

DAFTAR PUSTAKA

- Alam S.I., Dube S., Reddy G.S.N., Bhattacharya B.K., Shivaji S., Singh L. 2005. Purification and Characterization of Extracellular Protease Produced by *Clostridium* sp. from Schirmacher oasis, Antartica. *Journal of Enzyme and Microbial Technology*, 36, 824-831.
- Alashi, A.M., Blanchard, C.L., Mailer, R.J., Agboola, S.O., Mawson, A.J., He, R., Grigih, A., Aluko, R.E. 2014. Antioxidant properties of Australian canona meal protein hydrolysates. *Food Chemistry*, 146, 500-506.
- Andarwulan, N., Kusnandar, F & Herawati, D. 2011. *Analisis pangan*. Jakarta: Dian Rakyat.
- Arihara, K., 2006. Strategies for designing novel functional meat products. *Meat Science*, 74, 219-229.
- Ariyani, F., Saleh, M., Tazwir dan Hak, N., 2003, Optimasi Proses Produksi Hidrolisat Protein Ikan dari Mujahir (*Oreochromis mossambicus*). *Jurnal Penelitian Perikanan Indonesia*, Vol. (9), 11-21.
- Arnold van Huis, Joost van Itterbeeck, H. Klunder, E. Mertens, A. Halloran, G. Muir, P. Vantomme. 2013. Edible insects: future prospects for food and feed security. FAO of The United Nations Rome. Wageningen. 187 pp.
- Baglieri, A., V. Cadili, C. Mozzetti-Monterumici, M. Gennari, S. Tabasso, E. Montoneri, S. Nardi, and M. Negre, 2014. Fertilization of bean plants with tomato plants hydrolysates. Effect on biomass production, chlorophyll content and N assimilation. *Science Horticultura*, 176, 194-199.
- Balti, R., Bougatef, A., El-Hadj Ali, N., Zekri, D., Barkia, A., & Nasri, M. 2010. Influence of degree of hydrolysis on functional properties and angiotensin I converting enzyme-inhibitory activity of protein hydrolysates from cuttlefish (*Sepia officinalis*) by-products. *Journal of the Science of Food and Agriculture*, 90, 2006-2014.
- Benjamin, O., P. Silcock, J. Beauchamp, A. Buettner, and D. Everett, 2014. Emulsifying properties of legume proteins compared to β -lactoglobulin and tween 20 and the volatile release from oil-in-water emulsions. *Journal of Food Science*, 79(10), 2014-2022.
- Beveridge AJ. 1996. A theoretical study of the active sites of papain and S195C rat trypsin: Implication for the low reactivity of mutant serine proteinases. *Journal of Protein Science*, 5, 1355:1365.
- Blois, M.S. 1958. Antioxidant Determination by The Use of A Stable Free Radical. *Nature*, Vol. (181), 1199-1299.
- Charoenphun, N., Cheirsilp, B., and Sirinupong, N., 2013, Calcium-binding peptides derived from tilapia (*Oreochromis niloticus*) protein hydrolysate. *European Journal of Food Research Technology*, 236(5), 57-63.
- Chalamaiah, M.T. Jyothirmayi, P.V. Diwan, B.D. Kumar. 2015. Antioxidant activity and functional properties of enzymatic protein hydrolysates from common

- carp (*Cyprinus carpio*) roe (egg), *Journal of Food Science and Technology*, 52 (9), 5817–5825.
- Chatsuwan N, Puechkamut Y, Pinsirodom P. 2013. Characterization, functionality and antioxidant activity of water-soluble proteins extracted from *Bombyx mori* linn. *Current Applied Science and Technology*, 18, 83–96.
- Coates, J., 2006. Interpretation of Infrared Spectra. A Practical Approach. *Encyclopedia of Analytical Chemistry*.
- Dai, C., Ma, H., Luo, L., & Yin, X. 2013. Angiotensin I-converting enzyme (ACE) inhibitory peptide derived from *Tenebrio molitor* (L.) larva protein hydrolysate. *European Food Research and Technology*, 236, 681–689.
- Dávalos, A., Miguel, M., Bartolomé, B., & López-Fandiño, R. 2004. Antioxidant Activity of Peptides Derived from Egg White Proteins by Enzymatic Hydrolysis. *Journal of Food Protection*, Vol. (67), 1939–1944.
