

## DAFTAR PUSTAKA

- Adji, D., Susanty, A., Tafsin, M., 2021. Analisis kualitas daging ayam broiler asal pasar swalayan dan pasar tradisional Di Kota Medan Sumatera Utara. *Jurnal Sain Veteriner* 39, 224. <https://doi.org/10.22146/jsv.54354>
- Afshari, F., 2021. Experimental and numerical investigation on thermoelectric coolers for comparing air-to-water to air-to-air refrigerators. *J Therm Anal Calorim* 144, 855–868. <https://doi.org/10.1007/s10973-020-09500-6>
- All India Coordinated Research Project on Post Harvest Technology, Sofi, F.R., Raju, C.V., Lakshmisha, I.P., Singh, R.R., 2016. Antioxidant and antimicrobial properties of grape and papaya seed extracts and their application on the preservation of Indian mackerel (*Rastrelliger kanagurta*) during ice storage. *J Food Sci Technol* 53, 104–117. <https://doi.org/10.1007/s13197-015-1983-0>
- Almodovar, C.A.R., Hernandez, L.G.D., Santillan, G.C.M., Flores, A.M., Rosales, L.P.S., Tolentino, Engr.R.E., 2021. Design of Airconditioning System using Peltier and Liquid Based Heatsink, in: 2021 6th International Conference on Communication and Electronics Systems (ICCES). Presented at the 2021 6th International Conference on Communication and Electronics Systems (ICCES), IEEE, Coimbatre, India, pp. 123–130. <https://doi.org/10.1109/ICCES51350.2021.9489244>
- Ambaw, A., Delele, M.A., Defraeye, T., Ho, Q.T., Opara, L.U., Nicolai, B.M., Verboven, P., 2013. The use of CFD to characterize and design post-harvest storage facilities: Past, present and future. *Komputers and Electronics in Agriculture* 93, 184–194. <https://doi.org/10.1016/j.compag.2012.05.009>
- Arnold, B., 1992. Meat and Meat Products in Human Nutrition in Developing Countries.
- Aryawan, I.P.Y., 2016. Study eksperimenal performa pendingin ice bunker dengan kombinasi massa dry ice dan ice 5, 5.
- Atmojo, P.S., Sachro, S.S., Budienny, H., 2014. Penggunaan Analisis Dimensi untuk Mencari Korelasi Antar Variabel pada Uji Model Hidrolik. *JTS ITB* 21, 221. <https://doi.org/10.5614/jts.2014.21.3.5>
- Ballinger, J.T., Shugar, G.J., Ballinger, C.T., Shugar, G.J., 2011. Chemical technicians' ready reference handbook, 5th ed. ed. McGraw-Hill, New York.
- Banach, J.K., Żywica, R., Matuszevičius, P., 2021. Influence of various chilling methods on the sustainable beef production based on high voltage electrical stimulation. *PLoS ONE* 16, e0240639. <https://doi.org/10.1371/journal.pone.0240639>
- Banerjee, R., Maheswarappa, N.B., 2019. Superchilling of muscle foods: Potential alternative for chilling and freezing. *Critical Reviews in Food Science and Nutrition* 59, 1256–1263. <https://doi.org/10.1080/10408398.2017.1401975>
- Bao, H.N.D., Arason, S., Þórarinsdóttir, K.A., 2007a. Effects of Dry Ice and Superchilling on Quality and Shelf Life of Arctic Charr (*Salvelinus alpinus*) Fillets. *International Journal of Food Engineering* 3. <https://doi.org/10.2202/1556-3758.1093>
- Bao, H.N.D., Arason, S., Þórarinsdóttir, K.A., 2007b. Effects of Dry Ice and Superchilling on Quality and Shelf Life of Arctic Charr (*Salvelinus alpinus*)

- Fillets. *International Journal of Food Engineering* 3. <https://doi.org/10.2202/1556-3758.1093>
- Bao, H.N.D., Arason, S., Þórarinsdóttir, K.A., 2007c. Effects of Dry Ice and Superchilling on Quality and Shelf Life of Arctic Charr (*Salvelinus alpinus*) Fillets. *International Journal of Food Engineering* 3. <https://doi.org/10.2202/1556-3758.1093>
- Bao, H.N.D., Arason, S., Þórarinsdóttir, K.A., 2007d. Effects of Dry Ice and Superchilling on Quality and Shelf Life of Arctic Charr (*Salvelinus alpinus*) Fillets. *International Journal of Food Engineering* 3. <https://doi.org/10.2202/1556-3758.1093>
- Basri, I.Y., Irfan, D., 2018. *Komponen Elektronika* 90.
