

DAFTAR PUSTAKA

- Abu-Salem, F.M., Mahmoud, M.H., El-Kalyoub, M.H., Gibriel, A.Y., Abou-Arab, A., 2013. Characterization of Antioxidant Peptides of Soybean Protein Hydrolysate. *International Journal of Nutrition and Food Engineering* 7, 522–526.
- Ahmadi, F., Kadivar, M., Shahedi, M., 2007. Antioxidant activity of *Kelussia odoratissima* Mozaff. in model and food systems. *Food Chem* 105, 57–64. <https://doi.org/10.1016/j.foodchem.2007.03.056>
- Alaiz, M., Beppu, M., Ohishi, K., Kikugawa, K., 1994. Modification of Delipidated Apoprotein B of Low Density Lipoprotein by Lipid Oxidation Products in Relation to Macrophage Scavenger Receptor Binding. *Biol Pharm Bull* 17, 51–57. <https://doi.org/10.1248/bpb.17.51>
- Alashi, A.M., Blanchard, C.L., Mailer, R.J., Agboola, S.O., Mawson, A.J., He, R., Girgih, A., Aluko, R.E., 2014. Antioxidant properties of Australian canola meal protein hydrolysates. *Food Chem* 146, 500–506. <https://doi.org/10.1016/j.foodchem.2013.09.081>
- Ambawat, S., Khetarpaul, N., 2018. Comparative assessment of antioxidant, nutritional and functional properties of soybean and its by-product okara. *Annals of Phytomedicine: An International Journal* 7. <https://doi.org/10.21276/ap.2018.7.1.14>
- Ang, S.-S., Ismail-Fitry, M.R., 2019. Production of Different Mushroom Protein Hydrolysates as Potential Flavours in Chicken Soup Using Stem Bromelin Hydrolysis. *Food Technol Biotechnol* 57, 472–480. <https://doi.org/10.17113/ftb.57.04.19.6294>
- Arise, A.K., Alashi, A.M., Nwachukwu, I.D., Ijabadeniyi, O.A., Aluko, R.E., Amonsou, E.O., 2016. Antioxidant activities of bambara groundnut (*Vigna subterranea*) protein hydrolysates and their membrane ultrafiltration fractions. *Food Funct* 7, 2431–2437. <https://doi.org/10.1039/C6FO00057F>
- Arshad, Z.I.M., Amid, A., Yusof, F., Jaswir, I., Ahmad, K., Loke, S.P., 2014. Bromelin: an overview of industrial application and purification strategies. *Appl Microbiol Biotechnol* 98, 7283–7297. <https://doi.org/10.1007/s00253-014-5889-y>
- Balti, R., Bougatef, A., el Hadj Ali, N., Ktari, N., Jellouli, K., Nedjar-Arroume, N., Dhulster, P., Nasri, M., 2011. Comparative Study on Biochemical Properties and Antioxidative Activity of Cuttlefish (*Sepia officinalis*) Protein Hydrolysates Produced by Alcalase and *Bacillus licheniformis* NH1 Proteases. *J Amino Acids* 2011, 1–11. <https://doi.org/10.4061/2011/107179>
- Borawska, J., Darewicz, M., Vegarud, G.E., Minkiewicz, P., 2016. Antioxidant properties of carp (*Cyprinus carpio* L.) protein *ex vivo* and *in vitro* hydrolysates. *Food Chem* 194, 770–779. <https://doi.org/10.1016/j.foodchem.2015.08.075>
- Chalamaiah, M., Yu, W., Wu, J., 2018. Immunomodulatory and anticancer protein hydrolysates (peptides) from food proteins: A review. *Food Chem* 245, 205–222. <https://doi.org/10.1016/j.foodchem.2017.10.087>

- Chan, W.-M., Ma, C.-Y., 1999. Modification of Proteins from Soymilk Residue (Okara) by Trypsin. *J Food Sci* 64, 781–786. <https://doi.org/10.1111/j.1365-2621.1999.tb15911.x>
- Chen, K.-I., Erh, M.-H., Su, N.-W., Liu, W.-H., Chou, C.-C., Cheng, K.-C., 2012. Soyfoods and soybean products: from traditional use to modern applications. *Appl Microbiol Biotechnol* 96, 9–22. <https://doi.org/10.1007/s00253-012-4330-7>
- Chi, C.-F., Hu, F.-Y., Wang, B., Li, T., Ding, G.-F., 2015. Antioxidant and anticancer peptides from the protein hydrolysate of blood clam (*Tegillarca granosa*) muscle. *J Funct Foods* 15, 301–313. <https://doi.org/10.1016/j.jff.2015.03.045>
- Choudhary, D.K., Kumar, M., Prasad, R., Kumar, V., 2018. *In silico* Approach for Sustainable Agriculture. Springer Singapore, Singapore. <https://doi.org/10.1007/978-981-13-0347-0>
