

References

- Abd Ghani, A., Adachi, S., Shiga, H., Neoh, T. L., Adachi, S., & Yoshii, H. (2017). Effect of different dextrose equivalents of maltodextrin on oxidation stability in encapsulated fish oil by spray drying. *Bioscience, Biotechnology, and Biochemistry*, *81*(4), 705-711.
- Abdelwahed, W., Degobert, G., Stainmesse, S., & Fessi, H. (2006). Freeze-drying of nanoparticles: formulation, process and storage considerations. *Advanced drug delivery reviews*, *58*(15), 1688-1713.
- Abuzaytoun, R., Budge, S., Hansen, L. T., & MacKinnon, S. (2020). Modification of the ferrous oxidation-xyleneol orange method for determination of peroxide value in highly pigmented sea cucumber viscera lipid. *Journal of the American Oil Chemists' Society*, *97*(5), 509-516.
- Akonor, P. T., Osei Tutu, C., Affrifah, N. S., Budu, A. S., & Saalia, F. K. (2023). Kinetics of β -Carotene Breakdown and Moisture Sorption Behavior of Yellow Cassava Flour during Storage. *Journal of Food Processing and Preservation*, 2023.
- Albuquerque, B. R., Oliveira, M. B. P., Barros, L., & Ferreira, I. C. (2021). Could fruits be a reliable source of food colorants? Pros and cons of these natural additives. *Critical Reviews in Food Science and Nutrition*, *61*(5), 805-835.
- Alemayhu, A., Admassu, S., & Tesfaye, B. (2019). Shelf-life prediction of edible cotton, peanut and soybean seed oils using an empirical model based on standard quality tests. *Cogent Food & Agriculture*, *5*(1), 1622482.
- Andarwulan, N., Palupi, N. S., & Susanti. (2006) Pengembangan metode ekstraksi dan karakterisasi minyak buah merah (*Pandanus conoideus* L.). Prosiding Seminar Nasional Himpunan Ahli Pangan Indonesia (PATPI), 2 - 3 Agustus 2006.
- Anggraini, A., Sayuti, K., & Yenrina, R. (2019). ACCELERATED SHELF LIFE TEST (ASLT) METHOD WITH ARRHENIUS APPROACH FOR SHELF LIFE ESTIMATION OF SUGAR PALM FRUIT JAM. *Journal of Applied Agricultural Science and Technology* ISSN, *3*(2), 268-279.
- Anwar, S. H., & Kunz, B. (2011). The influence of drying methods on the stabilization of fish oil microcapsules: Comparison of spray granulation, spray drying, and freeze drying. *Journal of food engineering*, *105*(2), 367-378.
- AOCS Official Method Cd 8b-90. (1989). Peroxide value Acetic Acid-Isooctane Method. *Official methods and recommended practices of the American Oil Chemists' Society* (4th edn).
- Arumsari, N. I., Riyanto, S., & Rohman, A. (2013). Some physico-chemical properties of red fruit oil (*Pandanus conoideus* Lam) from hexane and chloroform fractions. *Journal of Food and Pharmaceutical Sciences*, *1*(2).

- Augustin, M. A., & Hemar, Y. (2009). Nano-and micro-structured assemblies for encapsulation of food ingredients. *Chemical society reviews*, 38(4), 902-912.
- Bae, E. K., & Lee, S. J. (2008). Microencapsulation of avocado oil by spray drying using whey protein and maltodextrin. *Journal of microencapsulation*, 25(8), 549-560.
- Barriuso, B., Astiasarán, I., & Ansorena, D. (2013). A review of analytical methods measuring lipid oxidation status in foods: a challenging task. *European food research and technology*, 236, 1-15.
- Berns, R. S. (2019). *Billmeyer and Saltzman's principles of color technology*. John Wiley & Sons.
- Bhandari, B., Bansal, N., Zhang, M., & Schuck, P. (Eds.). (2013). *Handbook of food powders: Processes and properties*. Elsevier.
- Bogacz-Radomska, L., & Harasym, J. (2018). β -Carotene—properties and production methods. *Food Quality and Safety*, 2(2), 69-74.
- Calligaris, S., Manzocco, L., Kravina, G., & Nicoli, M. C. (2007). Shelf-life modeling of bakery products by using oxidation indices. *Journal of agricultural and food chemistry*, 55(5), 2004-2009.
- Calligaris, S., Manzocco, L., Anese, M., & Nicoli, M. C. (2016). Shelf-life assessment of food undergoing oxidation—a review. *Critical reviews in food science and nutrition*, 56(11), 1903-1912.
- Calligaris, S., Manzocco, L., Anese, M., & Nicoli, M. C. (2019). Accelerated shelf life testing. In *Food quality and shelf life* (pp. 359-392). Academic Press.
- Calvo, P., Castaño, Á. L., Lozano, M., & González-Gómez, D. (2012). Influence of the microencapsulation on the quality parameters and shelf-life of extra-virgin olive oil encapsulated in the presence of BHT and different capsule wall components. *Food Research International*, 45(1), 256-261.
- Cittadini, A., Munekata, P. E. S., Pateiro, M., Sarriés, M. V., Domínguez, R., & Lorenzo, J. M. (2022). Encapsulation techniques to increase lipid stability. *Food Lipids*, 413-459.
- Cecchini, M., Contini, M., Massantini, R., Monarca, D., & Moschetti, R. (2011). Effects of controlled atmospheres and low temperature on storability of chestnuts manually and mechanically harvested. *Postharvest Biology and Technology*, 61(2-3), 131-136.
- Choe, E., & Min, D. B. (2006). Comprehensive reviews in food science and food safety mechanisms and factors for edible oil oxidation. *Comprehensive Reviews in Food Science and Food Safety*, 5, 169-186.
- Chutintrasri, B., & Noomhorm, A. (2007). Color degradation kinetics of pineapple puree during thermal processing. *LWT-Food Science and Technology*, 40(2), 300-306.

