131006

Serrano, M., Martínez-Romero, D., Castillo, S., Guillén, F., & Valero, D. (2005). The use of natural antifungal compounds improves the beneficial effect of MAP in sweet cherry storage. *Innovative Food Science and Emerging Technologies*, *6*(1), 115–123. https://doi.org/10.1016/j.ifset.2004.09.001

Shamsudin, R., Ariffin, S. H., Zainol Abdullah, W. N. Z., Azmi, N. S., & Halim, A. A. A. (2021). Modelling the kinetics of color and texture changes of Dabai (Canarium odontophyllum Miq.) during Blanching. *Agronomy 2021, Vol. 11, Page 2185*, *11*(11), 2185. https://doi.org/10.3390/AGRONOMY11112185

Shezi, S., Ngcobo, M. E. K., Khanyile, N., & Ncama, K. (2024). Physio-metabolic mechanisms behind postharvest quality deterioration in Broccoli (Brassica oleracea var. Italica) and Swiss Chard (Beta vulgaris L. var. Cicla): A Review. *Plants 2024, Vol. 13, Page 3174*, *13*(22), 3174. https://doi.org/10.3390/PLANTS13223174

Shoji, K., & Shi, J. (2007). Microbial and quality evaluation of green peppers stored in biodegradable film packaging. *Food Control*, *18*(9), 1121–1125.

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

https://doi.org/10.1016/j.foodcont.2006.07.013

Singh, G., Kapoor, I. P. S., Singh, P., de Heluani, C. S., de Lampasona, M. P., & Catalan, C. A. N. (2010). Comparative study of chemical composition and antioxidant activity of fresh and dry rhizomes of turmeric (Curcuma longa Linn.). *Food and Chemical Toxicology*, *48*(4), 1026–1031. https://doi.org/10.1016/j.fct.2010.01.015

Singh, R., Giri, S. K., & Kotwaliwale, N. (2014). Shelf-life enhancement of green bell pepper (Capsicum annuum L.) under active modified atmosphere storage. *Food Packaging and Shelf Life*, *1*(2), 101–112. https://doi.org/10.1016/j.fpsl.2014.03.001

Siracusa, V., Rocculi, P., Romani, S., & Rosa, M. D. (2008). Biodegradable polymers for food packaging: a review. *Trends in Food Science & Technology*, *19*(12), 634–643. https://doi.org/10.1016/J.TIFS.2008.07.003

Slamet, S., Waznah, U., Fridiana, F., & Yusrilia, Y. (2022). Antioxidant activities of extracts, methanol, and n-hexane partitions of cayenne pepper (Capsicum frutescens L.). *Media Farmasi: Jurnal Ilmu Farmasi*, *19*(1), 9–16. https://doi.org/10.12928/MF.V19I1.19093

Solovchenko, A. E., Avertcheva, O. V., & Merzlyak, M. N. (2006). Elevated sunlight promotes ripening-associated pigment changes in apple fruit. *Postharvest Biology and Technology*, *40*(2), 183–189. https://doi.org/10.1016/j.postharvbio.2006.01.013

Song, J., Sun, B., Chen, C., Ning, Z., Zhang, S., Cai, Y., Zheng, X., Cao, B., Chen, G., Jin, D., Li, B., Bian, J., Lei, J., He, H., & Zhu, Z. (2023). An R-R-type MYB transcription factor promotes non-climacteric pepper fruit carotenoid pigment biosynthesis. *Plant Journal*, *115*(3), 724–741. https://doi.org/10.1111/TPJ.16257

Standart, I. (2006). *US ISO 7543-1, Chillies and chilli oleoresins capsaicinoid content*.

Sudjatha, W., & Wisaniyasa, N. W. (2017). Fisiologi dan teknologi pascapanen. In *Udayana University Press 2017* (Vol. 1, Issue Agricultur).

Sulistyaningrum, A., & Darudriyo. (2018). Penurunan kualitas cabai rawit selama

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

penyimpanan dalam suhu ruang Decreasing of Cayenne Pepper Quality During Storage in Room Temperature. *Jurnal Agronida*, *4*(2), 64–71.