- Coscueta, E.R., Amorim, M.M., Voss, G.B., Nerli, B.B., Picó, G.A., Pintado, M.E., 2016. Bioactive properties of peptides obtained from Argentinian defatted soy flour protein by Corolase PP hydrolysis. *Food Chem* 198, 36–44. <https://doi.org/10.1016/j.foodchem.2015.11.068>
- de Figueiredo, V.R.G., Yamashita, F., Vanzela, A.L.L., Ida, E.I., Kurozawa, L.E., 2018. Action of multi-enzyme complex on protein extraction to obtain a protein concentrate from okara. *J Food Sci Technol* 55, 1508–1517. <https://doi.org/10.1007/s13197-018-3067-4>
- Dhaval, A., Yadav, N., Purwar, S., 2016. Potential Applications of Food Derived Bioactive Peptides in Management of Health. *Int J Pept Res Ther* 22, 377–398. <https://doi.org/10.1007/s10989-016-9514-z>
- Dziuba, J., Iwaniak, A., Minkiewicz, P., 2003. Computer-aided characteristics of proteins as potential precursors of bioactive peptides. *Polimery* 48, 50–53. <https://doi.org/10.14314/polimery.2003.050>
- Elavarasan, K., Naveen Kumar, V., Shamasundar, B.A., 2014. Antioxidant and Functional Properties of Fish Protein Hydrolysates from Fresh Water Carp (*Catla catla*) as Influenced by the Nature of Enzyme. *J Food Process Preserv* 38, 1207–1214. <https://doi.org/10.1111/jfpp.12081>
- Esfandi, R., Walters, M.E., Tsopmo, A., 2019. Antioxidant properties and potential mechanisms of hydrolyzed proteins and peptides from cereals. *Heliyon* 5, e01538. <https://doi.org/10.1016/j.heliyon.2019.e01538>
- Evangelho, J.A. do, Vanier, N.L., Pinto, V.Z., Berrios, J.J. de, Dias, A.R.G., Zavareze, E. da R., 2017. Black bean (*Phaseolus vulgaris* L.) protein hydrolysates: Physicochemical and functional properties. *Food Chem* 214, 460–467. <https://doi.org/10.1016/j.foodchem.2016.07.046>
- Eze, O.F., Chatzifragkou, A., Charalampopoulos, D., 2022. Properties of protein isolates extracted by ultrasonication from soybean residue (okara). *Food Chem* 368, 130837. <https://doi.org/10.1016/j.foodchem.2021.130837>

- Forghani, B., Ebrahimpour, A., Bakar, J., Abdul Hamid, A., Hassan, Z., Saari, N., 2012. Enzyme Hydrolysates from *Stichopus horrens* as a New Source for Angiotensin-Converting Enzyme Inhibitory Peptides. Evidence-Based Complementary and Alternative Medicine 2012, 1–9. <https://doi.org/10.1155/2012/236384>
- Gangopadhyay, N., Wynne, K., O'Connor, P., Gallagher, E., Brunton, N.P., Rai, D.K., Hayes, M., 2016. *In silico* and *in vitro* analyses of the angiotensin-I converting enzyme inhibitory activity of hydrolysates generated from crude barley (*Hordeum vulgare*) protein concentrates. Food Chem 203, 367–374. <https://doi.org/10.1016/j.foodchem.2016.02.097>
- Girgih, A.T., He, R., Hasan, F.M., Udenigwe, C.C., Gill, T.A., Aluko, R.E., 2015. Evaluation of the *in vitro* antioxidant properties of a cod (*Gadus morhua*) protein hydrolysate and peptide fractions. Food Chem 173, 652–659. <https://doi.org/10.1016/j.foodchem.2014.10.079>
- Gong, M., Aguirre, A.-M., Bassi, A., 2016. Technical Issues Related to Characterization, Extraction, Recovery, and Purification of Proteins from Different Waste Sources, in: Protein Byproducts. Elsevier, pp. 89–106. <https://doi.org/10.1016/B978-0-12-802391-4.00005-7>
- Guan, H., Diao, X., Jiang, F., Han, J., Kong, B., 2018. The enzymatic hydrolysis of soy protein isolate by Corolase PP under high hydrostatic pressure and its effect on bioactivity and characteristics of hydrolysates. Food Chem 245, 89–96. <https://doi.org/10.1016/j.foodchem.2017.08.081>
- Gupta, S., Kapoor, P., Chaudhary, K., Gautam, A., Kumar, R., Raghava, G.P.S., 2013. *In silico* Approach for Predicting Toxicity of Peptides and Proteins. PLoS One 8, e73957. <https://doi.org/10.1371/journal.pone.0073957>
- Hakeem, K.R., Shaik, N.A., Banaganapalli, B., Elango, R., 2019. Essentials of Bioinformatics, Volume III.