- du Jardin, P., 2012. The science of plant biostimulants-a bibliographic analysis. Contract 30-CE0455515/00-96, ad hoc Study on bio-stimulants products. <http://ec.europa.eu/enterprise/sectors/chemicals/files/fertilizers/finalreportbio2012en.pdf>.
- Ferreira I.C.F.R, Baptista P., Vilas-Boas M., dan Barros L. 2007. Free-Radical Scavenging Capacity and Reducing Power of Wild Edible Mushrooms from Northeast Portugal: Individual Cap and Stipe Activity. *Food Chemistry*, Vol. (100), 1511–1516.
- Firmansyah, M., Abduh, M.Y., 2019. Production of protein hydrolysate containing antioxidant activity from *Hermetia illucens*. *Heliyon*, 5, e02005.
- Girindra A. 1993. *Biokimia 1*. Jakarta: Penerbit PT. Gramedia Pustaka Utama.
- Giovani, S. 2019. Ekstraksi dan Karakteristik Gelatin Dari Kulit Ikan Tuna Yellofin (*Thunnus albacares*) dan Aplikasinya pada Es Krim. *Tesis*. Universitas Gadjah Mada.
- Glider, W.V., and M.S. Hagrove, 2002. *Using bromelain in pineapple juice to investigate enzyme function*. Association for Biology Laboratory Education (ABLE). Iowa State University. Ames.
- Grzonka Z, Kasprzykowski F, Wiczak. 2007. Cysteine Proteases. Di dalam: Polaina J, MacCabe AP, editor. *Industrial Enzymes: Structure, Function and Application*. Netherlands: Springer.
- Gu, R.Z., Li, C.Y., Liu, W.Y., Yi, W.X., Cai, M.Y., 2011. Angiotensin I-converting enzyme inhibitory activity of low molecular weight peptides from atlantic salmon (*Salmo salar* L.) skin. *Food Research International*, 44, 1536–1540.
- Hall, F.G., Jones, O.G., O'Haire, M.E., Liceaga, A.M., 2017. Functional properties of tropical banded cricket (*Gryllobates sigillatus*) protein hydrolysates. *Food Chemistry*, 224, 414–422.
- Haslaniza, H. 2010. The Effects of Enzyme Concentration, Temperature and Incubation Time on Nitrogen Content and Degree of Hydrolysis of Protein Precipitate from Cockle (*Anadara granosa*) meat wash water. *International Food Research Journal*. Vol. (17), 147–152.

- He, R., Girgih, A.T., Malomo, S. A, Ju, X. R, Aluko, R.E. 2013. Antioxidant activities of enzymatic rapeseed protein hydrolysates and the membrane ultrafiltration fraction. *Journal of Functional Food*, 5(1), 219-227.
- Hidayat, T. 2005. "Pembuatan Hidrolisat Protein dari Ikan Selar Kuning (*Caranx leptolepis*) dengan Menggunakan Enzim Papain". *Skripsi*. Fakultas Perikanan dan Ilmu Kelautan: Institut Pertanian Bogor.
- Huger, A.M. 2005. The *Oryctes* virus: Its detection, identification, and implementation in biological control of the coconut palm rhinoceros beetle, *Oryctes rhinoceros* (Coleoptera: Scarabaeidae). *Journal of Invertebrate Pathology*, 89, 78-84.
- Jamhari, L. M. Yusiati, E. Suryanto, M. N. Cahyanto, Y. Erwanto, and M. Muguruma. 2013a. Comparative study on angiotensin converting enzyme inhibitory activity of hydrolysate of meat protein of indonesian local livestock. *J. Indonesian Trop. Anim. Agric.* 38, 27-33.
- Je, J.Y., Lee, K.H., Lee, M.H., Ahn, C.B., 2008. Antioxidant and antihypertensive protein hydrolysates produced from tuna liver by enzymatic hydrolysis. *Food Research International*. 42 (9), 1266–1272.
- Jeon, Y. J., Byun, H. G., & Kim, S. K. 2000. Improvement of functional properties of cod frame protein hydrolysates using ultrafiltration membranes. *Process Biochemistry*, 35, 471–478.
- Jidaeni, V. A., 2011. Functional properties of soybean food ingredients in food systems. Department of Food Technology, Cape Peninsula University of Technology.
- Jung, S., Murphy, P.A., Johnson, L.A. 2005. Physicochemical and functional properties of soy protein substrate modified by low levels of protease hydrolysis. *Journal of Food Science*, 70 (2), C180-C187.