- Beier, S., 2006. *Transport Phenomena*. bookboon.com
- Berrang, M.E., Meinersmann, R.J., Smith, D.P., Zhuang, H., 2008. The Effect of Chilling in Cold Air or Ice Water on the Microbiological Quality of Broiler Carcasses and the Population of *Campylobacter*. *Poultry Science* 87, 992–998. <https://doi.org/10.3382/ps.2007-00406>
- Bitá, S., Malekpouri, P., Mohammadian, T., Varzi, H.N., Kochanian, P., 2015. Changes in biogenic amines and microbial loads in the muscle of orange-spotted grouper, *Epinephelus coioides* (Hamilton, 1822) during ice storage. *J Food Sci Technol* 52, 240–248. <https://doi.org/10.1007/s13197-013-0973-3>
- Bogor Agricultural University, Hajrawati, H., M., F., Bogor Agricultural University, Wahyuni, W., Bogor Agricultural University, Arief, I.I., Bogor Agricultural University, 2016. Kualitas Fisik, Mikrobiologis, dan Organoleptik Daging Ayam Broiler pada Pasar Tradisional di Bogor. *JIPTHP* 4, 386–389. <https://doi.org/10.29244/jipthp.4.3.386-389>
- Boonsumrej, S., Chaiwanichsiri, S., Tantratian, S., Suzuki, T., Takai, R., 2007a. Effects of freezing and *thawing* on the quality changes of tiger shrimp (*Penaeus monodon*) frozen by air-blast and cryogenic freezing. *Journal of Food Engineering* 80, 292–299. <https://doi.org/10.1016/j.jfoodeng.2006.04.059>
- Boonsumrej, S., Chaiwanichsiri, S., Tantratian, S., Suzuki, T., Takai, R., 2007b. Effects of freezing and *thawing* on the quality changes of tiger shrimp (*Penaeus monodon*) frozen by air-blast and cryogenic freezing. *Journal of Food Engineering* 80, 292–299. <https://doi.org/10.1016/j.jfoodeng.2006.04.059>
- Bulut, M., Bayer, Ö., Kırtıl, E., Bayındırlı, A., 2018. Effect of freezing rate and storage on the texture and quality parameters of strawberry and green bean frozen in home type freezer. *International Journal of Refrigeration* 88, 360–369. <https://doi.org/10.1016/j.ijrefrig.2018.02.030>
- Byun, S., Jeong, H., Kim, D.R., Lee, K.-S., 2020. Frost modeling under cryogenic conditions. *International Journal of Heat and Mass Transfer* 161, 120250. <https://doi.org/10.1016/j.ijheatmasstransfer.2020.120250>
- Cai, L., Wu, X., Li, X., Zhong, K., Li, Y., Li, J., 2014. Effects of different freezing treatments on physicochemical responses and microbial characteristics of Japanese sea bass (*Lateolabrax japonicas*) fillets during refrigerated storage. *LWT - Food Science and Technology* 59, 122–129. <https://doi.org/10.1016/j.lwt.2014.04.062>

- Chen, X., Dong, P., Li, K., Zhu, L., Yang, X., Mao, Y., Niu, L., Hopkins, D.L., Luo, X., Liang, R., Zhang, Y., 2022a. Effect of the combination of superchilling and superchilled storage on shelf-life and bacterial community dynamics of beef during long-term storage. *Meat Science* 192, 108910. <https://doi.org/10.1016/j.meatsci.2022.108910>
- Chen, X., Luo, X., Zhu, L., Liang, R., Dong, P., Yang, X., Niu, L., Hopkins, D.L., Gao, S., Mao, Y., Zhang, Y., 2022b. The underlying mechanisms of the effect of superchilling on the tenderness of beef *Longissimus lumborum*. *Meat Science* 194, 108976. <https://doi.org/10.1016/j.meatsci.2022.108976>
- Cheng, H., Song, S., Jung, E.-Y., Jeong, J.-Y., Joo, S.-T., Kim, G.-D., 2020. Comparison of beef quality influenced by freeze-thawing among different beef cuts having different muscle fiber characteristics. *Meat Science* 169, 108206. <https://doi.org/10.1016/j.meatsci.2020.108206>
- Costantini, A., Vaudano, E., Cravero, M.C., Petrozziello, M., Piano, F., Bernasconi, A., Garcia-Moruno, E., 2016a. Dry ice blasting, a new tool for barrel regeneration treatment. *Eur Food Res Technol* 242, 1673–1683. <https://doi.org/10.1007/s00217-016-2667-3>
- Costantini, A., Vaudano, E., Cravero, M.C., Petrozziello, M., Piano, F., Bernasconi, A., Garcia-Moruno, E., 2016b. Dry ice blasting, a new tool for barrel regeneration treatment. *Eur Food Res Technol* 242, 1673–1683. <https://doi.org/10.1007/s00217-016-2667-3>
- Cronin, K., Caro-Corrales, J., Gao, X., 2010. Heat transfer analysis of cheese cooling incorporating uncertainty in temperature measurement locations: Model development and validation. *Journal of Food Engineering* 99, 175–183. <https://doi.org/10.1016/j.jfoodeng.2010.02.016>
- Czarnowska, M., Gujska, E., 2012. Effect of Freezing Technology and Storage Conditions on Folate Content in Selected Vegetables. *Plant Foods Hum Nutr* 67, 401–406. <https://doi.org/10.1007/s11130-012-0312-2>
- Da Costa, I.H., Agustina, K.K., Swacita, I.B.N., 2022. Kualitas Daging Kambing yang Disimpan pada Suhu Dingin. *bulvet* 631. <https://doi.org/10.24843/bulvet.2022.v14.i06.p05>
- Dasir, Suyatno, 2019. *Teknologi Pengolahan Dan Pengawetan Ikan*. Noer Fikri Offset.
- Davey, K.R., 2016. A quantitative failure assessment of ice slurry cooling of fish at sea to meet regulatory guidelines – demonstrated with Southern Bluefin Tuna (*Thunnus maccoyii*). *Journal of Food Engineering* 183, 58–64. <https://doi.org/10.1016/j.jfoodeng.2016.03.020>
- De Paula Paseto Fernandes, R., De Alvarenga Freire, M.T., Da Costa Carrer, C., Trindade, M.A., 2013. Evaluation of Physicochemical, Microbiological and Sensory Stability of Frozen Stored Vacuum-Packed Lamb Meat. *Journal of Integrative Agriculture* 12, 1946–1952. [https://doi.org/10.1016/S2095-3119\(13\)60632-2](https://doi.org/10.1016/S2095-3119(13)60632-2)
- Department of Fish Processing Technology Fisheries College and Research Institute Tamil Nadu Veterinary and Animal Sciences University Thoothukkudi, 628 008

- India, Sasi, M., 2000. Chilling Fresh Fish in Dry and Wet Ice. AFS 13. <https://doi.org/10.33997/j.afs.2000.13.4.009>
- Devi, R., Rasane, P., Kaur, S., Singh, J., 2019. Meat and Meat losses: influence on meat quality 6.