- Halliwell, B., 1994. Free radicals, antioxidants, and human disease: curiosity, cause, or consequence? The Lancet 344, 721–724. [https://doi.org/10.1016/S0140-6736\(94\)92211-X](https://doi.org/10.1016/S0140-6736(94)92211-X)
- Hashemi, Z.S., Zarei, M., Fath, M.K., Ganji, M., Farahani, M.S., Afsharnouri, F., Pourzardosht, N., Khalesi, B., Jahangiri, A., Rahbar, M.R., Khalili, S., 2021. *In silico* Approaches for the Design and Optimization of Interfering Peptides Against Protein–Protein Interactions. Front Mol Biosci 8. <https://doi.org/10.3389/fmolb.2021.669431>
- He, R., Girgih, A.T., Malomo, S.A., Ju, X., Aluko, R.E., 2013. Antioxidant activities of enzymatic rapeseed protein hydrolysates and the membrane ultrafiltration fractions. J Funct Foods 5, 219–227. <https://doi.org/10.1016/j.jff.2012.10.008>
- Islam, Md.S., Wang, H., Admassu, H., Sulieman, A.A., Wei, F.A., 2022. Health benefits of bioactive peptides produced from muscle proteins: Antioxidant, anti-cancer, and anti-diabetic activities. Process Biochemistry 116, 116–125. <https://doi.org/10.1016/j.procbio.2022.03.007>

- Iwaniak, A., Minkiewicz, P., Darewicz, M., Sieniawski, K., Starowicz, P., 2016. BIOPEP database of sensory peptides and amino acids. *Food Research International* 85, 155–161. <https://doi.org/10.1016/j.foodres.2016.04.031>
- Jamdar, S.N., Rajalakshmi, V., Pednekar, M.D., Juan, F., Yardi, V., Sharma, A., 2010. Influence of degree of hydrolysis on functional properties, antioxidant activity and ACE inhibitory activity of peanut protein hydrolysate. *Food Chem* 121, 178–184. <https://doi.org/10.1016/j.foodchem.2009.12.027>
- Jiang, Y., Zhang, M., Lin, S., Cheng, S., 2018. Contribution of specific amino acid and secondary structure to the antioxidant property of corn gluten proteins. *Food Research International* 105, 836–844. <https://doi.org/10.1016/j.foodres.2017.12.022>
- Jin, D., Liu, X., Zheng, X., Wang, X., He, J., 2016. Preparation of antioxidative corn protein hydrolysates, purification and evaluation of three novel corn antioxidant peptides. *Food Chem* 204, 427–436. <https://doi.org/10.1016/j.foodchem.2016.02.119>
- Justus, A., Pereira, D.G., Ida, E.I., Kurozawa, L.E., 2019. Combined uses of an endo- and exopeptidase in okara improve the hydrolysates via formation of aglycone isoflavones and antioxidant capacity. *LWT* 115, 108467. <https://doi.org/10.1016/j.lwt.2019.108467>
- Ketnawa, S., Chaiwut, P., Rawdkuen, S., 2012. Pineapple wastes: A potential source for bromelin extraction. *Food and Bioproducts Processing* 90, 385–391. <https://doi.org/10.1016/j.fbp.2011.12.006>
- Kim, H.-O., Li-Chan, E.C.Y., 2006. Application of Fourier Transform Raman Spectroscopy for Prediction of Bitterness of Peptides. *Appl Spectrosc* 60, 1297–1306. <https://doi.org/10.1366/000370206778998978>
- Kim, S.-K., Wijesekara, I., 2010. Development and biological activities of marine-derived bioactive peptides: A review. *J Funct Foods* 2, 1–9. <https://doi.org/10.1016/j.jff.2010.01.003>
- Krishnan, A., Gokulakrishnan, M., 2015. Extraction, Purification of Bromelin From Pineapple and Determination of Its Effect on Bacteria Using Periodontitis. *Int J Pharm Sci Res* 6, 5284–5294.