- Colle, I. J., Lemmens, L., Knockaert, G., Van Loey, A., & Hendrickx, M. (2016). Carotene degradation and isomerization during thermal processing: A review on the kinetic aspects. *Critical Reviews in Food Science and Nutrition*, 56(11), 1844-1855.
- Colton, J. A., & Bower, K. M. (2002). Some misconceptions about R2. *International Society of Six Sigma Professionals, EXTRAOrdinary Sense*, 3(2), 20-22.
- Connell, J. J. (1975). Control of fish quality.
- Cortez, R., Luna-Vital, D. A., Margulis, D., & Gonzalez de Mejia, E. (2017). Natural pigments: stabilization methods of anthocyanins for food applications. *Comprehensive Reviews in Food Science and Food Safety*, 16(1), 180-198.
- Damodaran, S., Parkin, K. L., & Fennema, O. R. (Eds.). (2007). *Fennema's food chemistry*. CRC press.
- de Carvalho, L. M. J., Gomes, P. B., de Oliveira Godoy, R. L., Pacheco, S., do Monte, P. H. F., de Carvalho, J. L. V., ... & Ramos, S. R. R. (2012). Total carotenoid content, α -carotene and β -carotene, of landrace pumpkins (*Cucurbita moschata* Duch): A preliminary study. *Food Research International*, 47(2), 337-340.
- de la Presa-Owens, S., Lopez-Sabater, M. C., & Rivero-Urgell, M. (1995). Shelf-life prediction of an infant formula using an accelerated stability test (Rancimat). *Journal of Agricultural and Food Chemistry*, 43(11), 2879-2882.
- de Freitas Santos, P. D., Rubio, F. T. V., da Silva, M. P., Pinho, L. S., & Favaro-Trindade, C. S. (2021). Microencapsulation of carotenoid-rich materials: A review. *Food Research International*, 147, 110571.
- de Quirós, A. R. B., & Costa, H. S. (2006). Analysis of carotenoids in vegetable and plasma samples: A review. *Journal of food composition and analysis*, 19(2-3), 97-111.
- Desobry, S. A., Netto, F. M., & Labuza, T. P. (1997). Freeze-drying for β -Carotene Encapsulation and Preservation INTRODUCTION. *J Food Sci*, 62, 1158-62.
- Dickinson, E. (2009). Hydrocolloids as emulsifiers and emulsion stabilizers. *Food hydrocolloids*, 23(6), 1473-1482.
- Durance, T., & Yaghmaee, P. (2011). 4.51—Microwave dehydration of food and food ingredients. *Comprehensive biotechnology*, 617-628.
- Echavarría, A. P., Pagán, J., & Ibarz, A. (2012). Melanoidins formed by Maillard reaction in food and their biological activity. *Food Engineering Reviews*, 4, 203-223.
- Erdem, B. G., & Kaya, S. (2022). Edible film fabrication modified by freeze drying from whey protein isolate and sunflower oil: Functional property evaluation. *Food Packaging and Shelf Life*, 33, 100887.

- Erzhad, M. F., Adiyoga, R., Marwah, H., Wulandari, Z., Soenarno, M. S., Arifin, M., & Murtini, D. (2022, April). The Utilization of Red Fruit (*Pandanus conoideus* Lam) Extract for Making Goat's Milk Kefir. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1020, No. 1, p. 012030). IOP Publishing.
- Eun, J. B., Maruf, A., Das, P. R., & Nam, S. H. (2020). A review of encapsulation of carotenoids using spray drying and freeze drying. *Critical Reviews in Food Science and Nutrition*, *60*(21), 3547-3572.
- Fang, Z., & Bhandari, B. (2010). Encapsulation of polyphenols—a review. *Trends in food science & technology*, *21*(10), 510-523.
- Faulks, R. M., & Southon, S. (2005). Challenges to understanding and measuring carotenoid bioavailability. *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease*, *1740*(2), 95-100.
- Fellows, P. (2017). Freeze drying and freeze concentration. *Food processing technology, 4th edn. Woodhead publications Ltd., England*, 441-451.
- Ferdiansyah, F., Heriyanto, H., Wijaya, C. H., & Limantara, L. (2017). Pengaruh metode nanoenkapsulasi terhadap stabilitas pigmen karotenoid dan umur simpan minyak dari buah merah (*Pandanus conoideus* L). *Agritech*, *37*(4), 369-376.
- Ferrari, C. C., Marconi Germer, S. P., Alvim, I. D., & de Aguirre, J. M. (2013). Storage stability of spray-dried blackberry powder produced with maltodextrin or gum arabic. *Drying Technology*, *31*(4), 470-478.
- Fioramonti, S. A., Arzeni, C., Pilosof, A. M., Rubiolo, A. C., & Santiago, L. G. (2015). Influence of freezing temperature and maltodextrin concentration on stability of linseed oil-in-water multilayer emulsions. *Journal of Food Engineering*, *156*, 31-38.
- Fioramonti, S. A., Rubiolo, A. C., & Santiago, L. G. (2017). Characterisation of freeze-dried flaxseed oil microcapsules obtained by multilayer emulsions. *Powder technology*, *319*, 238-244.
- Fitria, E., Wulandari, N., Hariyadi, P., & Wijaya, H. (2020). Identifikasi dan Fraksinasi Karotenoid pada Minyak Buah Merah (*Pandanus conoideus*). *Indonesian Journal of Industrial Research*, *37*(1), 7-19.
- Foegeding, E. A., Luck, P., & Vardhanabhuti, B. (2011). Milk protein products/whey protein products. *Encyclopedia of Dairy Sciences*.
- Fuenmayor, C. A., Baron-Cangrejo, O. G., & Salgado-Rivera, P. A. (2021). Encapsulation of carotenoids as food colorants via formation of cyclodextrin inclusion complexes: A review. *Polysaccharides*, *2*(2), 454-476.