- Diana, C., Dihansih, E., Kardaya, D., 2018. Physical and chemical qualities of frozen beef within different *thawing* method. JP 9, 51. <https://doi.org/10.30997/jp.v9i1.1155>
- Dima, J.B., Santos, M.V., Baron, P.J., Califano, A., Zaritzky, N.E., 2014. Experimental study and numerical modeling of the freezing process of marine products. Food and Bioprocess Processing 92, 54–66. <https://doi.org/10.1016/j.fbp.2013.07.012>
- Dirita, C., De Bonis, M.V., Ruocco, G., 2007. Analysis of food cooling by jet impingement, including inherent conduction. Journal of Food Engineering 81, 12–20. <https://doi.org/10.1016/j.jfoodeng.2006.10.002>
- Effendy, M., 2019. Pengetahuan Dasar Sistem Kendali, 1st ed. Muhammadiyah University Press, Surakarta.
- Erdoğdu, F., 2005. Mathematical approaches for use of analytical solutions in experimental determination of heat and mass transfer parameters. Journal of Food Engineering 68, 233–238. <https://doi.org/10.1016/j.jfoodeng.2004.05.038>
- Fadiji, T., Ashtiani, S.-H.M., Onwude, D.I., Li, Z., Opara, U.L., 2021. Finite Element Method for Freezing and *Thawing* Industrial Food Processes. Foods 10, 869. <https://doi.org/10.3390/foods10040869>
- Ferreira, S.R., 2020. FDM for the freezing process of a slab using integral average properties. International Journal of Refrigeration 119, 326–339. <https://doi.org/10.1016/j.ijrefrig.2020.07.026>
- Ferreira, S.R., 2017. Freezing time of a slab using the method of lines. International Journal of Refrigeration 75, 77–94. <https://doi.org/10.1016/j.ijrefrig.2017.01.007>
- Fiandini, M., Nandiyanto, A.B.D., Al Husaeni, D.F., Al Husaeni, D.N., Mushiban, M., 2023. How to Calculate Statistics for Significant Difference Test Using SPSS: Understanding Students Comprehension on the Concept of Steam Engines as Power Plant. Indonesian J. Sci. Technol 9, 45–108. <https://doi.org/10.17509/ijost.v9i1.64035>
- Firdaus, M., 2019. Profil Perikanan Tuna Dan Cakalang Di Indonesia. Marina 4, 23. <https://doi.org/10.15578/marina.v4i1.7328>
- Food Processing Technology : Principles and Practice, n.d. 608.
- Freire, L.O., Navarrete, L.M., Corrales, B.P., Castillo, J.N., 2021. Efficiency in thermoelectric generators based on Peltier cells. Energy Reports 7, 355–361. <https://doi.org/10.1016/j.egyr.2021.08.099>
- Gandi, F., Yusfi, M., 2016. Perancangan Sistem Pendingin Air Menggunakan Elemen Peltier Berbasis Mikrokontroler ATmega8535 5, 7.
- Gao, H.Y., 2007. Methods of pre-cooling for fresh cod (gadus morhua) and influences on quality during chilled storage at -1.5°C.
- Giannoglou, M., Karra, Z., Platakou, E., Katsaros, G., Moatsou, G., Taoukis, P., 2016. Effect of high pressure treatment applied on starter culture or on semi-ripened cheese in the quality and ripening of cheese in brine. Innovative Food Science & Emerging Technologies 38, 312–320. <https://doi.org/10.1016/j.ifset.2016.07.024>
- Girgel, U., 2021. Principle component analysis (pca) of bean genotypes (*phaseolus vulgaris* L.) Concerning agronomic, morphological and biochemical

- characteristics. *Appl. Ecol. Env. Res.* 19, 1999–2011. [https://doi.org/10.15666/aeer/1903\\_19992011](https://doi.org/10.15666/aeer/1903_19992011)
- Gregory, S., Foster, K., Tyker, H., Wiseman, M., 1990. *The Dietary and Nutritional Survey of British Adults*. London.
- Gulati, T., Datta, A.K., 2013. Enabling komputer-aided food process engineering: Property estimation equations for transport phenomena-based models. *Journal of Food Engineering* 116, 483–504. <https://doi.org/10.1016/j.jfoodeng.2012.12.016>
- Guo, M., Jin, T.Z., Scullen, O.J., Sommers, C.H., 2013. Effects of Antimicrobial Coatings and Cryogenic Freezing on Survival and Growth of *Listeria innocua* on Frozen Ready-to-Eat Shrimp during *Thawing*: Antimicrobial coatings against Listeria on RTE shrimp.... *Journal of Food Science* 78, M1195–M1200. <https://doi.org/10.1111/1750-3841.12180>
- Gupta, S., Giri, S., Srivastava, T., Agarwal, P., Sharma, R., Agrawal, A., 2021. Smart Refrigerator based on ‘Internet of Things,’ in: 2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE). Presented at the 2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), IEEE, Greater Noida, India, pp. 436–439. <https://doi.org/10.1109/ICACITE51222.2021.9404612>
- Hadfield, J.M., n.d. *The Thermal and Physical Properties of Beef from Three USDA-Quality Grades Cooked to Multiple Degrees of Doneness*.