- Juniarti, Delvi O., dan Yuhernita. 2009. Kandungan Senyawa Kimia, Uji Toksisitas (*Brine Shrimp Lethality Test*) dan Antioksidan (1,2-diphenyl-2-pikrilhidrazyl) dari Ekstrak Daun Saga (*Abrus precatorius* L.). *Makara, Sains*, Vol. (13), No 1: 50-54.
- Kaewruang, P., Benjakul, S. dan Prodpran, T., 2014. Characteristics And Gelling Property Of Phosphorylated Gelatin From The Skin Of Unicorn Leatherjacket. *Food Chemistry*, 146, 591–596.
- Karawita, R., Siriwardhana, N., Lee, K., Heo, M., Yeo, I., Lee, Y. dan Jeon, Y. 2005. Reactive Oxygen Species Scavenging, Metal Chelation, Reducing Power and Lipid Peroxidation Inhibition Properties of Different Solvent Fractions from *Hizikia fusiformis*. *European Food Research and Technology*, 220, 363-371.
- Kim, S. dan I. Wijesekara, 2010. Development and biological activities of marinederived bioactive peptides: a review. *Journal of Functional Foods*, 2, 1-9.
- Kimatu, B.M., Zhao, L., Biao, Y., Ma, G., Yang, W., Pei, F., Hu, Q. 2013. Antioxidant potential of edible mushroom (*Agaricus bisporus*) protein hydrolysates. *Food Chemistry*, 230, 58-67

- Kong, B., Xiong, Y.L., 2006. Antioxidant activity of zein hydrolysates in a liposome system and the possible mode of action. *Agriculture Journal of Food Chemistry*, 54, 6059-6068.
- Ktari, N., Jridi, M., Bkhairia, I., Sayari, N., Salah, R.B., Nasri, M., 2012. Functionality and antioxidant properties of protein hydrolysates from muscle of zebra blenny (*Salaria basilisca*) obtained with different crude protease extracts. *Food Research International*, 49 (2), 747–756.
- Kumar, K.S., K Ganesan, S Kandasamy and P. V. S Rao, 2014. Study on the functional properties of protein concentrates of *Kappaphycus alvarezii* (Doty) an edible seaweed. *Food Chemistry*, 153,356-360.
- Lawal, O. S. 2004. Functionlity of African Locust Bean (*Parking Biolobossa*) Protein Isolate : Effect of pH, Ionic Strength and Various Protein Concentrations. *Journal of Food Chemistry*, 86, 345-355.
- Lisiecka, J., M. Knaflowski, T. Spizewski, B. Fraszczak, A. Kaluzewicz, and W. Krzesinski, 2011. The effect of animal protein hydrolysate on quantity and quality of strawberry daughter plants cv. ‘Elsanta’. *Acta Science. Pol. Hortorum Cultus*, 10,31–40.
- Lowry, O. H., Rosenbrough, N.J., Farr, A. L and Randall, R. J. 1951. Protein Measurement with Folin Phenol Reagent. *Journal Biol Chem*, 193, 265-275.
- Luo, H., Wang B., Li Z., Chi C. F., Zhang Q. & He G. 2013. Preparation and Evaluation of Antioxidant Peptide from Papain Hydrolysate of *Sphyrna lewini* Muscle Protein. *Food Science Technology*, 51 (1), 281-288.
- Maria, G., Purwanto M. 2014. The Role and Efficiency of Ammonium Sulphate Precipitation in Purification Process of Papain Crude Extract. *Procedia Chemistry*, 18, 127-131.
- Martinez, M. O., Pappatheodorou, J. T. O., Saldivar, A.O.S., Lara, S. G. 2017. Antioxidant activity and characterization of protein fractions and hydrolysates from normal and quality protein maize kernels. *Journal of Cereal Science*, 76, 85-91.
- Mailandari, M. 2012. “Uji Aktivitas Antioksidan Ekstrak daun *Garcinia kyda* Roxb. dengan Metode DPPH dan Identifikasi Senyawa Kimia Fraksi yang Aktif”. *Skripsi*. Jakarta: Universitas Indonesia.
- Mendis, E., Rajapakse, N., & Kim, S. K. 2005. Antioxidant Properties of a Radical Scavenging Peptide Purified from Enzymatically Prepared Fish Skin Gelatin Hydrolysate. *Journal of Agricultural and Food Chemistry*, Vol. (53), 581–587.