- Fратиани, A., Niro, S., Messina, M. C., Cinquanta, L., Panfili, G., Albanese, D., & Di Matteo, M. (2017). Kinetics of carotenoids degradation and furosine formation in dried apricots (*Prunus armeniaca* L.). *Food research international*, 99, 862-867.
- Gaidhani, K. A., Harwalkar, M., Bhambere, D., & Nirgude, P. S. (2015). Lyophilization/freeze drying—a review. *World journal of pharmaceutical research*, 4(8), 516-543.
- Gallagher, M. S., Mahajan, P. V., & Yan, Z. (2011). Modelling chemical and physical deterioration of foods and beverages. In *Food and beverage stability and shelf life* (pp. 459-481). Woodhead Publishing.
- Garcia-Amezquita, L. E., Welte-Chanes, J., Vergara-Balderas, F. T., & Bermúdez-Aguirre, D. (2016). Freeze-drying: the basic process.
- Goñi, S. M., & Salvadori, V. O. (2017). Color measurement: comparison of colorimeter vs. computer vision system. *Journal of Food Measurement and Characterization*, 11, 538-547.
- González-Peña, M. A., Ortega-Regules, A. E., Anaya de Parrodi, C., & Lozada-Ramírez, J. D. (2023). Chemistry, Occurrence, Properties, Applications, and Encapsulation of Carotenoids—A Review. *Plants*, 12(2), 313.
- Gordon, H. T., Bauernfeind, J. C., & Furia, T. E. (1983). Carotenoids as food colorants. *CRC Critical Reviews in Food Science and Nutrition*, 18(1), 59-97.
- Goulding, D. A., Fox, P. F., & O'Mahony, J. A. (2020). Milk proteins: An overview. *Milk proteins*, 21-98.
- Guadarrama-Lezama, A. Y., Jaramillo-Flores, E., Gutiérrez-López, G. F., Pérez-Alonso, C., Dorantes-Álvarez, L., & Alamilla-Beltrán, L. (2014). Effects of storage temperature and water activity on the degradation of carotenoids contained in microencapsulated chili extract. *Drying Technology*, 32(12), 1435-1447.
- Hogan, S. A., McNamee, B. F., O'Riordan, E. D., & O'Sullivan, M. (2001). Microencapsulating properties of sodium caseinate. *Journal of Agricultural and Food Chemistry*, 49(4), 1934-1938.
- Huck-Iriart, C., Álvarez-Cerimedo, M. S., Candal, R. J., & Herrera, M. L. (2011). Structures and stability of lipid emulsions formulated with sodium caseinate. *Current Opinion in Colloid & Interface Science*, 16(5), 412-420.
- Inyang, U., Oboh, I., & Etuk, B. (2017). Drying and the different techniques. *International Journal of Food Nutrition and Safety*, 8(1), 45-72.
- Irwin, J. W., & Hedges, N. (2004). Measuring lipid oxidation. *Understanding and Measuring Shelf life of Food*, 289-316.
- Islam, M. Z., Kitamura, Y., Kokawa, M., & Monalisa, K. (2017). Degradation kinetics and storage stability of vacuum spray-dried micro wet-milled orange juice (*Citrus unshiu*) powder. *Food and Bioprocess Technology*, 10, 1002-1014.

- Jangam, S. V., Mujumdar, A. S., & Adhikari, B. (2016). Drying: Physical and structural changes.
- Jaswir, I., Noviendri, D., Hasrini, R. F., & Octavianti, F. (2011). Carotenoids: Sources, medicinal properties and their application in food and nutraceutical industry. *J. Med. Plants Res*, 5(33), 7119-7131.
- Jay, J. M., Loessner, M. J., & Golden, D. A. (2005). Protection of foods by drying. *Modern food microbiology*, 443-456.
- Jena, S., & Das, H. (2012). Shelf life prediction of aluminum foil laminated polyethylene packed vacuum dried coconut milk powder. *Journal of Food Engineering*, 108(1), 135-142.
- Jiménez, A., Fabra, M. J., Talens, P., & Chiralt, A. (2013). Physical properties and antioxidant capacity of starch–sodium caseinate films containing lipids. *Journal of Food Engineering*, 116(3), 695-702.
- Kaleem, A., Aziz, S., & Iqtedar, M. (2015). Investigating changes and effect of peroxide values in cooking oils subject to light and heat. *FUUAST Journal of Biology*, 5(2), 191-196.
- Kardile, N. B., Nanda, V., & Thakre, S. (2020). Thermal degradation kinetics of total carotenoid and colour of mixed juice. *Agricultural Research*, 9, 400-409.
- Kaya, A., Tekin, A. R., & Öner, M. D. (1993). Oxidative stability of sunflower and olive oils: comparison between a modified active oxygen method and long term storage. *LWT-Food Science and Technology*, 26(5), 464-468.
- Kim, A. N., Kim, O. W., & Kim, H. (2022). Degradation kinetics of physicochemical and sensory properties of rice during storage at different temperatures. *LWT*, 164, 113688.
- Khan, A., Wang, C., Sun, X., Killpartrick, A., & Guo, M. (2019). Preparation and characterization of whey protein isolate–DIM nanoparticles. *International Journal of Molecular Sciences*, 20(16), 3917.
- Knockaert, G., Lemmens, L., Van Buggenhout, S., Hendrickx, M., & Van Loey, A. (2012). Changes in β -carotene bioaccessibility and concentration during processing of carrot puree. *Food Chemistry*, 133(1), 60-67.
- Koc, B., Yilmazer, M. S., Balkır, P., & Ertekin, F. K. (2010). Moisture sorption isotherms and storage stability of spray-dried yogurt powder. *Drying Technology*, 28(6), 816-822.
- Kochhar, S. P., & Henry, C. J. K. (2009). Oxidative stability and shelf-life evaluation of selected culinary oils. *International Journal of Food Sciences and Nutrition*, 60(sup7), 289-296.
- Kong, F., & Singh, R. P. (2011). Advances in instrumental methods to determine food quality deterioration. In *Food and beverage stability and shelf life* (pp. 381-404). Woodhead Publishing.

