

REFERENCES

- Abeyrathne, E., Huang, X., & Ahn, D. U. (2018). Antioxidant, angiotensin-converting enzyme inhibitory activity and other functional properties of egg white proteins and their derived peptides - A review. *Poult Sci*, 97(4), 1462-1468. <https://doi.org/10.3382/ps/pex399>
- Agarwal, E., Miller, M., Yaxley, A., & Isenring, E. (2013). Malnutrition in the elderly: a narrative review. *Maturitas*, 76(4), 296-302. <https://doi.org/10.1016/j.maturitas.2013.07.013>
- Aguilera, J. M., & Covacevich, L. (2023). Designing foods for an increasingly elderly population: a challenge of the XXI century. *Current Opinion in Food Science*, 51. <https://doi.org/10.1016/j.cofs.2023.101037>
- Alavi, F., Emam-Djomeh, Z., Mohammadian, M., Salami, M., & Moosavi-Movahedi, A. A. (2020a). Physico-chemical and foaming properties of nanofibrillated egg white protein and its functionality in meringue batter. *Food Hydrocolloids*, 101, 105554. <https://doi.org/https://doi.org/10.1016/j.foodhyd.2019.105554>
- Alavi, F., Emam-Djomeh, Z., Mohammadian, M., Salami, M., & Moosavi-Movahedi, A. A. (2020b). Physico-chemical and foaming properties of nanofibrillated egg white protein and its functionality in meringue batter. *Food Hydrocolloids*, 101. <https://doi.org/10.1016/j.foodhyd.2019.105554>
- Almomani, H. Y., Pascual, C. R., Grassby, P., & Ahmadi, K. (2023). Effectiveness of the SUGAR intervention on hypoglycaemia in elderly patients with type 2 diabetes: A pragmatic randomised controlled trial. *Res Social Adm Pharm*, 19(2), 322-331. <https://doi.org/10.1016/j.sapharm.2022.09.017>
- Azad, M. B., Abou-Setta, A. M., Chauhan, B. F., Rabbani, R., Lys, J., Copstein, L., Mann, A., Jeyaraman, M. M., Reid, A. E., Fiander, M., MacKay, D. S., McGavock, J., Wicklow, B., & Zarychanski, R. (2017). Nonnutritive sweeteners and cardiometabolic health: a systematic review and meta-analysis of randomized controlled trials and prospective cohort studies. *CMAJ*, 189(28), E929-E939. <https://doi.org/10.1503/cmaj.161390>
- Balcón-Pacheco, C. D., Ozuna, C., Jaramillo-Morales, O. A., Ramírez-Emiliano, J., & Franco-Robles, E. (2024). Long-term consumption of natural sweeteners differentially modulates stress, anxiety, and depression behaviors in C57BL/6 female mice. *Food Bioscience*, 57, 103503. <https://doi.org/https://doi.org/10.1016/j.fbio.2023.103503>
- Barragán, R., Coltell, O., Portolés, O., Asensio, E. M., Sorlí, J. V., Ortega-Azorín, C., González, J. I., Sáiz, C., Fernández-Carrión, R., Ordovas, J. M., & Corella, D. (2018). Bitter, Sweet, Salty, Sour and Umami Taste Perception Decreases with Age: Sex-Specific Analysis, Modulation by Genetic Variants and Taste-Preference Associations in 18 to 80 Year-Old Subjects. *Nutrients*, 10(10), 1539. <https://www.mdpi.com/2072-6643/10/10/1539>
- Bertin, R. L., Gonzaga, L. V., Borges, G. d. S. C., Azevedo, M. S., Maltez, H. F., Heller, M., Micke, G. A., Tavares, L. B. B., & Fett, R. (2014). Nutrient composition and identification/quantification of major phenolic compounds in *Sarcocornia ambigua* (Amaranthaceae) using HPLC-ESI-MS/MS. *Food Research International*, 55, 404-411. <https://doi.org/https://doi.org/10.1016/j.foodres.2013.11.036>
- Boesveldt, S., Bobowski, N., McCrickerd, K., Maître, I., Sulmont-Rossé, C., & Forde, C. G. (2018). The changing role of the senses in food choice and food intake across the lifespan. *Food Quality and Preference*, 68, 80-89.
- Bureau of Nutrition, D. o. H., Ministry of Public Health. (2020). *Dietary Reference Intake for Thais 2020*. Thailand: Bureau of Nutrition, Department of Health, Ministry of Public Health