- Mine, Y. and Shahidi F. 2006. *Nutraceutical Proteins and Peptides in Health and Disease*. CRC Press. Boca Raton.
- Mintah, B.K., He, R., Dabbour, M., Xiang, J., Hui, J., 2020. Characterization of edible soldier fly protein and hydrolysate altered by multiple-frequency ultrasound: Structural, physical, and functional attributes. *Process Biochemistry*, 95, 157-165.

- Molyneux, P. 2004. The Use of The Stable Free Radical *Diphenylpicryl-hydrazyl* (DPPH) for Estimating Antioxidant Activity, Songklanakarin. *Journal of Science and Technology*, Vol. 26 (2), 211-21.
- Muchtadi D. 1992. *Enzim dalam Industri Pangan*. Bogor: PAU-IPB.
- Muyonga, J. H., Cole, C. G. B. dan Duodu, K. G., 2004. Characterisation Of Acid Soluble Collagen From Skins Of Young And Adult Nile Perch (*Lates niloticus*). *Food Chemistry*. 85(1), 81–89.
- Moure, A., Sineiro, B., Herminia, D., Parajo, J.C., 2006. Functionality of oilseed protein products: a review. *Food Research International*, 39, 945-963.
- Nagodawithana, T., L. Nelles, and N. Trivedi, 2010. *Protein hydrolysates as hypoallergenic, flavors and palatants for companion animals*. In V. K.
- Nielsen, P. M. 1997. *Food Proteins and Their Applications*. New York: Maceel Dekker, Inc.
- Ninan, G., Jose, J. dan Abubacker, Z., 2011. Preparation And Characterization Of Gelatin Extracted From The Skins Of Rohu (*Labeo Rohita*) And Common Carp (*Cyprinus Carpio*). *Journal of Food Processing and Preservation*, 35(2), 143–162.
- Nurul, A.G., Sarbon, N.M. 2015. Effect of pH on functional, rheological and structural prooperties of eel (*Monopterus sp.*) skin gelatin compared to bovine gelatin. *International Food Research Journal*, 22 (2), 572-583.
- Nurhayati, T., Desniar dan M. Suhandana. 2013. Pembuatan Pepton secara Enzimatis menggunakan Bahan Baku Jeroan Ikan Tongkol. *Jurnal Pengolahan Hasil Perikanan Indonesia*, 16,1-11.
- Nwachukwu, I. D., & Aluko, R. E. 2019. Structural and Functional Properties of Food Protein derived Antioxidant Peptides. *Journal of Food Biochemistry*, e12761.
- Ou, B., D. Huang, M. Hampsch-Woodill, J.A. Flanagan and E.K. Deemer, 2002. Analysis of antioxidant activities of common vegetables employing oxygen radical absorbance capacity (ORAC) and ferric reducing antioxidant power (FRAP) assays: a comparative study. *Agricultural Journal of Food Chemistry*. 50, 3122-3128.
- Okaraonye, C.C., Ikewuchi, J.C. 2009. Nutritional Potential of *Oryctes rhinoceros* larva. *Pakistan Journal of Nutrition*, 8 (1), 35-38.
- Omotoso, O. T. 2015. An evaluation of the nutrients and some anti-nutrients in silkworm, *Bombyx mori* L. (*Bombycidae: Lepidoptera*). *Jordan Journal of Biological Sciences*, 8(1).
- Ovissipour, M., Rasco, B., Shihoodi, S. G., Modanlow, M., Gholami, S., & Nemati, M. 2013. Antioxidant activity of protein hydrolysates from whole anchovy sprat (*Clupeonella engrauliformis*) prepared using endogenous enzymes and commercial proteases. *Journal of the Science of Food and Agriculture*, 93(7), 1718–1726.

- Oyaizu M. 1986. Studies on product of browning reaction prepared from glucose amine. *Japan Journal Nutrition*, (44), 307- 315.
- Park, P.J., Jung, W.K., Nam, K.S., Shahidi, F., & Kim, S.K. 2001. Purification and Characterization of Antioxidative Peptides from Protein Hydrolysate of Lecithin Free Egg Yolk. *Journal of the American Oil Chemists Society*, (78), 651–656.
- Parkington and Xiong. 2000. Chemical and Functional Properties of Oxidatively Modified Beef Heart Surimi Stored at 20°C. *Journal of Food Chemistry and Toxicology*, 65 (3), 428-433.