- Kong, F., & Singh, R. P. (2016). Chemical deterioration and physical instability of foods and beverages. In *The stability and shelf life of food* (pp. 43-76). Woodhead Publishing.
- Kong, L., Bhosale, R., & Ziegler, G. R. (2018). Encapsulation and stabilization of β -carotene by amylose inclusion complexes. *Food Research International*, 105, 446-452.
- Koganti, V., Luthra, S., & Pikal, M. J. (2019). THE FREEZE DRYING PROCESS: THE USE OF MATHEMATICAL MODELING IN PROCESS DESIGN, UNDERSTANDING, AND SCALE-UP. *Chemical Engineering in the Pharmaceutical Industry: Drug Product Design, Development, and Modeling*, 293-309.
- Kumar, C., Karim, M. A., & Joardder, M. U. (2014). Intermittent drying of food products: A critical review. *Journal of Food Engineering*, 121, 48-57.
- Lago, C. C., & Noreña, C. P. Z. (2017). Thermodynamic and kinetics study of phenolics degradation and color of yacon (*Smallanthus sonchifolius*) microparticles under accelerated storage conditions. *Journal of food science and technology*, 54, 4197-4204.
- Lavelli, V., & Sereikaitė, J. (2022). Kinetic study of encapsulated β -carotene degradation in dried systems: A review. *Foods*, 11(3), 437.
- Lea, A., & Henry, B. (2003). Colorants (Colourants) | Properties and Determination of Natural Pigments.
- Lee, H. S. (2001). Characterization of carotenoids in juice of red navel orange (Cara Cara). *Journal of Agricultural and Food Chemistry*, 49(5), 2563-2568.
- Lee, W. J., Tan, C. P., Sulaiman, R., Smith Jr, R. L., & Chong, G. H. (2018). Microencapsulation of red palm oil as an oil-in-water emulsion with supercritical carbon dioxide solution-enhanced dispersion. *Journal of Food Engineering*, 222, 100-109.
- Lee, W. J., Tan, C. P., Sulaiman, R., Hee, Y. Y., & Chong, G. H. (2020). Storage stability and degradation kinetics of bioactive compounds in red palm oil microcapsules produced with solution-enhanced dispersion by supercritical carbon dioxide: A comparison with the spray-drying method. *Food chemistry*, 304, 125427.
- Leon, K., Mery, D., Pedreschi, F., & Leon, J. (2006). Color measurement in $L^* a^* b^*$ units from RGB digital images. *Food research international*, 39(10), 1084-1091.
- Lestari, N., Junaidi, L., Wijaya, H., Wardayanie, N. I. A., & Ariningsih, S. (2021). Pengembangan teknologi pengolahan serbuk minyak buah merah (*Pandanus conoideus* Lamk) untuk sediaan bahan tambahan pangan. *Warta IHP*, 38(2), 117-125.
- Liu, F., Cao, X., Wang, H., & Liao, X. (2010). Changes of tomato powder qualities during storage. *Powder Technology*, 204(1), 159-166.
- Lomauro, C. J., Bakshi, A. S., & Labuza, T. P. (1985). Moisture transfer properties of dry and semimoist foods. *Journal of Food Science*, 50(2), 397-400.

- Lombardelli, C., Benucci, I., & Esti, M. (2021). Novel food colorants from tomatoes: Stability of carotenoid-containing chromoplasts under different storage conditions. *LWT*, *140*, 110725.
- Lopez-Quiroga, E., Antelo, L. T., & Alonso, A. A. (2012). Time-scale modeling and optimal control of freeze–drying. *Journal of Food Engineering*, *111*(4), 655-666.
- Lu, W., Yang, X., Shen, J., Li, Z., Tan, S., Liu, W., & Cheng, Z. (2021). Choosing the appropriate wall materials for spray-drying microencapsulation of natural bioactive ingredients: Taking phenolic compounds as examples. *Powder Technology*, *394*, 562-574.
- Lubis, E. H., Wijaya, H., & Lestari, N. (2012). Mempelajari ekstraksi dan stabilitas total karotenoid, dan α -dan β -cryptoxanthin dalam ekstrak buah merah (*Pandanus conoideus* Lamk). *Jurnal Riset Teknologi Indonesia*, *6*(12), 126-140.
- Ly, B. C. K., Dyer, E. B., Feig, J. L., Chien, A. L., & Del Bino, S. (2020). Research techniques made simple: cutaneous colorimetry: a reliable technique for objective skin color measurement. *Journal of Investigative Dermatology*, *140*(1), 3-12.
- Lyu, Y., Bi, J., Chen, Q., Li, X., Lyu, C., & Hou, H. (2020). Color, carotenoids, and peroxidase degradation of seed-used pumpkin byproducts as affected by heat and oxygen content during drying process. *Food and Bioprocess Technology*, *13*, 1929-1939.
- Madene, A., Jacquot, M., Scher, J., & Desobry, S. (2006). Flavour encapsulation and controlled release—a review. *International journal of food science & technology*, *41*(1), 1-21.
- Madiyan, W. M., & Anisah, N. (2009). The effect of *Pandanus conoideus* Lam. oil on pancreatic (i-cells and glibenclamide hypoglycemic effect of diabetic Wistar rats. *Journal of the Medical Sciences (Berkala Ilmu Kedokteran)*, *41*(01).
- Malik, A., & Lestari, R. H. S. (2015). Potensi Tanaman Buah Merah dan Prospek Pengembangannya di Provinsi Papua. In *Prosiding Seminar Nasional Sumber Daya Genetik Pertanian*. <http://repository.pertanian.go.id/bitstream/handle/123456789/11989/potensi2> (Vol. 15, pp. 258-266).
- Man, C. M. D. (2004). Shelf-life testing. *Understanding and Measuring the Shelf-life of Food*, 340-356.
- Manzocco, L., Panozzo, A., & Calligaris, S. (2012). Accelerated shelf life testing (ASLT) of oils by light and temperature exploitation. *Journal of the American Oil Chemists' Society*, *89*, 577-583.
- Mas, M. A., Dewi, D. P., Surjawan, I., Arista, D., Amelia, V., Surjadi, A., & Kho, K. (2023). Production of red fruit (*Pandanus conoideus*) oil powder using spray drying and freeze drying. *International Journal of Food Engineering*, *19*(5), 211-224.
- Mauer, L. J., & Bradley, R. L. (2017). Moisture and total solids analysis. *Food analysis*, 257-286.
- McCann, D., Barrett, A., Cooper, A., Crumpler, D., Dalen, L., Grimshaw, K., ... & Stevenson, J. (2007). Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the