- Kumar, A., Minuye, N., Ayele Y.B., Yadav, M., 2018. A review of factors affecting enzymatic hydrolysis of pretreated lignocellulosic Biomass. *Res J Chem Environ* 22, 62–67.
- Kumar, V., Rani, A., Husain, L., 2016. Investigations of Amino Acids Profile, Fatty Acids Composition, Isoflavones Content and Antioxidative Properties in Soy Okara. *Asian Journal of Chemistry* 28, 903–906. <https://doi.org/10.14233/ajchem.2016.19548>
- Lafarga, T., Wilm, M., Wynne, K., Hayes, M., 2016. Bioactive hydrolysates from bovine blood globulins: Generation, characterisation, and *in silico* prediction of toxicity and allergenicity. *J Funct Foods* 24, 142–155. <https://doi.org/10.1016/j.jff.2016.03.031>

- Lamsal, B.P., Jung, S., Johnson, L.A., 2007. Rheological properties of soy protein hydrolysates obtained from limited enzymatic hydrolysis. *LWT - Food Science and Technology* 40, 1215–1223. <https://doi.org/10.1016/j.lwt.2006.08.021>
- Lee, J., Koo, N., Min, D.B., 2004. Reactive Oxygen Species, Aging, and Antioxidative Nutraceuticals. *Compr Rev Food Sci Food Saf* 3, 21–33. <https://doi.org/10.1111/j.1541-4337.2004.tb00058.x>
- Li, B., Yang, W., Nie, Y., Kang, F., Goff, H.D., Cui, S.W., 2019. Effect of steam explosion on dietary fiber, polysaccharide, protein and physicochemical properties of okara. *Food Hydrocoll* 94, 48–56. <https://doi.org/10.1016/j.foodhyd.2019.02.042>
- Lowry, O.H., Rosebrough, N.J., Farr, A.L., Randall, R.J., 1951. Protein measurement with the Folin phenol reagent. *J Biol Chem* 193, 265–75.
- Ma, C.-Y., Liu, W.-S., Kwok, K.C., Kwok, F., 1996. Isolation and characterization of proteins from soymilk residue (okara)*. *Food Research International* 29, 799–805. [https://doi.org/10.1016/0963-9969\(95\)00061-5](https://doi.org/10.1016/0963-9969(95)00061-5)
- Mahdavi-Yekta, M., Nouri, L., Azizi, M.H., 2019. The effects of hydrolysis condition on antioxidant activity of protein hydrolyzate from *quinoa*. *Food Sci Nutr* 7, 930–936. <https://doi.org/10.1002/fsn3.871>
- Malaypally, S.P., Ismail, B., 2010. Effect of Protein Content and Denaturation on the Extractability and Stability of Isoflavones in Different Soy Systems. *J Agric Food Chem* 58, 8958–8965. <https://doi.org/10.1021/jf1023774>
- Martins, B.C., Rescolino, R., Freitas Coelho, D. de, Espindola, F.S., Zanchetta, B., Tambourgi, E.B., Silveira, E., 2014. Studies of stability and characterization this enzyme bromelin in pineapple (*Ananas comosus*). *BMC Proc* 8, P137. <https://doi.org/10.1186/1753-6561-8-S4-P137>
- Maryam, S., Baits, M., Nadia, A., 2016. Pengukuran Aktivitas Antioksidan Ekstrak Etanol Daun Kelor (*Moringa oleifera* Lam.) Menggunakan Metode FRAP (Ferric Reducing Antioxidant Power). *Jurnal Fitofarmaka Indonesia* 2, 115–118. <https://doi.org/10.33096/jffi.v2i2.181>
- Maurer, H.R., 2001. Bromelin: biochemistry, pharmacology and medical use. *Cellular and Molecular Life Sciences* 58, 1234–1245. <https://doi.org/10.1007/PL00000936>
- Methven, L., 2012. Natural food and beverage flavour enhancer, in: *Natural Food Additives, Ingredients and Flavourings*. Elsevier, pp. 76–99. <https://doi.org/10.1533/9780857095725.1.76>