- Hamed Hammad Mohammed, H., Jin, G., Ma, M., Khalifa, I., Shukat, R., Elkhedir, A.E., Zeng, Q., Noman, A.E., 2020. Comparative characterization of proximate nutritional compositions, microbial quality and safety of camel meat in relation to mutton, beef, and chicken. *LWT* 118, 108714. <https://doi.org/10.1016/j.lwt.2019.108714>
- Hastawan, A.F., Haryono, S., Utomo, A.B., Hangga, A., Setiyawan, A., Septiana, R., Hafidz, C.M., Triantino, S.B., 2021. Comparison of testing load cell sensor data sampling method based on the variation of time delay. *IOP Conf. Ser.: Earth Environ. Sci.* 700, 012018. <https://doi.org/10.1088/1755-1315/700/1/012018>
- Hediyati, D., Suartana, I.M., 2021. Penerapan Principal Component Analysis (PCA) Untuk Reduksi Dimensi Pada Proses Clustering Data Produksi Pertanian Di Kabupaten Bojonegoro. *JIEET* 5, 49–54. <https://doi.org/10.26740/jieet.v5n2.p49-54>
- Hoang, D.K., Olatunji, J.R., Lovatt, S.J., Carson, J.K., 2022. Simulation of an industrial cheese chilling process. *International Journal of Refrigeration* 133, 41–50. <https://doi.org/10.1016/j.ijrefrig.2021.10.016>
- Hong, G.-P., Choi, M.-J., 2016. Comparison of the quality characteristics of abalone processed by high-pressure sub-zero temperature and pressure-shift freezing. *Innovative Food Science & Emerging Technologies* 33, 19–25. <https://doi.org/10.1016/j.ifset.2015.12.024>
- Irwanto, B., Kabib, M., Winarso, R., 2019. Rancang bangun sistem kontrol penimbangan tembakau dengan mikrokontroler arduino uno. *Crankshaft* 2. <https://doi.org/10.24176/crankshaft.v2i2.3837>
- Jading, A., Bintoro, N., Sutiarso, L., Karyadi, J.N.W., 2017. Artificial Neural Network-Based Modelling and Optimization to Estimate the Fineness Modulus of the

- Drying Process of Sago Starch Using a Pneumatic Conveying Recirculated Dryer. *IJET* 9, 3281–3291. <https://doi.org/10.21817/ijet/2017/v9i4/170904028>
- Jading, A., Bintoro, N., Sutiarmo, L., Wahyu Karyadi, J.N., 2018. Model Matematis Hubungan antara Kadar Air Akhir Bahan dengan Variabel Proses Pengeringan pada Pneumatic Conveying Recirculated Dryer. *Agritech* 38, 217. <https://doi.org/10.22146/agritech.15311>
- Jain, D., Ilyas, S.M., Pathare, P., Prasad, S., Singh, H., 2005. Development of mathematical model for cooling the fish with ice. *Journal of Food Engineering* 71, 324–329. <https://doi.org/10.1016/j.jfoodeng.2005.03.035>
- Jang, H., Kim, M.-H., Park, S.-K., Kim, Y.-S., Choi, B.C., 2020. Simulation of Heat and Mass Transfer Characteristics for the Optimal Operating Conditions of a Gas-to-Gas Membrane Humidifier with Porous Metal Foam. *Energies* 13, 5110. <https://doi.org/10.3390/en13195110>
- Jaysrichai, T., 2018. Load Cells Application for Developing Weight-Bearing Detection via Wireless Connection. *TOBEJ* 12, 101–107. <https://doi.org/10.2174/1874120701812010101>
- Jeong, J.-Y., Kim, G.-D., Yang, H.-S., Joo, S.-T., 2011a. Effect of freeze–thaw cycles on physicochemical properties and color stability of beef semimembranosus muscle. *Food Research International* 44, 3222–3228. <https://doi.org/10.1016/j.foodres.2011.08.023>
- Jeyasekaran, G., Ganesan, P., Anandaraj, R., Jeya Shakila, R., Sukumar, D., 2006a. Quantitative and qualitative studies on the bacteriological quality of Indian white shrimp (*Penaeus indicus*) stored in dry ice. *Food Microbiology* 23, 526–533. <https://doi.org/10.1016/j.fm.2005.09.009>
- Jeyasekaran, G., Ganesan, P., Anandaraj, R., Jeya Shakila, R., Sukumar, D., 2006b. Quantitative and qualitative studies on the bacteriological quality of Indian white shrimp (*Penaeus indicus*) stored in dry ice. *Food Microbiology* 23, 526–533. <https://doi.org/10.1016/j.fm.2005.09.009>
- Jeyasekaran, G., Ganesan, P., Jeya Shakila, R., Maheswari, K., Sukumar, D., 2004a. Dry ice as a novel chilling medium along with water ice for short-term preservation of fish Emperor breams, lethrinus (*Lethrinus miniatus*). *Innovative Food Science & Emerging Technologies* 5, 485–493. <https://doi.org/10.1016/j.ifset.2004.06.003>
- Jeyasekaran, G., Ganesan, P., Jeya Shakila, R., Maheswari, K., Sukumar, D., 2004b. Dry ice as a novel chilling medium along with water ice for short-term preservation of fish Emperor breams, lethrinus (*Lethrinus miniatus*). *Innovative Food Science & Emerging Technologies* 5, 485–493. <https://doi.org/10.1016/j.ifset.2004.06.003>
- Jeyasekaran, G., Ganesan, P., Jeya Shakila, R., Maheswari, K., Sukumar, D., 2004c. Dry ice as a novel chilling medium along with water ice for short-term preservation of fish Emperor breams, lethrinus (*Lethrinus miniatus*). *Innovative Food Science & Emerging Technologies* 5, 485–493. <https://doi.org/10.1016/j.ifset.2004.06.003>
- Jeyasekaran, G., Jeya Shakila, R., Sukumar, D., Ganesan, P., Anandaraj, R., 2010a. Quality changes in squid (*Loligo duvaucelli*) tubes chilled with dry ice and water ice. *J Food Sci Technol* 47, 401–407. <https://doi.org/10.1007/s13197-010-0066-5>
- Jeyasekaran, G., Jeya Shakila, R., Sukumar, D., Ganesan, P., Anandaraj, R., 2010b. Quality changes in squid (*Loligo duvaucelli*) tubes chilled with dry ice and water ice. *J Food Sci Technol* 47, 401–407. <https://doi.org/10.1007/s13197-010-0066-5>

- Jeyasekaran, G., Jeya Shakila, R., Sukumar, D., Ganesan, P., Anandaraj, R., 2010c. Quality changes in squid (*Loligo duvaucelli*) tubes chilled with dry ice and water ice. *J Food Sci Technol* 47, 401–407. <https://doi.org/10.1007/s13197-010-0066-5>
- Jeyasekaran, G., Jeya Shakila, R., Sukumar, D., Ganesan, P., Anandaraj, R., 2010d. Quality changes in squid (*Loligo duvaucelli*) tubes chilled with dry ice and water ice. *J Food Sci Technol* 47, 401–407. <https://doi.org/10.1007/s13197-010-0066-5>
- Jia, F., Jing, Y., Dai, R., Li, X., Xu, B., 2020a. High-pressure *thawing* of pork: Water holding capacity, protein denaturation and ultrastructure. *Food Bioscience* 38, 100688. <https://doi.org/10.1016/j.fbio.2020.100688>
- Jiang, Q., Nakazawa, N., Hu, Y., Wang, X., Osako, K., Okazaki, E., 2021. Evolution of tissue microstructure, protein properties, and oxidative stability of salted bigeye tuna (*Thunnus obesus*) meat during frozen storage. *LWT* 149, 111848. <https://doi.org/10.1016/j.lwt.2021.111848>
- Kaale, L.D., Eikevik, T.M., Bardal, T., Kjorsvik, E., Nordtvedt, T.S., 2013. The effect of cooling rates on the ice crystal growth in air-packed salmon fillets during superchilling and superchilled storage. *International Journal of Refrigeration* 36, 110–119. <https://doi.org/10.1016/j.ijrefrig.2012.09.006>
- Karel, M., Fennema, O.R., Lund, D.B., 1975a. Physical principles of food preservation, Principles of food science. M. Dekker, New York.