- community: a randomised, double-blinded, placebo-controlled trial. *The lancet*, 370(9598), 1560-1567.
- McClements, D.J. and Decker, E.A. (2017) 'Lipids', in S. Damodaran and K.L. Parkin (eds.) *Fennema's Food Chemistry*. Boca Raton: CRC Press.
- Meléndez-Martínez, A. J., Escudero-Gilete, M. L., Vicario, I. M., & Heredia, F. J. (2010). Study of the influence of carotenoid structure and individual carotenoids in the qualitative and quantitative attributes of orange juice colour. *Food Research International*, 43(5), 1289-1296.
- Mensink, M. A., Frijlink, H. W., van Der Voort Maarschalk, K., & Hinrichs, W. L. (2017). How sugars protect proteins in the solid state and during drying (review): Mechanisms of stabilization in relation to stress conditions. *European Journal of Pharmaceutics and Biopharmaceutics*, 114, 288-295.
- Minj, S., & Anand, S. (2020). Whey proteins and its derivatives: Bioactivity, functionality, and current applications. *Dairy*, 1(3), 233-258.
- Mizrahi, S. (2004). Accelerated shelf-life tests. *Understanding and measuring the shelf-life of food*, 318-339.
- Mizrahi, S. (2011). Accelerated shelf life testing of foods. In *Food and beverage stability and shelf life* (pp. 482-506). Woodhead Publishing.
- Mohamad, M. F., Dailin, D. J., Gomaa, S. E., Nurjayadi, M., & Enshasy, H. E. (2019). Natural colorant for food: a healthy alternative. *International Journal of Science & Technology Research*, 8(11), 3161-3166.
- Mohammed, N. K., Tan, C. P., Manap, Y. A., Muhiadin, B. J., & Hussin, A. S. M. (2020). Spray drying for the encapsulation of oils—A review. *Molecules*, 25(17), 3873.
- Molteni, C., La Motta, C., & Valoppi, F. (2022). Improving the Bioaccessibility and Bioavailability of Carotenoids by Means of Nanostructured Delivery Systems: A Comprehensive Review. *Antioxidants*, 11(10), 1931.
- Mukherjee, S., & Bhattacharya, S. (2006). Characterization of agglomeration process as a function of moisture content using a model food powder. *Journal of Texture Studies*, 37(1), 35-48.).
- Multari, S., Marsol-Vall, A., Keskitalo, M., Yang, B., & Suomela, J. P. (2018). Effects of different drying temperatures on the content of phenolic compounds and carotenoids in quinoa seeds (*Chenopodium quinoa*) from Finland. *Journal of Food Composition and Analysis*, 72, 75-82.
- Murtiningrum, S. K. (2005). Ekstraksi minyak dengan metode wet rendering dari buah pandan (*Pandanus conoideus* L). *Jurnal Teknologi Industri Pertanian*, 15(1).

- MURTININGRUM, M., SARUNGALLO, Z. L., & MAWIKERE, N. L. (2012). The exploration and diversity of red fruit (*Pandanus conoideus* L.) from Papua based on its physical characteristics and chemical composition. *Biodiversitas Journal of Biological Diversity*, 13(3).
- Nielsen, S. S. (2010). Determination of moisture content. *Food analysis laboratory manual*, 17-27.
- Nowak, D., & Jakubczyk, E. (2020). The freeze-drying of foods—The characteristic of the process course and the effect of its parameters on the physical properties of food materials. *Foods*, 9(10), 1488.
- Ntrallou, K., Gika, H., & Tsochatzis, E. (2020). Analytical and sample preparation techniques for the determination of food colorants in food matrices. *Foods*, 9(1), 58.
- Nurhasanah, S., Setyadi, A., Munarso, S. J., Subroto, E., & Filianty, F. (2022, May). Shelf-Life Prediction of Peanut Oil (*Arachis hypogaea* L.) Using an Accelerated Shelf-Life Testing (ASLT) Method in the Polypropylene Packaging. In IOP Conference Series: Earth and Environmental Science (Vol. 1024, No. 1, p. 012056). IOP Publishing.
- Oeji, A. A. (2015). Efek fitopreventif minyak buah merah (*Pandanus conoideus* Lam.) Terhadap Colitis-Associated Carcinogenesis. *Journal of Medicine and Health*, 1(2), 126-142.
- Onwude, D. I., Hashim, N., Janius, R., Nawi, N. M., & Abdan, K. (2017). Color change kinetics and total carotenoid content of pumpkin as affected by drying temperature. *Italian Journal of Food Science*, 29(1).
- Orlien, V., Risbo, J., Rantanen, H., & Skibsted, L. H. (2006). Temperature-dependence of rate of oxidation of rapeseed oil encapsulated in a glassy food matrix. *Food chemistry*, 94(1), 37-46.
- Padang, M. J. A., & Sarungallo, Z. L. (2022). PENGARUH FORMULASI MALTODEKSTRIN TERHADAP STABILITAS MIKROENKAPSULAT MINYAK BUAH MERAH (*Pandanus conoideus* Lamk.). *Jurnal Teknologi Pangan dan Kesehatan (The Journal of Food Technology and Health)*, 4(2), 67-74.
- Parikh, A., Agarwal, S., & Raut, K. (2014). A review on applications of maltodextrin in pharmaceutical industry. *system*, 4(6).
- Papoutsis, K., Golding, J. B., Vuong, Q., Pristijono, P., Stathopoulos, C. E., Scarlett, C. J., & Bowyer, M. (2018). Encapsulation of citrus by-product extracts by spray-drying and freeze-drying using combinations of maltodextrin with soybean protein and ι-carrageenan. *Foods*, 7(7), 115.
- Peleg, M. (2019). Modeling degradation kinetics in dry foods storage under varying temperature and moisture content—Theoretical evaluation. *Food Engineering Reviews*, 11, 1-13.
- Pereira, D. G., Afonso, A., & Medeiros, F. M. (2015). Overview of Friedman's test and post-hoc analysis. *Communications in Statistics-Simulation and Computation*, 44(10), 2636-2653.
- Phimolsiripol, Y., & Suppakul, P. (2016). Techniques in shelf life evaluation of food products.