- Minkiewicz, I., Waniak, D., Darewicz, 2019. BIOPEP-UWM Database of Bioactive Peptides: Current Opportunities. *Int J Mol Sci* 20, 5978. <https://doi.org/10.3390/ijms20235978>
- Mooney, C., Haslam, N.J., Pollastri, G., Shields, D.C., 2012. Towards the Improved Discovery and Design of Functional Peptides: Common Features of Diverse Classes Permit Generalized Prediction of Bioactivity. *PLoS One* 7, e45012. <https://doi.org/10.1371/journal.pone.0045012>

- Mora, L., Toldrá, F., 2023. Advanced enzymatic hydrolysis of food proteins for the production of bioactive peptides. *Curr Opin Food Sci* 49, 100973. <https://doi.org/10.1016/j.cofs.2022.100973>
- Moraes, F.M.L., Busanello, M., Garcia, S., 2016. Optimization of the fermentation parameters for the growth of *Lactobacillus* in soymilk with okara flour. *LWT* 74, 456–464. <https://doi.org/10.1016/j.lwt.2016.08.009>
- Mudgil, P., Kamal, H., Yuen, G.C., Maqsood, S., 2018. Characterization and identification of novel antidiabetic and anti-obesity peptides from camel milk protein hydrolysates. *Food Chem* 259, 46–54. <https://doi.org/10.1016/j.foodchem.2018.03.082>
- Muliterno, M.M., Rodrigues, D., de Lima, F.S., Ida, E.I., Kurozawa, L.E., 2017. Conversion/degradation of isoflavones and color alterations during the drying of okara. *LWT* 75, 512–519. <https://doi.org/10.1016/j.lwt.2016.09.031>
- Murray, T.K., Baker, B.E., 1952. Studies on protein hydrolysis. I.—preliminary observations on the taste of enzymic protein-hydrolysates. *J Sci Food Agric* 3, 470–475. <https://doi.org/10.1002/jsfa.2740031006>
- Najafian, L., Babji, A.S., 2019. Purification and Identification of Antioxidant Peptides from Fermented Fish Sauce (*Budu*). *Journal of Aquatic Food Product Technology* 28, 14–24. <https://doi.org/10.1080/10498850.2018.1559903>
- Najafian, L., Babji, A.S., 2014. Production of bioactive peptides using enzymatic hydrolysis and identification antioxidative peptides from patin (*Pangasius sutchi*) sarcoplasmic protein hydrolysate. *J Funct Foods* 9, 280–289. <https://doi.org/10.1016/j.jff.2014.05.003>
- Napper, A.D., Bennett, S.P., Borowski, M., Holdridge, M.B., Leonard, M.J., Rogers, E.E., Duan, Y., Laursen, R.A., Reinhold, B., Shames, S.L., 1994. Purification and characterization of multiple forms of the pineapple-stem-derived cysteine proteinases ananain and comosain. *Biochemical Journal* 301, 727–735. <https://doi.org/10.1042/bj3010727>
- Nasri, M., 2017. Protein Hydrolysates and Biopeptides. pp. 109–159. <https://doi.org/10.1016/bs.afnr.2016.10.003>
- Núñez de Gonzalez, M.T., Boleman, R.M., Miller, R.K., Keeton, J.T., Rhee, K.S., 2008. Antioxidant Properties of Dried Plum Ingredients in Raw and Precooked Pork Sausage. *J Food Sci* 73, H63–H71. <https://doi.org/10.1111/j.1750-3841.2008.00744.x>
- Onuh, J.O., Girgih, A.T., Aluko, R.E., Aliani, M., 2014. *In vitro* antioxidant properties of chicken skin enzymatic protein hydrolysates and membrane fractions. *Food Chem* 150, 366–373. <https://doi.org/10.1016/j.foodchem.2013.10.107>