- Caturano, A., Galiero, R., Rocco, M., Tagliaferri, G., Piacevole, A., Nilo, D., Di Lorenzo, G., Sardu, C., Russo, V., Vetrano, E., Monda, M., Marfella, R., Rinaldi, L., & Sasso, F. C. (2024). The Dual Burden: Exploring Cardiovascular Complications in Chronic Kidney Disease. *Biomolecules*, 14(11). <https://doi.org/10.3390/biom14111393>
- Chakraborty, S., & Dash, K. K. (2023). A comprehensive review on heat and mass transfer simulation and measurement module during the baking process. *Applied Food Research*, 3(1). <https://doi.org/10.1016/j.afres.2023.100270>
- Chan, M., Wong, M., Katz, B., Casazza, K., Klokol, D., Nishkumai, O., Pan-Paticia, S., Alexander, M., & Lakey, J. (2024). Mass Spectrometry Analysis of Organ-Specific Cellular Extracts-Nanomized Organo Peptides: The Stability Study. *J Stem Cell Res*, 5(2), 1-11.
- Cichero, J. A. Y. (2016). Adjustment of Food Textural Properties for Elderly Patients. *Journal of Texture Studies*, 47(4), 277-283. <https://doi.org/10.1111/jtxs.12200>
- Cichero, J. A. Y. (2018). Age-Related Changes to Eating and Swallowing Impact Frailty: Aspiration, Choking Risk, Modified Food Texture and Autonomy of Choice. *Geriatrics (Basel)*, 3(4). <https://doi.org/10.3390/geriatrics3040069>
- Clydesdale, F. M. (1993). Color as a factor in food choice. *Crit Rev Food Sci Nutr*, 33(1), 83-101. <https://doi.org/10.1080/10408399309527614>
- Cottone, E. (2009). Use of natural antioxidants in dairy and meat products: A review of sensory and instrumental analyses.
- Ding, M., Huang, Z., Jin, Z., Zhou, C., Wu, J., Zhao, D., Shan, K., Ke, W., Zhang, M., Nian, Y., & Li, C. (2022). The effect of fat content in food matrix on the structure, rheological properties and digestive properties of protein. *Food Hydrocolloids*, 126, 107464. <https://doi.org/https://doi.org/10.1016/j.foodhyd.2021.107464>
- Ding, Y., Xiao, N., Guo, S., Lin, J., Chen, L., Mou, X., & Ai, M. (2024). Impact of NaCl perturbation on physicochemical and structural properties of preheat-treated egg white protein modulating foaming property. *Food Chemistry*, 459, 140377. <https://doi.org/https://doi.org/10.1016/j.foodchem.2024.140377>
- Doets, E. L., & Kremer, S. (2016). The silver sensory experience—A review of senior consumers' food perception, liking and intake. *Food Quality and Preference*, 48, 316-332.
- EFSA. (2011). Scientific Opinion on the substantiation of health claims related to the sugar replacers xylitol, sorbitol, mannitol, maltitol, lactitol, isomalt, erythritol, D-tagatose, isomaltulose, sucralose and polydextrose and maintenance of tooth mineralisation by. *EFSA Journal*, 9(4). <https://doi.org/10.2903/j.efsa.2011.2076>
- Fazriyati Siregar, R., Ni'matullah Al-Baarri, A., Hintono, A., Budi Pramono, Y., & Budi Muhammad Abduh, S. (2016). Purifikasi Dan Profil Protein Ovotransferrin Dari Eggshell Membrane Telur Ayam Ras Dan Buras. *Jurnal Teknologi dan Industri Pangan*, 27(1), 87-94. <https://doi.org/10.6066/jtip.2016.27.1.87>
- Figiel, A., & Tajner-Czopek, A. (2006). The effect of candy moisture content on texture. *Journal of Foodservice*, 17(4), 189-195.
- Foegeding, E. A., & Davis, J. P. (2011). Food protein functionality: A comprehensive approach. *Food Hydrocolloids*, 25(8), 1853-1864. <https://doi.org/10.1016/j.foodhyd.2011.05.008>
- Forouzesh, A., Forouzesh, F., Samadi Foroushani, S., & Forouzesh, A. (2022). A new method for calculating cholesterol and saturated fat contents and determining appropriate cholesterol levels in foods. *Available at SSRN 4131337*.
- Frisoli, T. M., Schmieder, R. E., Grodzicki, T., & Messerli, F. H. (2012). Salt and hypertension: is salt dietary reduction worth the effort? *The American journal of medicine*, 125(5), 433-439.