- Piergiovanni, L., & Limbo, S. (2019). Food shelf-life models. In *Sustainable food supply chains* (pp. 49-60). Academic Press.
- Pohan, H. G., & Wardayani, N. I. A. (2006). Mempelajari proses ekstraksi dan karakterisasi minyak buah merah (*Pandanus conoideus* L). *Warta Industri Hasil Pertanian*, 23(2), 26-41.
- PPG. (n. d.). What are the optimal storage conditions for powder coatings? <https://assets-us-01.kc-usercontent.com/7c9f15b5-676a-0083-ecb4-52bd17329261/2019b2de-5d0f-46d8-a101-361465ab3002/PPG-IC-WHAT-ARE-THE-OPTIMAL-STORAGE-CONDITIONS-FOR-POWDER-COATINGS.pdf>
- Przybysz, M. A., Szterk, A., Symoniuk, E., Gaszczyk, M., & Dluzewska, E. (2018). Alpha-and beta-carotene stability during storage of microspheres obtained from spray-dried microencapsulation technology. *Polish Journal of Food and Nutrition Sciences*, 68(1).
- Pudziuelyte, L., Marksa, M., Sosnowska, K., Winnicka, K., Morkuniene, R., & Bernatoniene, J. (2020). Freeze-drying technique for microencapsulation of *Elsholtzia ciliata* ethanolic extract using different coating materials. *Molecules*, 25(9), 2237.
- Ragnarsson, J. O., & Labuza, T. P. (1977). Accelerated shelf-life testing for oxidative rancidity in foods—A review. *Food Chemistry*, 2(4), 291-308.
- Rahman, M. S., & Perera, C. O. (2007). Drying and food preservation. In *Handbook of food preservation* (pp. 421-450). CRC Press.
- Ramdany, R., Kamaruddin, M., Pongoh, A., & Suryani, E. A. (2021). THE DAYA TERIMA DAN KANDUNGAN GIZI COOKIES TEPUNG SAGU KOMBINASI TEPUNG KACANG MERAH DENGAN PENAMBAHAN SARI BUAH MERAH. *Jurnal Health Sains*, 2(2), 235-241.
- Ratti, C. (2001). Hot air and freeze-drying of high-value foods: a review. *Journal of food engineering*, 49(4), 311-319.
- Ratti, C. (2008). Freeze and vacuum drying of foods. *Drying technologies in food processing*, 225-251.
- Rezvankhah, A., Emam-Djomeh, Z., & Askari, G. (2020). Encapsulation and delivery of bioactive compounds using spray and freeze-drying techniques: A review. *Drying Technology*, 38(1-2), 235-258.
- Ribeiro, B. D., Barreto, D. W., & Coelho, M. A. Z. (2011). Technological aspects of β -carotene production. *Food and Bioprocess Technology*, 4, 693-701.
- Ribeiro, B.D., Grando de Oliveira, R. (2013). Carotenoids as Colorants. In: Ramawat, K., Mérillon, JM. (eds) *Natural Products*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-22144-6_172
- Rodriguez, E. S., Julio, L. M., Henning, C., Diehl, B. W., Tomás, M. C., & Ixtaina, V. Y. (2019). Effect of natural antioxidants on the physicochemical properties and stability of freeze-dried

- microencapsulated chia seed oil. *Journal of the Science of Food and Agriculture*, 99(4), 1682-1690.
- Rodriguez-Amaya, D. B. (2003). CAROTENOIDS | Occurrence, Properties, and Determination.
- Rodriguez-Amaya, D. B. (2010). Quantitative analysis, in vitro assessment of bioavailability and antioxidant activity of food carotenoids—A review. *Journal of Food Composition and Analysis*, 23(7), 726-740.
- Rohman, A., Sugeng, R., & Man, Y. C. (2012). Characterization of red fruit (*Pandanus conoideus* Lam) oil.
- Rózyło, R. (2020). Recent trends in methods used to obtain natural food colorants by freeze-drying. *Trends in Food Science & Technology*, 102, 39-50.
- Ruan, R., Choi, Y. J., & Chung, M. S. (2007). Caking in food powders. *Food Science and Biotechnology*, 16(3), 329-336.
- Saini, R. K., & Keum, Y. S. (2018). Carotenoid extraction methods: A review of recent developments. *Food chemistry*, 240, 90-103.
- Sadolona, E., & Agustin, R. (2021). Pengaruh Penambahan Minyak Buah Merah Terhadap Kualitas Organoleptik Nugget Ayam. *Jurnal AgroSainTa: Widyaiswara Mandiri Membangun Bangsa*, 5(2), 77-84.
- Sahafi, S. M., Goli, S. A. H., Kadivar, M., Varshosaz, J., & Shirvani, A. (2021). Pomegranate seed oil nanoemulsion enriched by α -tocopherol; the effect of environmental stresses and long-term storage on its physicochemical properties and oxidation stability. *Food Chemistry*, 345, 128759.
- Samosir, R., Langowuyo, A., & Simaremare, E. S. (2022). WIRAUSAHA: BOLU BUAH MERAH BERNILAI GIZI TINGGI. *Martabe: Jurnal Pengabdian Kepada Masyarakat*, 5(4), 1555-1559.
- Sant'Anna, V., Gurak, P. D., Marczak, L. D. F., & Tessaro, I. C. (2013). Tracking bioactive compounds with colour changes in foods—A review. *Dyes and Pigments*, 98(3), 601-608.
- Sarungallo, Z. L. (2014). Karakterisasi Sifat Fisik Buah Merah (*Pandanus conoideus*), Metode Ekstraksi, dan Sifat Kimia Minyak yang dihasilkannya. *Disertasi. Sekolah Pascasarjana IPB*.
- Sarungallo, Z. L., Hariyadi, P., Andarwulan, N., & Purnomo, E. H. (2015). Characterization of chemical properties, lipid profile, total phenol and tocopherol content of oils extracted from nine clones of red fruit (*Pandanus conoideus*). *Agriculture and Natural Resources*, 49(2), 237-250.
- Sarungallo, Z. L., Hariyadi, P., Andarwulan, N., & Purnomo, E. H. (2019a). Keragaman karakteristik fisik buah, tanaman dan rendemen minyak dari 9 klon buah merah (*Pandanus conoideus*). *Agrikan: Jurnal Agribisnis Perikanan*, 12(1), 70-82.