Sulistyaningrum, A., & Darudryo, D. (2018). Decreasing of cayenne pepper quality during storage in room temperature. *JURNAL AGRONIDA*, *4*(2). https://doi.org/10.30997/JAG.V4I2.1566

Susmiati, Y., Purwantana, B., Bintoro, N., & Rahayoe, S. (2022). Heat transfer characteristics in vertical tubular baffle internal reboiler through dimensional analysis. *International Journal of Technology*, *13*(3), 508–517. https://doi.org/10.14716/ijtech.v13i3.5170

Swandari, T., Basunanda, P., & Aziz-Purwantoro. (2017). Penggunaan alat sensor warna untuk menduga derajat dominansi gen penyandi karakter warna buah cabai hasil persilangan. *AGROISTA: Jurnal Agroteknologi*, *1*(1), 40–49.

Taoukis, P. S., & Labuza, T. P. (1989). Applicability of time-temperature indicators as shelf life monitors of food products. *Journal of Food Science*, *54*(4), 783–788. https://doi.org/10.1111/J.1365-2621.1989.TB07882.X

Tatengkeng, M. A. (2019). Kadar vitamin c cabai rawit (Capsicum frutescens L) hasil ozonasi selama penyimpanan suhu ruang. *Pasundan Food Technology Journal*. https://doi.org/10.23969/pftj.v6i2.1296

Thakur, N., Sharma, B., Bishnoi, S., Jain, S., Nayak, D., & Sarma, T. K. (2019). Biocompatible Fe3+ and Ca2+ Dual Cross-Linked G-Quadruplex Hydrogels as Effective Drug Delivery System for pH-Responsive Sustained Zero-Order Release of Doxorubicin [Research-article]. *ACS Applied Bio Materials*, *2*(8), 3300–3311. https://doi.org/10.1021/acsabm.9b00334

Thi, N., Tham, H., & Minh, N. P. (2014). *Effects of combining packaging and temperature preservation on cayenne pepper quality*. *1*(3), 22–29.

Tzortzakis, N. G. (2009). Essential Oil: Innovative tool to improve the preservation of fresh produce-A Review. *Fresh Produce*, *3*(1), 87–97.

Valero, D., & Serrano, M. (2010). *Postharvest biology and technology for preserving fruit quality*. http://www.copyright.com/

Valšíková-Frey, M., Komár, P., & Rehuš, M. (2017). The effect of varieties and degree of ripeness to vitamin C content in tomato fruits. *Acta Horticulturae et*

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Regiotecturae, *20*(2), 44–48. https://doi.org/10.1515/ahr-2017-0010

Van Boekel, M. A. J. S. (2008). Kinetic modeling of food quality: A critical review. *Comprehensive Reviews in Food Science and Food Safety*, *7*(1), 144–158. https://doi.org/10.1111/j.1541-4337.2007.00036.x

Vicent, V., Ndoye, F. T., Verboven, P., Nicolaï, B. M., & Alvarez, G. (2018). Quality changes kinetics of apple tissue during frozen storage with temperature fluctuations. *International Journal of Refrigeration*, *92*, 165–175. https://doi.org/10.1016/j.ijrefrig.2018.05.023

Wahua, C., & Olaleye, S. M. (2013). Comparative taxonomic studies on Solanum aethiopicum Linn. and Solanum nigrum Linn. (Solanaceae). *Greener Journal of Agricultural Sciences*, *3*(12), 849–855. https://doi.org/10.15580/GJAS.2013.3.111713966

Wang, Y., Liu, L., & Wei, Y. (2025). The influence of consumption purpose on consumer preferences for fruit attributes: the moderating effect of color perception. *Foods*, *14*(11), 1902. https://doi.org/10.3390/FOODS14111902

Ward, G. (2016). Modified Atmosphere Packaging for extending storage life of fresh fruits and vegetables. In *Reference Module in Food Science*. Elsevier. https://doi.org/10.1016/b978-0-08-100596-5.03167-x

Wati, R. Y. (2018). Pengaruh pemanasan media PCA berulang terhadap uji TPC di Laboratorium Mikrobiologi Teknologi Hasil Pertanian Unand. *Jurnal TEMAPELA*, *1*(2), 44–47. https://doi.org/10.25077/temapela.1.2.44-47.2018

Wifek, M., Saeed, A., Rehman, R., & Nisar, S. (2016). Lemongrass: a review on its botany, properties, applications and active components. *Ijcbs*, *9*(January), 79–84. www.iscientific.org/Journal.html

Wills, R. B. H., & Golding, J. (2016). Advances in postharvest fruit and vegetable technology. *Advances in Postharvest Fruit and Vegetable Technology*, 1–368. https://doi.org/10.1201/b18489

Wills, R. B. H., Harris, D. R., Spohr, L. J., & Golding, J. B. (2014). Reduction of energy usage during storage and transport of bananas by management of exogenous ethylene levels. *Postharvest Biology and Technology*, *89*, 7–10. https://doi.org/10.1016/j.postharvbio.2013.11.002