- Funami, T. (2016). The Formulation Design of Elderly Special Diets. *Journal of Texture Studies*, 47(4), 313-322. <https://doi.org/10.1111/jtxs.12202>
- Gad, A. S., & Sayd, A. F. (2015). Antioxidant properties of rosemary and its potential uses as natural antioxidant in dairy products—A review. *Food and Nutrition Sciences*, 6(01), 179.
- Gallego, M., Barat, J. M., Grau, R., & Talens, P. (2022). Compositional, structural design and nutritional aspects of texture-modified foods for the elderly. *Trends in Food Science & Technology*, 119, 152-163.
- Gao, J., Brennan, M. A., Mason, S. L., & Brennan, C. S. (2016). Effect of sugar replacement with stevianna and inulin on the texture and predictive glycaemic response of muffins. *International Journal of Food Science & Technology*, 51(9), 1979-1987. <https://doi.org/10.1111/ijfs.13143>
- Gökçe, C., Bozkurt, H., & Maskan, M. (2023). The use of carob flour and stevia as sugar substitutes in sponge cake: Optimization for reducing sugar and wheat flour in cake formulation. *International Journal of Gastronomy and Food Science*, 32. <https://doi.org/10.1016/j.ijgfs.2023.100732>
- Guiné, R. P. F. (2022). Textural Properties of Bakery Products: A Review of Instrumental and Sensory Evaluation Studies. *Applied Sciences*, 12(17). <https://doi.org/10.3390/app12178628>
- Ha, T. S. (2020). Geriatric Physiology for Surgical Intensivists: Part I. *Journal of Acute Care Surgery*, 10(3), 73-82. <https://doi.org/10.17479/jacs.2020.10.3.73>
- Hall, G., & Wendin, K. (2008). Sensory design of foods for the elderly. *Ann Nutr Metab*, 52 Suppl 1, 25-28. <https://doi.org/10.1159/000115344>
- Harlina, P. W., Ma, M., Shahzad, R., & Khalifa, I. (2022). Effect of rosemary extract on lipid oxidation, fatty acid composition, antioxidant capacity, and volatile compounds of salted duck eggs. *Food Science of Animal Resources*, 42(4), 689.
- Hayes, M. (2020). Measuring Protein Content in Food: An Overview of Methods. *Foods*, 9(10). <https://doi.org/10.3390/foods9101340>
- Hwang, E.-S., & Moon, S. J. (2022). Effects of Baking Temperatures on the Quality Characteristic, Antioxidant Activity, and Acrylamide Formation of Cookies. *Journal of the Korean Society of Food Science and Nutrition*, 51(1), 38-46. <https://doi.org/10.3746/jkfn.2022.51.1.38>
- Institute of Medicine, T. N. A. o. S., Engineering, and Medicine. (2010). *Front-of-Package Nutrition Rating Systems and Symbols: Phase I Report*. T. N. A. Press. <https://doi.org/10.17226/12957>
- Kaneda, H., Maeshima, K., Goto, N., Kobayakawa, T., Ayabe-Kanamura, S., & Saito, S. (2000). Decline in taste and odor discrimination abilities with age, and relationship between gustation and olfaction. *Chemical senses*, 25(3), 331-337.
- Karimipour-Saryazdi, A., Ghaffarifar, F., Dalimi, A., Foroutan, M., Sadraei, J., & Horton, J. (2025). Immunogenicity of an in-silico designed multi-epitope DNA vaccine encoding ROP21 and ROP29 of *Toxoplasma gondii* against both acute and chronic toxoplasmosis in BALB/c mice. *Microbial Pathogenesis*, 107321.
- Karnatak, K., & Bajwa, U. (2019). Effect of sugar substitution by natural high intensity sweetener on the quality characteristics of cookies and muffins. *Agricultural Research Journal*, 56(3). <https://doi.org/10.5958/2395-146x.2019.00080.2>
- Khlestkin, V., Pavlovskaya, E., Lokachuk, M., Parakhina, O., & Savkina, O. (2019). Degradation of β -Lactoglobulin during sourdough bread production. *Foods and Raw materials*, 283-290. <https://doi.org/10.21603/2308-4057-2019-2-283-290>
- Kim, S., & Joo, N. (2015). The study on development of easily chewable and swallowable foods for elderly. *Nutr Res Pract*, 9(4), 420-424. <https://doi.org/10.4162/nrp.2015.9.4.420>