- Karel, M., Fennema, O.R., Lund, D.B., 1975b. Physical principles of food preservation, Principles of food science. M. Dekker, New York.
- Khan, M.Y., Mittal, A., 2017. Freezing of food products: A review 6, 6.
- Kuffi, K.D., Defraeye, T., Nicolai, B.M., De Smet, S., Geeraerd, A., Verboven, P., 2016. CFD modeling of industrial cooling of large beef carcasses. *International Journal of Refrigeration* 69, 324–339. <https://doi.org/10.1016/j.ijrefrig.2016.06.013>
- Laguerre, O., Derens, E., Flick, D., 2018. Modelling of fish refrigeration using flake ice. *International Journal of Refrigeration* 85, 97–108. <https://doi.org/10.1016/j.ijrefrig.2017.09.014>
- Lampila, L.E., 1990. Comparative microstructure of red meat, poultry and fish muscle. *Journal of Muscle Foods* 1, 247–267. <https://doi.org/10.1111/j.1745-4573.1990.tb00369.x>
- Ledesma, R.D., Valero-Mora, P., Macbeth, G., 2015. The Scree Test and the Number of Factors: a Dynamic Graphics Approach. *Span. J. Psychol.* 18, E11. <https://doi.org/10.1017/sjp.2015.13>
- Leygonie, C., Britz, T.J., Hoffman, L.C., 2012. Impact of freezing and *thawing* on the quality of meat: Review. *Meat Science* 91, 93–98. <https://doi.org/10.1016/j.meatsci.2012.01.013>
- Li, D., Zhu, Z., Sun, D.-W., 2018. Effects of freezing on cell structure of fresh cellular food materials: A review. *Trends in Food Science & Technology* 75, 46–55. <https://doi.org/10.1016/j.tifs.2018.02.019>
- Li, R., Rovers, T.A.M., Jæger, T.C., Hougaard, A.B., Svensson, B., Simonsen, A.C., Ipsen, R., 2021. Effect of *thawing* procedures on the properties of frozen and subsequently thawed casein concentrate. *International Dairy Journal* 112, 104860. <https://doi.org/10.1016/j.idairyj.2020.104860>

- Li, X., Wu, W., Li, K., Ren, X., Wang, Z., 2022. Experimental study on a wet precooling system for fruit and vegetables with ice slurry. *International Journal of Refrigeration* 133, 9–18. <https://doi.org/10.1016/j.ijrefrig.2021.10.001>
- Liu, B., Ma, R., Fan, H., 2021. Evaluation of the impact of freeze-thaw cycles on pore structure characteristics of black soil using X-ray computed tomography. *Soil and Tillage Research* 206, 104810. <https://doi.org/10.1016/j.still.2020.104810>
- Lubis, Z., Wibowo, A., Annisa, S., 2019. Metode baru perancangan mesin pendingin mini menggunakan rangkaian variabel lm317 berbasis arduino uno (fokus hardware dan software) 15, 6.
- Macé, S., Cardinal, M., Jaffrès, E., Cornet, J., Lalanne, V., Chevalier, F., Sérot, T., Pilet, M.-F., Dousset, X., Joffraud, J.-J., 2014. Evaluation of the spoilage potential of bacteria isolated from spoiled cooked whole tropical shrimp (*Penaeus vannamei*) stored under modified atmosphere packaging. *Food Microbiology* 40, 9–17. <https://doi.org/10.1016/j.fm.2013.11.018>
- Mao, J., Zhao, L., Di, Y., Liu, X., Xu, W., 2020. A resolved CFD–DEM approach for the simulation of landslides and impulse waves. *Komputer Methods in Applied Mechanics and Engineering* 359, 112750. <https://doi.org/10.1016/j.cma.2019.112750>
- Maulana Firdaus, R., Supriyo, B., Suharjono, A., 2019. Electronic and GUI Development of Roller Brake Tester. *J. Phys.: Conf. Ser.* 1273, 012070. <https://doi.org/10.1088/1742-6596/1273/1/012070>
- Maximo, G.J., Ferreira, M.C., Shiozawa, S., Bessa, L.C.B.A., Meirelles, A.J.A., Batista, E.A.C., 2019. Chapter 7 - Liquid–Liquid and Vapor–Liquid–Liquid Equilibrium in Food Processes, in: *Thermodynamics of Phase Equilibria in Food Engineering*. Academic Press, pp. 275–334.
- Michele, P., 2021. OECD-FAO Agricultural Outlook 2021-2030.