- O'Toole, D.K., 1999. Characteristics and Use of Okara, the Soybean Residue from Soy Milk ProductionA Review. *J Agric Food Chem* 47, 363–371. <https://doi.org/10.1021/jf980754l>

- Pal, G.K., Suresh, P.V., 2017a. Physico-chemical characteristics and fibril-forming capacity of carp swim bladder collagens and exploration of their potential bioactive peptides by *in silico* approaches. *Int J Biol Macromol* 101, 304–313. <https://doi.org/10.1016/j.ijbiomac.2017.03.061>
- Pal, G.K., Suresh, P.V., 2017b. Comparative assessment of physico-chemical characteristics and fibril formation capacity of thermostable carp scales collagen. *Materials Science and Engineering: C* 70, 32–40. <https://doi.org/10.1016/j.msec.2016.08.047>
- Park, S.Y., Lee, J.-S., Baek, H.-H., Lee, H.G., 2010. Purification and Characterization of Antioxidant Peptides from Soy Protein Hydrolysate. *J Food Biochem* 34, 120–132. <https://doi.org/10.1111/j.1745-4514.2009.00313.x>
- Peredo-Lovillo, A., Hernández-Mendoza, A., Vallejo-Cordoba, B., Romero-Luna, H.E., 2022. Conventional and *in silico* approaches to select promising food-derived bioactive peptides: A review. *Food Chem X* 13, 100183. <https://doi.org/10.1016/j.fochx.2021.100183>
- Pooja, K., Rani, S., Prakash, B., 2017. *In silico* approaches towards the exploration of rice bran proteins-derived angiotensin-I-converting enzyme inhibitory peptides. *Int J Food Prop* 1–14. <https://doi.org/10.1080/10942912.2017.1368552>
- Potter, S.M., 1995. Overview of proposed mechanisms for the hypocholesterolemic effect of soy. *J Nutr* 125, 606S–611S. https://doi.org/10.1093/jn/125.3_Suppl.606S
- Puspawati, N.M., Wahjuni, S., Ayu, N.K.I.K., Fudholi, A., 2021. Effect of Different Papain Concentrations on the Properties of Chicken Skin Protein Hydrolysates. *International Journal of Design & Nature and Ecodynamics* 16, 445–450. <https://doi.org/10.18280/ijdne.160411>
- Raksakulthai, R., Haard, N.F., 2003. Exopeptidases and Their Application to Reduce Bitterness in Food: A Review. *Crit Rev Food Sci Nutr* 43, 401–445. <https://doi.org/10.1080/10408690390826572>
- Rao, M.B., Tanksale, A.M., Ghatge M.S., Deshpande, V.V., 1998. Molecular and Biotechnological Aspects of Microbial Proteases. *Microbiology and Molecular Biology Reviews* 597–635.
- Ratnayani, K., Ratnayani, O., Pane, I.A., 2022. Antioxidant Activity and Amino Acid Composition of Okara Protein Hydrolysate. *KnE Life Sciences*. <https://doi.org/10.18502/cls.v7i3.11140>
- Ren, J., Zhao, M., Shi, J., Wang, J., Jiang, Y., Cui, C., Kakuda, Y., Xue, S.J., 2008. Purification and identification of antioxidant peptides from grass carp muscle hydrolysates by consecutive chromatography and electrospray ionization-mass spectrometry. *Food Chem* 108, 727–736. <https://doi.org/10.1016/j.foodchem.2007.11.010>
- Rowan, A.D., Buttle, D.J., Barrett, A.J., 1990. The cysteine proteinases of the pineapple plant. *Biochem J* 266, 869–75.

- Rungtip Jutamongkon, Sanguansri Charoenrein, 2010. Effect of temperature on the stability of fruit bromelin from smooth cayenne pineapple. *Kasetsart Journal (Natural Sciences)* 44, 943–948.