UNIVERSITAS GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Wills, R. B. H., WB, M., D, G., & DC, J. (2007). *Extending postharvest life of green chilli pepper fruits with Modified Atmosphere Packaging | Semantic Scholar*. University of New South Wales Press, Sydney. https://www.semanticscholar.org/paper/Extending-Postharvest-Life-of-Green-Chilli-Pepper-Edusei-Ofosu-Anim/2b2426a18d38a810a0e4a501531e8d87f98bc4d4

Wulandari, S., Bey, Y., & Tindaon, K. D. (2012). Pengaruh jenis bahan pengemas dan lama penyimpanan terhadap kadar vitamin C dan susut berat cabai rawit (Capsicum frutescens L.). *J. Biogenesis*, *8*(2), 23–30. https://fkip.unri.ac.id/wp-content/uploads/2020/06/Pengaruh-Jenis-Bahan-Pengemas-Dan-Lama-Penyimpanan-Terhadap-Kadar-Vitamin-C-Dan-Susut-Berat-Cabai-Rawit-Capsicum-Frutescens-L-2.pdf

Yahia, E. M. (2018). Postharvest physiology and biochemistry of fruits and vegetables. *Postharvest Physiology and Biochemistry of Fruits and Vegetables*, 1–476. https://doi.org/10.1016/C2016-0-04653-3

Yan, H., Wang, R., Ji, N., Li, J., Ma, C., Lei, J., Ba, L., Wen, G., & Long, X. (2022). Regulation of cell wall degradation and energy metabolism for maintaining shelf quality of blueberry by short-term 1-methylcyclopropene treatment. *Agronomy 2023, Vol. 13, Page 46*, *13*(1), 46. https://doi.org/10.3390/AGRONOMY13010046

Yuexin Yang. (2024). *The effect of temperature and packaging on the quality of fresh cucumbers during storage*. moz-extension://2a833eab-ccc6-4cec-a292-a6345df25001/enhanced-reader.html?openApp&pdf=https%3A%2F%2Fedepot.wur.nl%2F651066

Zam, W., Ilyas, I., & Syatrawati, S. (2019). Penerapan teknologi pascapanen untuk meningkatkan nilai jual Cabai Di Tanatoraja. *Jurnal Dedikasi Masyarakat*, *2*(2), 92. https://doi.org/10.31850/jdm.v2i2.407

Zewdie, Y., & Bosland, P. W. (2001). Capsaicinoid profiles are not good chemotaxonomic indicators for Capsicum species. *Biochemical Systematics and Ecology*, *29*(2), 161–169. https://doi.org/10.1016/S0305-1978(00)00041-7

UNIVERSITAS
GADJAH MADA
ANALISIS MATEMATIS PERANCANGAN MODIFIED ATMOSPHERE PACKAGING (MAP) UNTUK CABAI RAWIT (Capsicum frutescens L.) KULTIVAR RHS N 30 A DENGAN PRETREATMENT MINYAK SERAI
Erni Romansyah, Prof. Dr. Ir. Nursigit Bintoro, M.Sc, IPU., ASEAN Eng., APEC Eng
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Zhang, W., Lin, M., Feng, X., Yao, Z., Wang, T., & Xu, C. (2022). Effect of lemon essential oil-enriched coating on the postharvest storage quality of citrus fruits. *Food Science and Technology (Brazil), 42*, 1–9. https://doi.org/10.1590/fst.125421

Zhang, W., Luo, Z., Wang, A., Gu, X., & Lv, Z. (2021). Kinetic models applied to quality change and shelf life prediction of kiwifruits. *LWT, 138*, 110610. https://doi.org/10.1016/j.lwt.2020.110610

Zhang, Z., Mo, Z., Zhang, X., Wang, J., Li, J., Shi, H., Wang, P., & Lin, Z. (2022). The antifungal activity and action mechanism of lemongrass (Cymbopogon flexuosus) essential oil against Fusarium avenaceum. *Journal of Essential Oil-Bearing Plants*, *25*(3), 536–547. https://doi.org/10.1080/0972060X.2022.2090283

Zhao, Y., Li, L., Gao, S., Wang, S., Li, X., & Xiong, X. (2023). Postharvest storage properties and quality kinetic models of cherry tomatoes treated by high-voltage electrostatic fields. *LWT-Food Science and Technology, 176*, 114497. https://doi.org/10.1016/j.lwt.2023.114497