- Kim, S., Kwon, Y. S., & Hong, K. H. (2023). What Is the Relationship between the Chewing Ability and Nutritional Status of the Elderly in Korea? *Nutrients*, 15(9). <https://doi.org/10.3390/nu15092042>
- Kodad, O., & Socias i Company, R. (2008). Variability of oil content and of major fatty acid composition in almond (*Prunus amygdalus* Batsch) and its relationship with kernel quality. *Journal of agricultural and food chemistry*, 56(11), 4096-4101.
- Kohajdová, Z., & Karovičová, J. (2009). Application of hydrocolloids as baking improvers. *Chemical Papers*, 63(1). <https://doi.org/10.2478/s11696-008-0085-0>
- Kreger, J. W., Lee, Y., & Lee, S. Y. (2012). Perceptual changes and drivers of liking in high protein extruded snacks. *J Food Sci*, 77(4), S161-169. <https://doi.org/10.1111/j.1750-3841.2012.02634.x>
- Kremer, S., Bult, J. H., Mojet, J., & Kroeze, J. H. (2007). Food perception with age and its relationship to pleasantness. *Chem Senses*, 32(6), 591-602. <https://doi.org/10.1093/chemse/bjm028>
- Lambert, K., Cullen, V., Jones, B., McAlpine, A., & Rossiter, B. (2025). Novel insights and practical strategies for health professionals to improve the uptake of plant-based diets in people with chronic kidney disease. *Kidney Res Clin Pract*. <https://doi.org/10.23876/j.krcp.24.272>
- Landi, F., Calvani, R., Tosato, M., Martone, A. M., Ortolani, E., Saveria, G., D'Angelo, E., Sisto, A., & Marzetti, E. (2016). Protein Intake and Muscle Health in Old Age: From Biological Plausibility to Clinical Evidence. *Nutrients*, 8(5). <https://doi.org/10.3390/nu8050295>
- Lee, D., Redfern, O., & Orengo, C. (2007). Predicting protein function from sequence and structure. *Nature reviews molecular cell biology*, 8(12), 995-1005.
- Lee, J. H., Kim, H. S., Yun, D. H., Chon, J., Han, Y. J., Yoo, S. D., Kim, D. H., Lee, S. A., Joo, H. I., Park, J. S., Kim, J. C., & Soh, Y. (2016). The Relationship Between Tongue Pressure and Oral Dysphagia in Stroke Patients. *Ann Rehabil Med*, 40(4), 620-628. <https://doi.org/10.5535/arm.2016.40.4.620>
- Lee, J. H., & Paik, H. D. (2019). Anticancer and immunomodulatory activity of egg proteins and peptides: a review. *Poult Sci*, 98(12), 6505-6516. <https://doi.org/10.3382/ps/pez381>
- Lekjing, S., Keawpeng, I., Venkatachalam, K., & Karrila, S. (2022). Impact of Different Sugar Types and Their Concentrations on Salted Duck Egg White Based Meringues. *Foods*, 11(9). <https://doi.org/10.3390/foods11091248>
- Licciardello, F., Frisullo, P., Laverse, J., Muratore, G., & Del Nobile, M. A. (2012). Effect of sugar, citric acid and egg white type on the microstructural and mechanical properties of meringues. *Journal of Food Engineering*, 108(3), 453-462. <https://doi.org/10.1016/j.jfoodeng.2011.08.021>
- Lindsey, M. (2024). Cross-cultural differences in food preferences and consumption patterns. *J Food Sci*, 5, 30-42.
- Lis, A., Staniewski, B., & Ziajka, J. (2021). A comparison of butter texture measurements with the AP 4/2 penetrometer and TA.XT. Plus texture analyzer. *International Journal of Food Properties*, 24(1), 1744-1757. <https://doi.org/10.1080/10942912.2021.1999262>
- Liu, T., Zheng, J., Du, J., & He, G. (2024). Food Processing and Nutrition Strategies for Improving the Health of Elderly People with Dysphagia: A Review of Recent Developments. *Foods*, 13(2). <https://doi.org/10.3390/foods13020215>
- Lu, R. (2013). Principles of solid food texture analysis *. In *Instrumental Assessment of Food Sensory Quality* (pp. 103-128). <https://doi.org/10.1533/9780857098856.1.103>
- Ma, B., Fu, X., Zhu, P., Lu, Z., Niu, J., & Lu, F. (2024). Allergenicity, assembly and applications of ovalbumin in egg white: a review. *Crit Rev Food Sci Nutr*, 64(24), 8672-8688. <https://doi.org/10.1080/10408398.2023.2202774>



- Madureira, A. R., Pereira, C. I., Gomes, A. M. P., Pintado, M. E., & Xavier Malcata, F. (2007). Bovine whey proteins – Overview on their main biological properties. *Food Research International*, 40(10), 1197-1211. <https://doi.org/10.1016/j.foodres.2007.07.005>
- Maître, I. (2014). *Perceptions sensorielles et préférences alimentaires des seniors: Contribution au maintien du statut nutritionnel et à l'appréciation des produits* [Université d'Angers].
- Mansoori, S., Kushner, N., Suminski, R. R., Farquhar, W. B., & Chai, S. C. (2019). Added Sugar Intake is Associated with Blood Pressure in Older Females. *Nutrients*, 11(9). <https://doi.org/10.3390/nu11092060>
- Masri, A. A., Bakar, F. I. A., Abidin, M. Z., & Malik, N. H. (2023). Development of Antioxidant Jelly Using Tropical Fruits. *Tropical Journal of Natural Product Research*, 7(7). <https://doi.org/10.26538/tjnpr/v7i7.22>
- Mathlouthi, M. (2001). Water content, water activity, water structure and the stability of foodstuffs. *Food Control*, 12(7), 409-417. [https://doi.org/10.1016/S0956-7135\(01\)00032-9](https://doi.org/10.1016/S0956-7135(01)00032-9)
- Matsuo, K., Kito, N., Ogawa, K., Izumi, A., & Masuda, Y. (2020). Effects of textured foods on masticatory muscle activity in older adults with oral hypofunction. *J Oral Rehabil*, 47(2), 180-186. <https://doi.org/10.1111/joor.12901>
- Mihulova, M., Vejlupekova, M., Hanušová, J., Štětina, J., & Panovská, Z. (2013). Effect of modified whey proteins on texture and sensory quality of processed cheese.
- Ministry of Public Health, T. (2023). *Notification of the Ministry of Public Health (No. 445) B.E. 2566 (2023): Nutrition Labelling*. Thailand: Ministry of Public Health, Thailand
- Mitchell, M., Brutnon, N. P., Fitzgerald, R. J., & Wilkinson, M. G. (2013). The Use of Herbs, Spices, and Whey Proteins as Natural Flavor Enhancers and Their Effect on the Sensory Acceptability of Reduced-Salt Chilled Ready-Meals. *Journal of Culinary Science & Technology*, 11(3), 222-240. <https://doi.org/10.1080/15428052.2013.769869>
- Mohanty, A. (2011). Proteomic Techniques for Application in Food Science. *Chemical Analysis of Value Added Dairy Products and Their Quality Assurance*, 100-105.
- Moretton, M., Cattaneo, C., Mosca, A. C., Proserpio, C., Anese, M., Pagliarini, E., & Pellegrini, N. (2023). Identification of desirable mechanical and sensory properties of bread for the elderly. *Food Quality and Preference*, 104, 104716. <https://doi.org/10.1016/j.foodqual.2022.104716>
- Nammakuna, N., Barringer, S. A., & Ratanatriwong, P. (2016). The effects of protein isolates and hydrocolloids complexes on dough rheology, physicochemical properties and qualities of gluten-free crackers. *Food Sci Nutr*, 4(2), 143-155. <https://doi.org/10.1002/fsn3.266>
- Nastaj, M., Solowiej, B. G., Terpilowski, K., Kucia, W., Tomasevic, I. B., & Perez-Huertas, S. (2023). The Effect of Erythritol on the Physicochemical Properties of Reformulated, High-Protein, and Sugar-Free Macarons Produced from Whey Protein Isolate Intended for Diabetics, Athletes, and Physically Active People. *Foods*, 12(7). <https://doi.org/10.3390/foods12071547>
- Nastaj, M., Sołowiej, B. G., Terpilowski, K., & Mleko, S. (2020). Effect of erythritol on physicochemical properties of reformulated high protein meringues obtained from whey protein isolate. *International Dairy Journal*, 105. <https://doi.org/10.1016/j.idairyj.2020.104672>
- Nemš, A., Miedzianka, J., & Kita, A. (2022). Quality and nutritional value of cookies enriched with plant-based protein preparations. *Journal of the Science of Food and Agriculture*, 102(11), 4629-4639.
- Nuryandani, E., Kurnianto, D., Jasmadi, J., Sefrienda, A. R., Novitasari, E., Apriyati, E., Wanita, Y. P., Indrasari, S. D., Sunaryanto, R., Tjokrokusumo, D., Yani, A., Suryaningtyas, I. T., & Andriana, Y. (2024). Phytotoxic and Cytotoxic Effects,