- Moria, H., Pourhedayat, S., Dizaji, H.S., Abusorrah, A.M., Abu-Hamdeh, N.H., Wae-hayee, M., 2021. Exergoeconomic analysis of a Peltier effect air cooler using experimental data. *Applied Thermal Engineering* 186, 116513. <https://doi.org/10.1016/j.applthermaleng.2020.116513>
- Muchtar, H., Sumanjaya, R., 2018. Control Switch Otomatis pada Tegangan Energi Alternatif dan Tegangan Sumber PLN Menggunakan Raspberry Pi. *RESISTOR* 1, 97. <https://doi.org/10.24853/resistor.1.2.97-102>
- Mutlu Ozturk, H., 2021. Energy and exergy analyses of vacuum cooling as experimental assessment: case study for boiled cauliflower (*Brassica Oleracea* Var). *J Therm Anal Calorim* 145, 1335–1352. <https://doi.org/10.1007/s10973-020-10487-3>
- Muttalib, S.A., Bintoro, N., Karyadi, J.N.W., Dwi, A., 2023. Development of Device for Force Compressive Control System in a Freezer of Pressed-Plate Type 12.
- Muttalib, S.A., Bintoro, N., Karyadi, J.N.W., Saputro, A.D., 2024. Development of method and apparatus to speed up cooling process of fish products. Presented at the Proceedings Of The 8th International Conference On Engineering, Technology, And Industrial Applications 2021 (8th ICETIA 2021): Engineering, Environment, and Health: Exploring the Opportunities for the Future, Surakarta, Indonesia, p. 020003. <https://doi.org/10.1063/5.0180090>
- Muys, D., Westenbrink, G., Meindert, J., 1995. *Pig husbandry in the tropics*, 5. ed. ed, Agrodok. AGROMISA, Wageningen.

- Ninan, D.G., n.d. Handling, Chilling and Freezing of Fishery Products.
- Noya Van Delsen, M.S., Wattimena, A.Z., Saputri, S., 2017. Penggunaan metode analisis komponen utama untuk mereduksi faktor-faktor inflasi Di Kota Ambon. *Barekeng: J. Mat. & Ter.* 11, 109–118. <https://doi.org/10.30598/barekengvol11iss2pp109-118>
- Nugroho, R.R., Nursigit Bintoro, Joko, 2017. Analisis Sistem Aerasi pada Penyimpanan Gabah dalam Silo Menggunakan Computational Fluid Dynamics (CFD) | *Jurnal Keteknikaan Pertanian [WWW Document]*. URL <https://journal.ipb.ac.id/index.php/jtep/article/view/18522> (accessed 2.11.24).
- Orban, E., Nevigato, T., Di Lena, G., Masci, M., Casini, I., Caproni, R., Rampacci, M., 2011. Total volatile basic nitrogen and trimethylamine nitrogen levels during ice storage of European hake (*Merluccius merluccius*): A seasonal and size differentiation. *Food Chemistry* 128, 679–682. <https://doi.org/10.1016/j.foodchem.2011.03.086>
- Patel, A., Sao, A., Nair, S., Mandavi, J., Tamrakar, N., 2022. Principal component analysis for eight quantitative traits in 55 indigenous rice germplasm (*Oryza sativa* L.).
- Pham, Q.T., 2006. Modelling heat and mass transfer in frozen foods: a review. *International Journal of Refrigeration* 29, 876–888. <https://doi.org/10.1016/j.ijrefrig.2006.01.013>
- Piranavatharsan, U., Jinadasa, B.K.K.K., Jayasinghe, C.V.L., 2023. Validation of thiobarbituric acid reactive substances (TBARS) method for measuring secondary lipid oxidation products in fresh Indian mackerel (*Rastrelliger kanagurta*). *Food and Humanity* 1, 1194–1199. <https://doi.org/10.1016/j.foohum.2023.09.009>
- Prasetyo, A., Wijaksana, H., Suarnadwipa, N., 2019. Studi Eksperimental Penggunaan Dry Ice Untuk Konfigurasi Inline Dengan Rasio Pengisian Tube 50% Terhadap Performansi Dew Point Cooling Sistem 8, 6.
- Priharsanti, A.H.T., 2009. Populasi Bakteri dan Jamur pada Daging Sapi dengan Penyimpanan Suhu Rendah 7, 7.
- Program Studi Statistika, F.MIPA, Universitas Syiah Kuala, Anwar, S., 2018. Modifikasi Pembobotan Systemic Important Score dengan Principal Component Analysis. *JEPI* 18, 128–151. <https://doi.org/10.21002/jepi.2018.08>
- Purwantana, B., Bintoro, N., 2012. Mesin pembelah biji kedelai (*Glycine max* L.) sistem gesek putar 32.
- Rahman, S. (Ed.), 2007. Handbook of food preservation, 2nd ed. ed, Food science and technology. CRC Press, Boca Raton.
- Ramady, G.D., Lestari, N.S., Fadriani, H., Sufyani, R., Mahardika, A.G., Hidayat, R., Hermawaty, 2021. Development of a Cooling System Simulation Model using Thermoelectric Peltier based on Microcontroller. *J. Phys.: Conf. Ser.* 1933, 012088. <https://doi.org/10.1088/1742-6596/1933/1/012088>
- Realini, C.E., Guàrdia, M.D., Garriga, M., Pérez-Juan, M., Arnau, J., 2011. High pressure and freezing temperature effect on quality and microbial inactivation of cured pork carpaccio. *Meat Science* 88, 542–547. <https://doi.org/10.1016/j.meatsci.2011.02.008>

- Ren, Q., Zhu, X., Li, J., Han, J., Fang, K., 2023. Heat and mass transfer model for pork carcass precooling: Comprehensive evaluation and optimization. *Food and Bioproducts Processing* 138, 70–85. <https://doi.org/10.1016/j.fbp.2023.01.004>
- Rigdon, M., Stelzleni, A.M., McKee, R.W., Pringle, T.D., Bowker, B., Zhuang, H., Thippareddi, H., 2021. Texture and quality of chicken sausage formulated with woody breast meat. *Poultry Science* 100, 100915. <https://doi.org/10.1016/j.psj.2020.12.014>
- Saritza, M., Kotsios, D.P., Theodorakioglou, F., Theodoros, M.P., Michalis, M.S., Despoina, M.T., n.d. *Meat And Fish Products And Processing* 310.