- Pasupuleti, and A. L. Demain (Eds.), *Protein hydrolysates in biotechnology* (pp. 191-207). Springer. Netherlands.
- Pecha, J., T. Fürst, K. Kolomaznik, V. Friebrova, and P. Svoboda, 2012. Protein biostimulant foliar uptake modeling: the impact of climatic conditions. *AIChEJ*, 58, 2010–2019.
- Peranginangin, R., Haq, N., Ma'ruf, W. F., Rusli, A., 2017. Ekstraksi Gelatin dari Kulit Ikan Patin (*Pangasius Hypophthalmus*) secara Proses Asam. *Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan*. 10(3) : 75.
- Picot, L.R. Ravallec, M. Fouchereau-Péron, L. Vandanjon, P. Jaouen, M. Chaplain-Derouiniot. 2010. Impact of ultrafiltration and nanofiltration of an industrial fish protein hydrolysate on its bioactive properties, *Journal of Science Food Agriculture*, 90, 1819–1826.
- Pigot, G.M., and Tucker, B.W., 1990, Utility Fish Flesh Effectively While Maintaining Nutritional Qualities. *Seafood Effects of Technology on Nutrition*, Marcel Decker, Inc, New York.
- Pisoschi, A.M., Cheregi, M.C., Danet, A.F., 2009. Total Antioxidant Capacity of Some Commercial Fruit Juices: Electrochemical and Spectrophotometrical Approaches. *Molecules*, 14, 480-493.
- Poedjiadi A. 2006. *Dasar-Dasar Biokimia*. Jakarta: UI-Press.
- Prakash, A. 2001. *Antioxydant activity*. Medallion Laboratories: Analithycal Progres, 19 (2), 1-4.
- Prastika, H. H., Ratnayani, K., Puspawati, N. M., Laksmiwati, A.A. I. A. M. 2019. Penggunaan enzim pepsin untuk produksi hidrolisat protein kacang gude (*Cajanus cajan* (L.) Millsp.) yang aktif antioksidan. *Indonesian E-Journal of Applied Chemistry*. 7(2),180-188.
- Prawiro, A., 2009. *Characterization of Protease Enzymes from Sengon Buto Sprouts Extract and it use as a Milk Coagulant*. Yogyakarta: Gadjah Mada University.
- Price, N.C and S. Lewis. 1989. *Fundamental of Enzymology* 2nd Edition. Oxford University Press. Oxford.
- Prior R.L., Wu X., Schaich K. 2005. Standarized Method for the Determination of Antioxidant Capacity and Phenolics in Foods and Dietary Supplements. *Journal of Agricultural and Food Chemistry*, 53, 4290-4302.
- Putra, S.N.K.M., Ishak, N.H., Sarbon, N.M., 2018. Preparation characterization of physicochemical properties of golden apple snail (*Pomacea canaliculata*)

- protein hydrolysate as affected by different proteases. *Biocatalysis and Agricultural Biotechnology*, 13, 123–128.
- Purwoko, T dan Handajani, N, S. 2007. Kandungan Protein Kecap Manis Tanpa Fermentasi Moromi Hasil Fermentasi *Rhizopus oryzae* dan *R. oligosporus*. *Biodiversitas*, 8(3), 223-227.
- Puspawati, N., Simpen, I. dan Sumerta M. I., 2012. Isolasi Gelatin Dari Kulit Kaki Ayam Broiler Dan Karakterisasi Gugus Fungsinya Dengan Spektrofotometri FTIR. *Jurnal Kimia*. 6(1).
- Qian, Z. J., W. Jung, and S. Kim, 2008. Free radical scavenging activity of a novel antioxidative peptide purified from hydrolysate of bullfrog skin, *Rana catesbeiana* Shaw. *Bioresource Technology*. 99:1690-1698.
- Rajapakse, N., Mendis, E., Byun, H.G., & Kim, S.K. 2005. Purification and In Vitro Antioxidative Effects of Giant Squid Muscle Peptides on Free Radical-Mediated Oxidative Systems. *Journal of Nutritional Biochemistry*, 16, 562–569.
- Rajaram, D. dan A.R. Nazeer, 2010. Antioxidant properties of protein hydrolysates obtained from marine fishes *Lepturacanthus savala* and *Sphyrna barracuda*. *International Journal of Biotechnology and Biochemistry*, 6(3),435-444.