- Antioxidant Potentials, and Phytochemical Constituents of Stevia rebaudiana Leaves. *Scientifica (Cairo)*, 2024, 2200993. <https://doi.org/10.1155/2024/2200993>
- O'Charoen, S., Hayakawa, S., Matsumoto, Y., & Ogawa, M. (2014). Effect of D-psicose used as sucrose replacer on the characteristics of meringue. *J Food Sci*, 79(12), E2463-2469. <https://doi.org/10.1111/1750-3841.12699>
- Oktaviana, A. S., Hersoelistiyorini, W., & Nurhidajah, N. (2017). Kadar protein, daya kembang, dan organoleptik cookies dengan substitusi tepung mocaf dan tepung pisang kepok. *Jurnal Pangan Dan Gizi*, 7(2), 72-81.
- Oldham, A. M., McComber, D. R., & Cox, D. F. (2000). Effect of cream of tartar level and egg white temperature on angel food cake quality. *Family and Consumer Sciences Research Journal*, 29(2), 111-124.
- Park, J. W., Lee, S., Yoo, B., & Nam, K. (2020). Effects of texture properties of semi-solid food on the sensory test for pharyngeal swallowing effort in the older adults. *BMC Geriatr*, 20(1), 493. <https://doi.org/10.1186/s12877-020-01890-4>
- Park, S., Kim, D. K., Park, H., Yoon, D., & Byambaa, S. (2022). Improvement of chewing and swallowing risks in community-dwelling older adults using texture-modified food. *Nutr Res Pract*, 16(3), 354-365. <https://doi.org/10.4162/nrp.2022.16.3.354>
- Parra-Campos, A., & Ordóñez-Santos, L. E. (2019). Natural pigment extraction optimization from coffee exocarp and its use as a natural dye in French meringue. *Food Chem*, 285, 59-66. <https://doi.org/10.1016/j.foodchem.2019.01.158>
- Pathare, P. B., Opara, U. L., & Al-Said, F. A.-J. (2012). Colour Measurement and Analysis in Fresh and Processed Foods: A Review. *Food and Bioprocess Technology*, 6(1), 36-60. <https://doi.org/10.1007/s11947-012-0867-9>
- Pereira Ávila, E. T., Lima, T. d. R., de Almeida, P. C., Tolazzi, G. J., Cavalcante, L. P., Doneda, D. L., Paes, G. B., Junior, R. C. V., Damazo, A. S., & Voltarelli, F. A. (2025). HIGH-PROTEIN DIET BASED ON WHEY PROTEIN ISOLATE PRESERVES MUSCLE MASS AND ITS ASSOCIATION WITH RESISTANCE TRAINING ATTENUATES GLOMERULAR HYPERTROPHY IN RATS. *Nutrition*, 112708. <https://doi.org/https://doi.org/10.1016/j.nut.2025.112708>
- Peteliuk, V., Rybchuk, L., Bayliak, M., Storey, K. B., & Lushchak, O. (2021). Natural sweetener Stevia rebaudiana: Functionalities, health benefits and potential risks. *EXCLI journal*, 20, 1412.
- Pico, J., Khomenko, I., Capozzi, V., Navarini, L., & Biasioli, F. (2020). Real-Time Monitoring of Volatile Compounds Losses in the Oven during Baking and Toasting of Gluten-Free Bread Doughs: A PTR-MS Evidence. *Foods*, 9(10). <https://doi.org/10.3390/foods9101498>
- Prawidya, D., Hendra, Y., Syamsiar, K., & Khafidurrohman, A. (2017). Developing Food Sensory Test System with Preference Test (Hedonic and Hedonic Quality). International Conference on Sustainable Information Engineering and Technology,
- Prieto-Vazquez Del Mercado, P., Mojica, L., & Morales-Hernandez, N. (2022). Protein Ingredients in Bread: Technological, Textural and Health Implications. *Foods*, 11(16). <https://doi.org/10.3390/foods11162399>
- Ptaszek, P., Kabziński, M., Kruk, J., Kaczmarczyk, K., Żmudziński, D., Liszka-Skoczylas, M., Mickowska, B., Łukasiewicz, M., & Banaś, J. (2015). The effect of pectins and xanthan gum on physicochemical properties of egg white protein foams. *Journal of Food Engineering*, 144, 129-137. <https://doi.org/10.1016/j.jfoodeng.2014.07.017>
- Rajput, Y., & Sharma, R. (2011). SDS-PAGE–Principle and Applications. *Chemical Analysis of Value Added Dairy Products and Their Quality Assurance*, 81.
- Ramadhani, P., & Mahmudiono, T. (2018). Hubungan Konsumsi Sugar-Sweetened Beverages Dengan Kejadian Diabetes Mellitus Pada Lansia. *Media Gizi Indonesia*, 13(1). <https://doi.org/10.20473/mgi.v13i1.49-56>