- Sasi, M., Jeyasekaran, G., Shanmugam, S.A., Jeyashakila, R., 2000. Chilling Fresh Fish in Dry and Wet Ice 8.
- Schober, P., Boer, C., Schwarte, L.A., 2018. Correlation Coefficients: Appropriate Use and Interpretation. *Anesthesia & Analgesia* 126, 1763. <https://doi.org/10.1213/ANE.0000000000002864>
- Setyadi, H.J., Taruk, M., Widagdo, P.P., Pakpahan, H.S., 2017. Sistem kendali untuk monitoring alat bantu (light center, condensate tank and pump ) studi kasus : PLTGU Tanjung Batu Kutai Kartanegara 5.
- Shaleh, A.I., Bani, A.U., Sudarsono, B.G., 2022. Design and Manufacture of Air Pressure Measuring Instruments With Arduino Microcontroller-Based Pressure Water Sensors. *Journal of Mathematics and Technology* 1, 12.
- Silvestri, L., 2021. CFD modeling in Industry 4.0: New perspectives for smart factories. *Procedia Komputer Science* 180, 381–387. <https://doi.org/10.1016/j.procs.2021.01.359>
- Sinaga, F.O., Amdani, K., Rajagukguk, J., 2019. Rancang bangun miniatur eskalator otomatis menggunakan sensor berat ( load cell) berbasis mikrokontroler ATMEGA 2560 7.
- Smith, N.A.S., Mitchell, S.L., Ramos, A.M., 2014. Analysis and simplification of a mathematical model for high-pressure food processes. *Applied Mathematics and Computation* 226, 20–37. <https://doi.org/10.1016/j.amc.2013.10.030>
- Soedioetama, A., 2010. Ilmu Gizi, 7. Dian Rakyat, Jakarta.
- Soglia, F., Silva, A.K., Lião, L.M., Laghi, L., Petracci, M., 2019. Effect of broiler breast abnormality and freezing on meat quality and metabolites assessed by <sup>1</sup>H-NMR spectroscopy. *Poultry Science* 98, 7139–7150. <https://doi.org/10.3382/ps/pez514>
- Solo-de-Zaldívar, B., Herranz, B., Borderías, A.J., Tovar, C.A., 2014. Effect of freezing and frozen storage on restructured FISH prototypes made with glucomannan and FISH mince. *Food Hydrocolloids* 41, 233–240. <https://doi.org/10.1016/j.foodhyd.2014.04.019>
- Srivastava, R.S., Kumar, A., Sharma, S., Thakur, H., Patel, S., Vaish, R., 2021. Development and applications of thermoelectric based dehumidifiers. *Energy and Buildings* 252, 111446. <https://doi.org/10.1016/j.enbuild.2021.111446>
- Stanisławczyk, R., Rudy, M., Gil, M., 2019. The influence of frozen storage and selected substances on the quality of horse meat. *Meat Science* 155, 74–78. <https://doi.org/10.1016/j.meatsci.2019.04.024>
- Sumardjo, D., Mulyani, N.S., n.d. Oksidasi lemak dalam daging kelinci dan ayam pada kondisi penyimpanan yang berbeda 5.

- Sun, D.-W., Hu, Z., 2003. CFD simulation of coupled heat and mass transfer through porous foods during vacuum cooling process. *International Journal of Refrigeration* 26, 19–27. [https://doi.org/10.1016/S0140-7007\(02\)00038-5](https://doi.org/10.1016/S0140-7007(02)00038-5)
- Suryana, E.A., Martianto, D., Baliwati, Y.F., 2019. Pola Konsumsi dan Permintaan Pangan Sumber Protein Hewani di Provinsi Nusa Tenggara Barat dan Nusa Tenggara Timur. *Analisis Kebijakan. Pertan.* 17, 1. <https://doi.org/10.21082/akp.v17n1.2019.1-12>
- Svendsen, E.S., Widell, K.N., Tveit, G.M., Nordtvedt, T.S., Uglem, S., Standal, I., Greiff, K., 2022. Industrial methods of freezing, *thawing* and subsequent chilled storage of whitefish. *Journal of Food Engineering* 315, 110803. <https://doi.org/10.1016/j.jfoodeng.2021.110803>
- Szpicier, A., Bińkowska, W., Wojtasik-Kalinowska, I., Salih, S.M., Półtorak, A., 2023. Application of computational fluid dynamics simulations in food industry. *Eur Food Res Technol* 249, 1411–1430. <https://doi.org/10.1007/s00217-023-04231-y>
- Tao, Y., Guo, Y., Li, J., Ye, K., Zhang, Y., Zeng, X., Dou, H., 2023. Effect of temperature fluctuation during superchilling storage on the microstructure and quality of raw pork. *Meat Science* 198, 109096. <https://doi.org/10.1016/j.meatsci.2023.109096>
- Tornberg, E., 2005. Effects of heat on meat proteins – Implications on structure and quality of meat products. *Meat Science* 70, 493–508. <https://doi.org/10.1016/j.meatsci.2004.11.021>
- Trujillo, F.J., Pham, Q.T., 2006. A computational fluid dynamic model of the heat and moisture transfer during beef chilling. *International Journal of Refrigeration* 29, 998–1009. <https://doi.org/10.1016/j.ijrefrig.2006.05.001>
- Utama, Y., Widiyanto, Y., Sardjono, A., Kusuma, H., 2018. *Sistem Pengaturan Dasar. Aseni, Mimika Baru.*
- Valentas, K.J., Rotstein, E., Singh, R.P. (Eds.), 1997. *Handbook of food engineering practice.* CRC Press, Boca Raton, Fla.
- Valtýsdóttir, K.L., Margeirsson, B., Arason, S., Lauzon, H.L., Martinsdóttir, E., n.d. Guidelines for precooling of fresh fish during processing and choice of packaging with respect to temperature control in cold chains.