- Rao, M. B., A. M. Tanksala, M. S. Ghatge & V. V. Deshpande. 1998. Molecular and Biotechnological Aspects of Microbial Proteases. *Microbiology and Molecular Biology Reviews*, 62, 597–635.
- Rashid, F., Hussain, S. dan Ahmed, Z., 2018. Extraction Purification And Characterization Of Galactomannan From Fenugreek For Industrial Utilization. *Carbohydrate Polymers*, 180, 88–95.
- Rutherford, SM. 2010. Methodology for determining degree of hydrolysis of proteins in hydrolysates: a review. *Journal AOAC International*, 93 (5), 1515–1522.
- Saiga, A., S. Tanabe, and T. Nishimura, 2003. Antioxidant activity of peptides obtained from porcine myofibrillar proteins by protease treatment. *Agricultural Journal of Food Chemistry*, 51, 3661-3667.
- Samaranayaka, A. G. P., and E. C. Y. Li-Chan, 2011. Food-derived peptidic antioxidants: a review of their production, assessment, and potential applications. *Journal of Functional Foods*, 3,229–254.
- Santoso, J., E. Hendra, dan T.M. Siregar. 2009. Pengaruh substitusi susu skim dengan konsentrat protein ikan nila hitam (*Oreochromis niloticus*) terhadap karakteristik fisiko kimia makanan bayi. *Jurnal Ilmu Teknologi Pangan*, 7(1), 87-107.
- Sarmadi, B.H. dan A. Ismail, 2010. Antioxidative peptides from food proteins: a review. *Peptides*, 31, 1949-1956.
- Sathe, S.K., Deshpande, S.S., and Salunkhe, D.K. 1982. Functional properties of winged bean (*Psophocarpus tetragonolobus* L.) proteins. *Journal of Food Science*, 47: 503-508.

- Selmane, D., C. Vial, and G. Djelveh, 2008. Extraction of proteins from slaughterhouse by-products: influence of operating conditions on functional properties. *Meat Science*, 79,640–647.
- Shahidi F dan Botta JR. 1994. *Seafood: Chemistry, Processing Technology and Quality*. Glasgow: Blackie Academic and Professsional.
- Soeparno. 2005. *Ilmu dan Teknologi Daging*. Cetakan ke-4. Gadjah Mada University Press, Yogyakarta.
- Spellman, D.E., M.C. Evoya, G. Cuinnb, and R.J. FitzGerald, 2003. Proteinase and exopeptidase hydrolysis of whey protein: comparison of the TNBS, OPA and pH Stat methods for quantification of degree of hydrolysis. *International Dairy Journal*, 13,447-453.
- Steen, L., S. Glorieux, O. Goemaere, K. Brijs, H. Paelinck, I. Foubert, and I. Fraeye, 2016. Functional properties of pork liver protein fractions. *Food Bioprocess Technology*, 9, 970–980.
- Suhartono MT. 1992. *Protease*. Bogor: PAU Bioteknologi IPB.
- Sunarlim, R., dan Usmiati, S. 2009. Karakteritik Daging Kambing Dengan Perendaman Enzim Papain. *Prosiding Seminar Nasional Teknologi Peternakan Dan Veteriner* 2009.
- Suryanti, S., Rizal, E.I. Hari, dan Sukarno, 2011. Pengaruh pencucian terhadap sifat fungsional daging lumat ikan Patin Siam (*Pangasius hypophthalmus*). *Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan*. 5 (2).
- Tatiya A.U., Tapadiya G.G., Kotecha S., dan Surana S.J. 2011. Effects of Solvents on Total Phenolics, Antioxidant and Antimicrobial Properties of *Bridelia retusa* Spreng. Stem Bark. *Indian Journal of Natural Products and Resources*, 2, 442-447.
- Udenigwe, C.C., M. C. Udechukwu, C. Yiridoe, A. Gibson, and M. Gong, 2016. Antioxidant mechanism of potato protein hydrolysates against in vitro oxidation of reduced glutathione. *Journal of Functional Foods*, 20,195–203.
- Underwood, A.L. and R.A. Day, Jr. 1986. *Analisa Kimia Kuantitatif*. Jakarta: Erlangga
- Vercruysse L, Smagghe G, Beckers T, Camp JV: Antioxidative and ACE inhibitory activities in enzymatic hydrolysates of the cotton leafworm. *Spodoptera littoralis*. *Food Chemistry*, 2009, 114(1), 38–43
- Wang W., de Mejia E.G. 2005. A New Frontier in Soy Bioactive Peptides that May Prevent Age related Chronic Disease. *Comprehensive Reviews in Food Science and Food Safety*. 2005, 63-78.