- Razavi, S. M. A., & Irani, M. (2019). Rheology of Food Gum. In *Bioactive Molecules in Food* (pp. 1959-1985). https://doi.org/10.1007/978-3-319-78030-6_20
- Razi, S. M., Fahim, H., Amirabadi, S., & Rashidinejad, A. (2023). An overview of the functional properties of egg white proteins and their application in the food industry. *Food Hydrocolloids*, *135*, 108183. <https://doi.org/https://doi.org/10.1016/j.foodhyd.2022.108183>
- Regnat, K., Mach, R. L., & Mach-Aigner, A. R. (2018). Erythritol as sweetener-wherefrom and whereto? *Appl Microbiol Biotechnol*, *102*(2), 587-595. <https://doi.org/10.1007/s00253-017-8654-1>
- Ritz, E., Hahn, K., Ketteler, M., Kuhlmann, M. K., & Mann, J. (2012). Phosphate additives in food--a health risk. *Dtsch Arztebl Int*, *109*(4), 49-55. <https://doi.org/10.3238/arztebl.2012.0049>
- Rothenberg, E., Ekman, S., Bülow, M., Möller, K., Svantesson, J., & Wendin, K. (2016). Texture-modified meat and carrot products for elderly people with dysphagia: preference in relation to health and oral status. *Scandinavian Journal of Food and Nutrition*, *51*(4), 141-147. <https://doi.org/10.1080/17482970701760675>
- Sadhu, P., Rathod, F., Kumari, M., Shah, N., Talele, C., & Aundhia, C. (2024). Exploring Stevia: A Natural Sweetener with Multifaceted Health Benefits. *Journal of Natural Remedies*, 757-764. <https://doi.org/10.18311/jnr/2024/36196>
- Sanca, L., C , C., Namara, N., Lopes, A., Emanuel, A., Oliveiros, B., Byberg, S., Bjerregaard-Andersen, M., Carvalho, E., Massart, A., & Teixeira, A. (2025). Effect of Self-reported Physical Activity on Glycaemia and Blood Pressure in Healthy Participants from Bissau: A Cross-sectional Study. *Sports Medicine - Open*, *11*(1), 19. <https://doi.org/10.1186/s40798-025-00821-0>
- Saraiva, A., Carrascosa, C., Raheem, D., Ramos, F., & Raposo, A. (2020). Natural Sweeteners: The Relevance of Food Naturalness for Consumers, Food Security Aspects, Sustainability and Health Impacts. *Int J Environ Res Public Health*, *17*(17). <https://doi.org/10.3390/ijerph17176285>
- Saulo, A. A. (2005). Sugars and sweeteners in foods.
- Sch gger, H., & von Jagow, G. (1987). Tricine-sodium dodecyl sulfate-polyacrylamide gel electrophoresis for the separation of proteins in the range from 1 to 100 kDa. *Analytical Biochemistry*, *166*(2), 368-379. [https://doi.org/https://doi.org/10.1016/0003-2697\(87\)90587-2](https://doi.org/https://doi.org/10.1016/0003-2697(87)90587-2)
- Sebii, H., Ghribi, A. M., Chebbi, W., Attia, H., & Besbes, S. (2025). Total replacement of egg white by aquafaba and commercial substitute in meringue formulation: Effect on physico-chemical properties and hedonic appreciation. *International Journal of Gastronomy and Food Science*, *39*. <https://doi.org/10.1016/j.ijgfs.2025.101103>
- Sharma, K., & Chauhan, E. S. (2018). Multifaceted Whey Protein: Its Applications in Food Industry. *International Journal of Health Sciences and Research*, *8*, 262-268.
- Sharma, N., Barui, A. K., & Rajput, Y. (2011). Identification of Proteins Through Western Blotting--Practical. *Chemical Analysis of Value Added Dairy Products and Their Quality Assurance*, 200.
- Simpson, R. J. (2008). Quantifying protein by bicinchoninic Acid. *CSH Protoc*, 2008, pdb prot4722. <https://doi.org/10.1101/pdb.prot4722>
- Song, X., Perez-Cueto, F. J. A., & Bredie, W. L. P. (2018). Sensory-Driven Development of Protein-Enriched Rye Bread and Cream Cheese for the Nutritional Demands of Older Adults. *Nutrients*, *10*(8). <https://doi.org/10.3390/nu10081006>
- Sperber, B. L. (2010). *Influence of pectin characteristics on complexation with β -lactoglobulin*. Wageningen University and Research.