- Sarungallo, Z. L., Santoso, B., Murtiningrum, M., Roreng, M. K., & Murni, V. (2019b). KARAKTERISTIK MUTU MIKROENKAPSULAT MINYAK BUAH MERAH (*Pandanus conoideus*) DENGAN PERBANDINGAN KONSENTRASI: The Characteristics of Quality of Microencapsulate Red Fruit Oil (*Pandanus conoideus*) With a Comparison of the Composition of the Emulsifying Material and the Coating Material. *Pro Food*, 5(2), 528-540.
- Sarungallo, Z. L., Santoso, B., Lisangan, M. M., Paiki, S. N. P., Situngkir, R. U., & Asokawaty, E. A. (2019). Kinetika perubahan mutu minyak buah merah (*Pandanus conoideus*) hasil degumming selama penyimpanan. *Jurnal Aplikasi Teknologi Pangan*, 7(4).
- Satriyanto, B., Widjanarko, S. B., & Yunianta, Y. (2012). Heat Stability of Red Fruit Extract (*Pandanus conoideus*) Color as Potential Source of Natural Pigments. *Jurnal Teknologi Pertanian*, 13(3).
- Scott, K. J. (2001). Detection and measurement of carotenoids by UV/VIS spectrophotometry. *Current protocols in food analytical chemistry*, (1), F2-2.
- Selim, K. A., Alharthi, S. S., Abu El-Hassan, A. M., Elneairy, N. A., Rabee, L. A., & Abdel-Razek, A. G. (2021). The effect of wall material type on the encapsulation efficiency and oxidative stability of fish oils. *Molecules*, 26(20), 6109..
- Sezgin, A. C., & Ayyıldız, S. (2017). Food additives: colorants. *Science within Food: Up-to-Date Advances on Research and Educational Ideas*, 87-94.
- Sigurdson, G. T., Tang, P., & Giusti, M. M. (2017). Natural colorants: Food colorants from natural sources. *Annual review of food science and technology*, 8, 261-280.
- Sirait, M. S., Warsiki, E., & Setyaningsih, D. (2021, May). Potential of red fruit oil (*Pandanus conoideus* Lam.) as an antioxidant active packaging: A review. In *IOP Conference Series: Earth and Environmental Science* (Vol. 749, No. 1, p. 012008). IOP Publishing.
- Silva-Espinoza, M. A., Ayed, C., Foster, T., Camacho, M. D. M., & Martínez-Navarrete, N. (2019). The impact of freeze-drying conditions on the physico-chemical properties and bioactive compounds of a freeze-dried orange puree. *Foods*, 9(1), 32.
- Singh, H., Kumar, Y., & Meghwal, M. (2022). Encapsulated oil powder: Processing, properties, and applications. *Journal of Food Process Engineering*, 45(8), e14047.
- Sherwin, E. R. (1978). Oxidation and antioxidants in fat and oil processing. *Journal of the American Oil Chemists' Society*, 55(11), 809-814.
- Shukla, S. (2011). Freeze drying process: A review. *International journal of pharmaceutical sciences and research*, 2(12), 3061.
- Sonawane, S. H., Bhanvase, B. A., Sivakumar, M., & Potdar, S. B. (2020). Current overview of encapsulation. *Encapsulation of Active Molecules and Their Delivery System*, 1-8.