- Villamonte, G., Simonin, H., Duranton, F., Chéret, R., de Lamballerie, M., 2013. Functionality of pork meat proteins: Impact of sodium chloride and phosphates under high-pressure processing. *Innovative Food Science & Emerging Technologies* 18, 15–23. <https://doi.org/10.1016/j.ifset.2012.12.001>
- Wang, Q., Wang, Y., Li, M., Hadibi, T., Kang, L., Liu, Q., 2024. Ice slurry preparation methods and their applicability to fruit and vegetable precooling systems: A critical review. *International Journal of Refrigeration* 157, 60–72. <https://doi.org/10.1016/j.ijrefrig.2023.10.016>
- Wang, S.K., 2000. *Handbook of air conditioning and refrigeration*, 2nd ed. ed. McGraw-Hill, New York.
- Wang, Y., Liang, H., Xu, R., Lu, B., Song, X., Liu, B., 2020. Effects of temperature fluctuations on the meat quality and muscle microstructure of frozen beef. *International Journal of Refrigeration* 116, 1–8. <https://doi.org/10.1016/j.ijrefrig.2019.12.025>
- Wang, Y.-Y., Tayyab Rashid, M., Yan, J.-K., Ma, H., 2021. Effect of multi-frequency ultrasound *thawing* on the structure and rheological properties of myofibrillar

- proteins from small yellow croaker. *Ultrasonics Sonochemistry* 70, 105352. <https://doi.org/10.1016/j.ultsonch.2020.105352>
- Wulantika, T., 2021. Perubahan kondisi produk hortikultura pada penyimpanan suhu rendah dan suhu ruang.
- Xia, B., Sun, D.-W., 2002. Applications of computational fluid dynamics (cfD) in the food industry: a review. *Komputers and Electronics in Agriculture* 34, 5–24. [https://doi.org/10.1016/S0168-1699\(01\)00177-6](https://doi.org/10.1016/S0168-1699(01)00177-6)
- Xia, X., Kong, B., Liu, J., Diao, X., Liu, Q., 2012a. Influence of different *thawing* methods on physicochemical changes and protein oxidation of porcine longissimus muscle. *LWT - Food Science and Technology* 46, 280–286. <https://doi.org/10.1016/j.lwt.2011.09.018>
- Xia, X., Kong, B., Liu, J., Diao, X., Liu, Q., 2012b. Influence of different *thawing* methods on physicochemical changes and protein oxidation of porcine longissimus muscle. *LWT - Food Science and Technology* 46, 280–286. <https://doi.org/10.1016/j.lwt.2011.09.018>
- Xu, C.-C., Liu, D.-K., Guo, C.-X., Wu, Y., 2020. Effect of cooling rate and super-chilling temperature on ice crystal characteristic, cell structure, and physicochemical quality of super-chilled fresh-cut celery. *International Journal of Refrigeration* 113, 249–255. <https://doi.org/10.1016/j.ijrefrig.2020.01.024>
- Xu, J.-C., Zhang, M., Mujumdar, A.S., Adhikari, B., 2017. Recent developments in smart freezing technology applied to fresh foods. *Critical Reviews in Food Science and Nutrition* 57, 2835–2843. <https://doi.org/10.1080/10408398.2015.1074158>
- Yan, W., Rajcan, I., 2002. Biplot Analysis of Test Sites and Trait Relations of Soybean in Ontario. *Crop Science* 42, 11–20. <https://doi.org/10.2135/cropsci2002.1100>
- Yanagisawa, T., Ariizumi, M., Shigematsu, Y., Kobayashi, H., Hasegawa, M., Watanabe, K., 2010. Combination of Super Chilling and High Carbon Dioxide Concentration Techniques Most Effectively to Preserve Freshness of Shell Eggs during Long-Term Storage. *Journal of Food Science* 75, E78–E82. <https://doi.org/10.1111/j.1750-3841.2009.01451.x>
- Yendri, D., Adrizal, Derisma, Afif, H., 2020. Design of Cow Cattle Weighing System Technology and Automatic Giving Feed, in: 2020 International Conference on Information Technology Systems and Innovation (ICITSI). Presented at the 2020 International Conference on Information Technology Systems and Innovation (ICITSI), IEEE, Bandung - Padang, Indonesia, pp. 185–191. <https://doi.org/10.1109/ICITSI50517.2020.9264977>
- Zahorulko, A., Cherevko, O., Zagorulko, A., Yancheva, M., Budnyk, N., Nakonechna, Y., Oliynyk, N., Novgorodska, N., 2021. Design of an apparatus for low-temperature processing of meat delicacies. *EEJET* 5, 6–12. <https://doi.org/10.15587/1729-4061.2021.240675>
- Zhang, C., Yang, L., Lin, W., Wei, J., Chen, J., Ma, Z., 2021. Experimental investigation and life-cycle cost analysis of a cold storage enhanced vacuum cooling system using ice slurry. *Sustainable Energy Technologies and Assessments* 45, 101074. <https://doi.org/10.1016/j.seta.2021.101074>
- Zhang, M., Li, F., Diao, X., Kong, B., Xia, X., 2017. Moisture migration, microstructure damage and protein structure changes in porcine longissimus muscle as influenced

- by multiple freeze-thaw cycles. *Meat Science* 133, 10–18. <https://doi.org/10.1016/j.meatsci.2017.05.019>
- Zhang, M., Xia, X., Liu, Q., Chen, Q., Kong, B., 2019. Changes in microstructure, quality and water distribution of porcine longissimus muscles subjected to ultrasound-assisted immersion freezing during frozen storage. *Meat Science* 151, 24–32. <https://doi.org/10.1016/j.meatsci.2019.01.002>
- Zhou, P., Chu, Y., Lv, Y., Xie, J., 2022. Quality of frozen mackerel during storage as processed by different freezing methods. *International Journal of Food Properties* 25, 593–607. <https://doi.org/10.1080/10942912.2022.2053154>