- Stanhope, K. L. (2016). Sugar consumption, metabolic disease and obesity: The state of the controversy. *Crit Rev Clin Lab Sci*, 53(1), 52-67. <https://doi.org/10.3109/10408363.2015.1084990>
- Stone, H. (2018). Example food: What are its sensory properties and why is that important? *NPJ Sci Food*, 2, 11. <https://doi.org/10.1038/s41538-018-0019-3>
- Struck, S., Jaros, D., Brennan, C. S., & Rohm, H. (2014). Sugar replacement in sweetened bakery goods. *International Journal of Food Science & Technology*, 49(9), 1963-1976. <https://doi.org/10.1111/ijfs.12617>
- Sukhmani, G., Yogesh, G., Shalini, A. S. S., Vikas, K., Anil, P., & Ashwani, K. (2018). Natural sweeteners: health benefits of stevia. *Foods and Raw materials*, 6, 392-402.
- Sungur, Ş., & Kilboz, Y. (2016). Determination of sugar profiles of sweetened foods and beverages. *J. Food Nutr. Res*, 4, 349-354.
- Sura, L., Madhavan, A., Carnaby, G., & Crary, M. A. (2012). Dysphagia in the elderly: management and nutritional considerations. *Clin Interv Aging*, 7, 287-298. <https://doi.org/10.2147/CIA.S23404>
- Suri, S., Kathuria, D., Mishra, A., & Sharma, R. (2021). Phytochemical composition and pharmacological impact of natural non-calorie sweetener-monk fruit (*Siraitia grosvenorii*): a review. *Nutrition & Food Science*, 51(6), 897-910.
- Tam, M., & Koppel, K. (2021). Sensory impairment: natural result of aging. *Journal of Sensory Studies*, 36(5), e12693.
- Tang, X., & Liu, J. (2017). A Comparative Study of Partial Replacement of Wheat Flour with Whey and Soy Protein on Rheological Properties of Dough and Cookie Quality. *Journal of Food Quality*, 2017, 1-10. <https://doi.org/10.1155/2017/2618020>
- Tang, Y., Huang, Y., Li, M., Zhu, W., Zhang, W., Luo, S., Zhang, Y., Ma, J., & Jiang, Y. (2024). Balancing Maillard reaction products formation and antioxidant activities for improved sensory quality and health benefit properties of pan baked buns. *Food Res Int*, 195, 114984. <https://doi.org/10.1016/j.foodres.2024.114984>
- Tattari, S., Gavaravarapu, S. M., Pullakhandam, R., Bhatia, N., Kaur, S., Sarwal, R., Rajkumar, H., & Reddy, G. B. (2022). Nutritional requirements for the elderly in India: A status paper. *Indian J Med Res*, 156(3), 411-420. https://doi.org/10.4103/ijmr.ijmr_2784_21
- Thomas, J. E., & Glade, M. J. (2010). Stevia: It's Not Just About Calories. *The Open Obesity Journal*, 2, 101-109. <https://doi.org/https://doi.org/10.2174/1876823701002010101>
- Triawan, F., Aprilia, G., Saptaji, K., Saville, R., & Nandiyanto, A. (2021). Determining Crispness Level of Dry Food through Its Compressive Strain Energy. *Indonesian Journal of Computing, Engineering and Design (IJoCED)*, 106-118. <https://doi.org/10.35806/ijoced.v3i2.55>
- Tugnolo, A., Giovenzana, V., Malegori, C., Oliveri, P., Casson, A., Curatitoli, M., Guidetti, R., & Beghi, R. (2021). A reliable tool based on near-infrared spectroscopy for the monitoring of moisture content in roasted and ground coffee: A comparative study with thermogravimetric analysis. *Food Control*, 130. <https://doi.org/10.1016/j.foodcont.2021.108312>
- Tunick, M. H. (2011). Food texture analysis in the 21st century. *J Agric Food Chem*, 59(5), 1477-1480. <https://doi.org/10.1021/jf1021994>
- USDA. (2021). *Egg, white, raw, fresh*. FoodData Central, U.S. Department of Agriculture. Retrieved JUNE 17 from <https://fdc.nal.usda.gov/fdc-app.html#/food-details/748789/nutrients>
- Van der Plancken, I., Van Loey, A., & Hendrickx, M. (2007). Effect of moisture content during dry-heating on selected physicochemical and functional properties of dried egg white. *Journal of agricultural and food chemistry*, 55(1), 127-135.