- Soto, M., Dhuique-Mayer, C., Servent, A., Jiménez, N., Vaillant, F., & Achir, N. (2020). A kinetic study of carotenoid degradation during storage of papaya chips obtained by vacuum frying with saturated and unsaturated oils. *Food Research International*, 128, 108737.
- Southward, C. R. (2003). Casein and caseinates | Uses in the Food Industry.
- Staniszewska, I., Dzadz, Ł., Xiao, H. W., & Zielinska, M. (2022). Evaluation of storage stability of dried cranberry powders based on the moisture sorption isotherms and glass transition temperatures. *Drying Technology*, 40(1), 89-99.
- Subagio, A., & Morita, N. (2001). Instability of carotenoids is a reason for their promotion on lipid oxidation. *Food research international*, 34(2-3), 183-188.
- Subrata, B. A. G., Sumaryadi, A., & Wenda, G. (2019). Pengolahan dan Pemanfaatan Buah Merah dalam Upaya Pengentasan Kemiskinan. *Jurnal Pengabdian kepada Masyarakat (Indonesian Journal of Community Engagement)*, 5(1), 57-71.
- Talbot, G. (2016). The stability and shelf life of fats and oils. In *The stability and shelf life of food* (pp. 461-503). Woodhead Publishing.
- Tan, M., Mei, J., & Xie, J. (2021). The formation and control of ice crystal and its impact on the quality of frozen aquatic products: A review. *Crystals*, 11(1), 68.
- Tang, Y. C., & Chen, B. H. (2000). Pigment change of freeze-dried carotenoid powder during storage. *Food Chemistry*, 69(1), 11-17.
- Taoukis, P. S., & Giannakourou, M. C. (2004). Temperature and food stability: analysis and control. Understanding and measuring the shelf-life of food, 42-68.
- Taoukis, P. S., Labuza, T. P., & Saguy, I. S. (1997). Kinetics of food deterioration and shelf-life prediction. The Editors, 30.
- Tharukliling, S., Radiati, L. E., Thohari, I., & Susilo, A. (2021, June). Colour and chemical characteristics of patty burger added with red fruit paste (*Pandanus conoideus* Lam k). In *IOP Conference Series: Earth and Environmental Science* (Vol. 788, No. 1, p. 012075). IOP Publishing.
- Thumthanaruk, B., Laohakunjit, N., & Chism, G. W. (2021). Characterization of spray-dried Gac aril extract and estimated shelf life of β -carotene and lycopene. *PeerJ*, 9, e11134.
- Torrieri, E. (2016). Storage Stability: Shelf Life Testing.
- Tsourouflis, S., Flink, J. M., & Karel, M. (1976). Loss of structure in freeze-dried carbohydrates solutions: effect of temperature, moisture content and composition. *Journal of the Science of Food and Agriculture*, 27(6), 509-519.
- Tuyen, C. K., Nguyen, M. H., & Roach, P. D. (2010). Effects of spray drying conditions on the physicochemical and antioxidant properties of the Gac (*Momordica cochinchinensis*) fruit aril powder. *Journal of food engineering*, 98(3), 385-392.

- Valero, A., Carrasco, E., & García-Gimeno, R. M. (2012). Principles and methodologies for the determination of shelf-life in foods. *Trends in vital food and control engineering*, 1, 3-42.
- Van Boekel, M. A. J. S. (2008). Kinetic modelling of reactions in food: A critical review. *Compr. Rev. Food Sci. Food Saf*, 7, 144-158.
- Velasco, J., Dobarganes, C., & Márquez-Ruiz, G. (2003). Variables affecting lipid oxidation in dried microencapsulated oils. *Grasas y aceites*, 54(3), 304-314.
- Velasco, J., Marmesat, S., Holgado, F., Márquez-Ruiz, G., & Dobarganes, C. (2008). Influence of two lipid extraction procedures on the peroxide value in powdered infant formulas. *European Food Research and Technology*, 226, 1159-1166.
- Walujo, E. B., & Keim, A. P. (2007). Kajian etnotaksonomi *Pandanus conoideus* Lamarck untuk menjembatani pengetahuan lokal dan ilmiah. *Berita Biologi*, 8(5), 391-404.
- Wasono, M. S. E., & Yuwono, S. S. (2014). PENDUGAAN UMUR SIMPAN TEPUNG PISANG GORENG MENGGUNAKAN METODE ACCELERATED SHELF LIFE TESTING DENGAN PENDEKATAN ARRHENIUS [IN PRESS OKTOBER 2014]. *Jurnal pangan dan agroindustri*, 2(4), 178-187.
- Wibowo, S., Vervoort, L., Tomic, J., Santiago, J. S., Lemmens, L., Panozzo, A., ... & Van Loey, A. (2015). Colour and carotenoid changes of pasteurised orange juice during storage. *Food chemistry*, 171, 330-340.
- Wijaya, H., Natania, N., Sonatha, M. D., A'yuni, Q., & Caroline, C. (2020). OPTIMIZATION OF TOTAL CAROTENOIDS, PHENOLIC CONTENT, AND SENSORY ACCEPTABILITY OF JAVA TEA-BASED FUNCTIONAL DRINK ENRICHED WITH RED FRUITS' OIL EMULSION. *Indonesian Journal of Natural Pigments*, 2(1), 1-1.
- Wrolstad, R. E., & Culver, C. A. (2012). Alternatives to those artificial FD&C food colorants. *Annual review of food science and technology*, 3, 59-77.
- Wrolstad, R. E., & Smith, D. E. (2017). Color analysis. *Food analysis*, 545-555.
- Yanuwar, W., Widjanarko, S. B., & Wahono, T. (2007). Karakteristik dan stabilitas antioksidan mikrokapsul minyak buah merah (*Pandanus conoideus* Lam) dengan bahan penyalut berbasis protein. *Jurnal Teknologi Pertanian*, 8(2), 127-135.
- Young, N. W. G., & O'sullivan, G. R. (2011). The influence of ingredients on product stability and shelf life. In *Food and beverage stability and shelf life* (pp. 132-183). Woodhead Publishing.
- Zhang, C., Fu, Y., Li, Z., Li, T., Shi, Y., Xie, H., ... & Li, Z. (2021a). Application of whey protein isolate fibrils in encapsulation and protection of β -carotene. *Food Chemistry*, 346, 128963.
- Zhang, N., Li, Y., Wen, S., Sun, Y., Chen, J., Gao, Y., ... & Yu, X. (2021b). Analytical methods for determining the peroxide value of edible oils: A mini-review. *Food Chemistry*, 358, 129834.

- Zhang, B., Zheng, L., Liang, S., Lu, Y., Zheng, J., Zhang, G., Li, W., & Jiang, H. (2022). Encapsulation of capsaicin in whey protein and OSA-modified starch using spray-drying: Physicochemical properties and its stability. *Foods*, *11*(4), 612.
- Zamora, R., & Hidalgo, F. J. (2005). Coordinate contribution of lipid oxidation and Maillard reaction to the nonenzymatic food browning. *Critical reviews in food science and nutrition*, *45*(1), 49-59.