- Sabadin, I.S., Villas-Boas, M.B., de Lima Zollner, R., Netto, F.M., 2012. Effect of combined treatment of hydrolysis and polymerization with transglutaminase on β -lactoglobulin antigenicity. *European Food Research and Technology* 235, 801–809. <https://doi.org/10.1007/s00217-012-1802-z>
- Saiga, A., Tanabe, S., Nishimura, T., 2003. Antioxidant Activity of Peptides Obtained from Porcine Myofibrillar Proteins by Protease Treatment. *J Agric Food Chem* 51, 3661–3667. <https://doi.org/10.1021/jf021156g>
- Saito, K., Jin, D.-H., Ogawa, T., Muramoto, K., Hatakeyama, E., Yasuhara, T., Nokihara, K., 2003. Antioxidative Properties of Tripeptide Libraries Prepared by the Combinatorial Chemistry. *J Agric Food Chem* 51, 3668–3674. <https://doi.org/10.1021/jf021191n>
- Santos, D.C. dos, Oliveira Filho, J.G. de, Silva, J. de S., Sousa, M.F. de, Vilela, M. da S., Silva, M.A.P. da, Lemes, A.C., Egea, M.B., 2019. Okara flour: its physicochemical, microscopical and functional properties. *Nutr Food Sci* 49, 1252–1264. <https://doi.org/10.1108/NFS-11-2018-0317>
- Sarmadi, B.H., Ismail, A., 2010. Antioxidative peptides from food proteins: A review. *Peptides (N.Y.)* 31, 1949–1956. <https://doi.org/10.1016/j.peptides.2010.06.020>
- Schaafsma, G., 2009. Safety of protein hydrolysates, fractions thereof and bioactive peptides in human nutrition. *Eur J Clin Nutr* 63, 1161–1168. <https://doi.org/10.1038/ejcn.2009.56>
- Seo, W.H., Lee, H.G., Baek, H.H., 2007. Evaluation of Bitterness in Enzymatic Hydrolysates of Soy Protein Isolate by Taste Dilution Analysis. *J Food Sci* 73, S41–S46. <https://doi.org/10.1111/j.1750-3841.2007.00610.x>
- Shin, K.-S., Lee, J.-H., 2021. Optimization of enzymatic hydrolysis of immature citrus (Citrus unshiu Marcov.) for flavonoid content and antioxidant activity using a response surface methodology. *Food Sci Biotechnol* 30, 663–673. <https://doi.org/10.1007/s10068-021-00897-w>
- Silvestre, M.P.C., 1997. Review of methods for the analysis of protein hydrolysates. *Food Chem* 60, 263–271. [https://doi.org/10.1016/S0308-8146\(96\)00347-0](https://doi.org/10.1016/S0308-8146(96)00347-0)
- Singh, B.P., Vij, S., Hati, S., 2014. Functional significance of bioactive peptides derived from soybean. *Peptides (N.Y.)* 54, 171–179. <https://doi.org/10.1016/j.peptides.2014.01.022>
- Sonklin, C., Laohakunjit, N., Kerdchoechuen, O., 2011. Physicochemical and Flavor Characteristics of Flavoring Agent from Mungbean Protein Hydrolyzed by Bromelin. *J Agric Food Chem* 59, 8475–8483. <https://doi.org/10.1021/jf202006a>

- Stanojevic, S.P., Barac, M.B., Pesic, M.B., Vucelic-Radovic, B. v., 2012. Composition of Proteins in Okara as a Byproduct in Hydrothermal Processing of Soy Milk. *J Agric Food Chem* 60, 9221–9228. <https://doi.org/10.1021/jf3004459>
- Su, S.I.T., Yoshida, C.M.P., Contreras-Castillo, C.J., Quiñones, E.M., Venturini, A.C., 2013. Okara, a soymilk industry by-product, as a non-meat protein source in reduced fat beef burgers. *Ciência e Tecnologia de Alimentos* 33, 52–56. <https://doi.org/10.1590/S0101-20612013000500009>
- Tanuja, S., Viji, P., Zynudheen, A., Joshy, C., 2012. Composition, functional properties and antioxidative activity of hydrolysates prepared from the frame meat of Striped catfish (*Pangasianodon hypophthalmus*). *Egyptian Journal of Biology* 14. <https://doi.org/10.4314/ejb.v14i1.3>
- Utami, T., Kusuma, E.N., Satiti, R., Rahayu, E.S., Cahyanto, M.N., 2019. Hydrolyses of meat and soybean proteins using crude bromelin to produce. *Int Food Res J* 26, 117–122.
- Vanidia, N., 2022. Aktivitas Antioksidan dan Sifat Fungsional Protein Kacang Hijau (*Vigna radiata* L.) yang Dihidrolisis Menggunakan Enzim Papain. Universitas Gadjah Mada, Yogyakarta.