- Wang, R., & Hartel, R. W. (2021). Understanding stickiness in sugar-rich food systems: A review of mechanisms, analyses, and solutions of adhesion. *Comprehensive Reviews in Food Science and Food Safety*, 20(6), 5901-5937.
- Wang, Y., & Vardhanabhuti, B. (2024). The Influence of pH on the Emulsification Properties of Heated Whey Protein-Pectin Complexes. *Foods*, 13(14). <https://doi.org/10.3390/foods13142295>
- WHO. (2015). *Guideline: Sugars intake for adults and children*. WHO. <https://apps.who.int/iris/handle/10665/154587>
- Wijayanti, H. B., Bansal, N., & Deeth, H. C. (2014). Stability of Whey Proteins during Thermal Processing: A Review. *Comprehensive Reviews in Food Science and Food Safety*, 13(6), 1235-1251. <https://doi.org/10.1111/1541-4337.12105>
- Wittig, I., Braun, H. P., & Schagger, H. (2006). Blue native PAGE. *Nat Protoc*, 1(1), 418-428. <https://doi.org/10.1038/nprot.2006.62>
- Wittig, I., & Schagger, H. (2009). Native electrophoretic techniques to identify protein-protein interactions. *Proteomics*, 9(23), 5214-5223. <https://doi.org/10.1002/pmic.200900151>
- Wouters, A. G. B., Rombouts, I., Fierens, E., Brijs, K., & Delcour, J. A. (2018). Enzymatically Hydrolyzed Wheat Gluten as a Foaming Agent in Food: Incorporation in a Meringue Recipe as a Proof-of-Concept. *J Food Sci*, 83(8), 2119-2126. <https://doi.org/10.1111/1750-3841.14283>
- Yamada, S., & Inaba, M. (2021). Potassium Metabolism and Management in Patients with CKD. *Nutrients*, 13(6). <https://doi.org/10.3390/nu13061751>
- Yao, Y., Huang, V., Seah, V., & Kim, J. E. (2024). Impact of Quantity and Type of Dietary Protein on Cardiovascular Disease Risk Factors Using Standard and Network Meta-analyses of Randomized Controlled Trials. *Nutrition Reviews*, 83(3), e814-e828. <https://doi.org/10.1093/nutrit/nuae086>
- Yoon, K.-H., Kim, W.-M., & Lee, G.-H. (2023). Properties of Meringue Cookies by Adding Various Chickpea Aqueous Solution Amount Instead of Egg White. *Journal of the Korean Society of Food Science and Nutrition*, 52(5), 539-546. <https://doi.org/10.3746/jkfn.2023.52.5.539>
- Youssef, M. K., & Barbut, S. (2010). Effects of caseinate, whey and milk proteins on emulsified beef meat batters prepared with different protein levels. *Journal of Muscle Foods*, 21(4), 785-800.
- Yuan, S., & Larsson, S. C. (2023). Epidemiology of sarcopenia: Prevalence, risk factors, and consequences. *Metabolism*, 144, 155533. <https://doi.org/https://doi.org/10.1016/j.metabol.2023.155533>
- Yüceer, M., & Asik, H. (2020). Texture, rheology, storage stability, and sensory evaluation of meringue's prepared from lipase enzyme-modified liquid egg white. *Journal of Food Processing and Preservation*, 44(9). <https://doi.org/10.1111/jfpp.14667>
- Yüceer, M., & Caner, C. (2021). Effects of protease-hydrolyzed egg white on the meringue batter properties and meringue textural and sensory properties during storage. *International Journal of Gastronomy and Food Science*, 25. <https://doi.org/10.1016/j.ijgfs.2021.100409>
- Yüceer, M., & Caner, C. (2022). Investigate the enzyme-texturized egg albumen on the functionality, sensorial and textural characteristics of cooked meringue cookies during storage. *Journal of Food Measurement and Characterization*, 16(4), 2961-2968. <https://doi.org/10.1007/s11694-022-01397-z>
- Yusof, N., Jaswir, I., Jamal, P., & Jami, M. S. (2019). Texture Profile Analysis (TPA) of the jelly dessert prepared from halal gelatin extracted using High Pressure Processing (HPP). *Malaysian Journal of Fundamental and Applied Sciences*, 15, 604-608.
- Zeng, X., Wang, M., Chen, L., & Zheng, B. (2024). Impact of using whole chestnut flour as a substitute for cake flour on digestion, functional and storage properties of chiffon cake:



UNIVERSITAS
GADJAH MADA

Development of High Protein and Reduced Sugar Functional Meringue Cookies for Elderly-Friendly Consumption

Bintang Wijaya Yudha, Dr. Dwi Larasatie Nur Fibri, S.T.P., M.Sc.; Asst. Prof. Nualpun Sirinupong, Ph.D.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

A potential application study. *Food Chem*, 432, 137016.

<https://doi.org/10.1016/j.foodchem.2023.137016>

Zhang, S., Zhang, Z., Lin, M., & Vardhanabhuti, B. (2012). Raman spectroscopic characterization of structural changes in heated whey protein isolate upon soluble complex formation with pectin at near neutral pH. *J Agric Food Chem*, 60(48), 12029-12035. <https://doi.org/10.1021/jf303780c>