- Vong, W.C., Liu, S.-Q., 2016. Biovalorisation of okara (soybean residue) for food and nutrition. *Trends Food Sci Technol* 52, 139–147. <https://doi.org/10.1016/j.tifs.2016.04.011>
- Wali, N., 2019. Nonvitamin and Nonmineral Nutritional Supplements. Elsevier. <https://doi.org/10.1016/C2016-0-03546-5>
- Wang, M.-P., Lu, W., Yang, J., Wang, J.-M., Yang, X., 2017. Preparation and characterisation of isoflavone aglycone-rich calcium-binding soy protein hydrolysates. *Int J Food Sci Technol* 52, 2230–2237. <https://doi.org/10.1111/ijfs.13502>
- Wang, W., de Mejia, E.G., 2005. A New Frontier in Soy Bioactive Peptides that May Prevent Age-related Chronic Diseases. *Compr Rev Food Sci Food Saf* 4, 63–78. <https://doi.org/10.1111/j.1541-4337.2005.tb00075.x>
- Wardani, D.W., 2022. Evaluasi *in silico* dan *in vitro* untuk Aktivitas Antioksidan dan Sifat Fungsional Kolagen Kulit Ikan Tuna Sirip Kuning (*Thunnus albacares*) yang Dihidrolisis dengan Enzim Papain. Universitas Gadjah Mada, Yogyakarta.
- Wu, C., He, M., Zheng, L., Tian, T., Teng, F., Li, Y., 2021. Effect of cavitation jets on the physicochemical properties and structural characteristics of the okara protein. *J Food Sci* 86, 4566–4576. <https://doi.org/10.1111/1750-3841.15891>
- Yokomizo, A., Takenaka, Y., Takenaka, T., 2002. Antioxidative Activity of Peptides Prepared from Okara Protein. *Food Sci Technol Res* 8, 357–359. <https://doi.org/10.3136/fstr.8.357>
- You, L., Zhao, M., Cui, C., Zhao, H., Yang, B., 2009. Effect of degree of hydrolysis on the antioxidant activity of loach (*Misgurnus anguillicaudatus*) protein hydrolysates.

- Innovative Food Science & Emerging Technologies 10, 235–240.
<https://doi.org/10.1016/j.ifset.2008.08.007>
- Zainol, K., Surianarayanan, S.K., Abdullah, M.A.A., Mamat, H., Zin, Z.M., 2020. Effect of Hydrolysis Time on Antioxidant and Antimicrobial Properties of Jack Bean (*Canavalia ensiformis*) Protein Hydrolysate. *Malays J Biochem Mol Biol* 5–11.
- Zhang, M., Feng, X., Liang, Y., He, M., Geng, M., Huang, Y., Teng, F., Li, Y., 2022. Effects of electron beam irradiation pretreatment on the structural and functional properties of okara protein. *Innovative Food Science and Emerging Technologies* 79. <https://doi.org/10.1016/j.ifset.2022.103049>
- Zhang, Q., Tong, X., Qi, B., Wang, Z., Li, Y., Sui, X., Jiang, L., 2018. Changes in antioxidant activity of Alcalase-hydrolyzed soybean hydrolysate under simulated gastrointestinal digestion and transepithelial transport. *J Funct Foods* 42, 298–305. <https://doi.org/10.1016/j.jff.2018.01.017>
- Zhang, X., Gao, B., Shi, H., Slavin, M., Huang, H., Whent, M., Sheng, Y., Yu, L. (Lucy), 2012. Chemical Composition of 13 Commercial Soybean Samples and Their Antioxidant and Anti-inflammatory Properties. *J Agric Food Chem* 60, 10027–10034. <https://doi.org/10.1021/jf303039a>
- Zhao, W.-H., Luo, Q.-B., Pan, X., Chi, C.-F., Sun, K.-L., Wang, B., 2018. Preparation, identification, and activity evaluation of ten antioxidant peptides from protein hydrolysate of swim bladders of miiuy croaker (*Müichthys müiuy*). *J Funct Foods* 47, 503–511. <https://doi.org/10.1016/j.jff.2018.06.014>
- Zheng, Z., Li, Jiaxin, Li, Jinwei, Sun, H., Liu, Y., 2019. Physicochemical and antioxidative characteristics of black bean protein hydrolysates obtained from different enzymes. *Food Hydrocoll* 97, 105222. <https://doi.org/10.1016/j.foodhyd.2019.105222>
- Zou, T.-B., He, T.-P., Li, H.-B., Tang, H.-W., Xia, E.-Q., 2016. The Structure-Activity Relationship of the Antioxidant Peptides from Natural Proteins. *Molecules* 21, 72. <https://doi.org/10.3390/molecules21010072>