- Wardana. 2008. Hidrolisis Protein Keong Mas (*Pomacea canaliculata* Lamark) menggunakan Papain untuk menghasilkan Pepton. Sekolah Pascasarjana Teknologi Industri Pertanian. Institut Pertanian Bogor. *Tesis*
- Whittaker, J.R. 1994. *Principles of Enzimology For The Food Sciences*. California: Marcel Dekker Inc

- Widyanto, H., Saputra, S., Suryati. *Control of Horn Beetle (*Oryctes rhinoceros* L.) using feromon traps for oil palm (*Elaeis guineensis* Jacq.) on Peatland in Riau*. Assesment Institute for Agricultural Technology Riau.
- Wijayanti, A.T. 2009. “Kajian Penyaringan dan Lama Penyimpanan dalam Pembuatan Fish Pepton dari Ikan Selar Kuning (*Caranx leptolepis*)”. *Skripsi*. Bogor: Institut Pertanian Bogor.
- Winarno, F. G. 1983. *Enzim Pangan*. Gramedia Pustaka Utama, Jakarta.
- Winarno, F. G. 1987. *Enzim Pangan*. P.T Gramedia. Jakarta.
- Winarno, F.G. 1995. *Enzim Pangan*. Jakarta: PT Gramedia Utama.
- Winarsi, H. 2007. *Antioksidan Alami dan Radikal Bebas*. Yogyakarta: Penerbit Kanisius.
- Wiriaphan, C., Chitsomboon, B., Yongsowadigul, J. 2012. Antioxidant activity of protein hydrolysates derived from threadfin bream surimi byproducts. *Food Chemistry*, 132, 104-111.
- Witono, Y., Windrati, W.S., Taruna, I., Afriliana, A., Assadam, A., 2014. Production and characterization of protein hydrolyzate from “Bibisan fish” (*Apogon albimaculosus*) as an indigenous flavor by enzymatic hydrolysis. *Advanced Journal of Food Science Technology*, 6 (12), 1348–1355.
- Wong D. M. S. 1989. *Mechanism and Theory in Food Chemistry*. AVI Book-Van Norstrand Reinhold. New York
- Wu, Q.Y., Jia, J.Q., Tan, G.X., Xu, J.L., Gui, Z.Z. 2011. Physicochemical properties of silkworm larvae protein isolate and gastrointestinal hydrolysate bioactivities. *African Journal of Biotechnology*, 10 (32), 6145-6153.
- Xie, Z., J. Huang, X. Xu, and Z. Jin, 2008. Antioxidant activity of peptides isolated from alfalfa leaf protein hydrolysate. *Food Chemistry*, 111,370-376.
- Xie, J., Du, M., Shen, M., Wu, T., Lin, L. 2018. Physico-chemical properties, antioxidant activities and angiotensin-I converting enzyme inhibitory of protein hydrolysates from Mung Bean (*Vigna radiate*). *Food Chemistry*, 210, 243-250.
- Xiong, Y.L. 2010. *Antioxidant Peptides. In Bioactive Proteins and Peptides as Functional Foods and Nutraceuticals*. Y. Mine. E. Li-Chan, and B. Jiang, Eds., Blackwell Publishing Limited. Institute of Food Technologists.
- Yang, H., Y. Li, P. Li, Q. Liu, B. Kong, X. Huang, and Z. Wu, 2013. Physicochemical changes of antioxidant peptides hydrolyzed from porcine plasma protein subject to free hydroxyl radical system. *Advance Journal of Food Science and Technology*, 5(1),14–18.
- Yu, J., A. Mohamed, and G. Ipek, 2007. Peanut protein concentrate: production and functional properties as affected by processing. *Food Chemistry*, 103, 121-129.
- Yuniwati, M., Yusran, dan Rahmadany. 2008. Pemanfaatan Enzim Papain sebagai Penggumpal. *Seminar Nasional Aplikasi Sains dan Teknologi IST AKPRIND* Yogyakarta.

- Yi, L., Lakemond, C. M., Sagis, L. M., Eisner-Schadler, V., van Huis, A., & van Boekel, M. A. 2013. Extraction and characterisation of protein fractions from five insect species. *Food Chemistry*, 141(4), 3341–3348.
- Zayas, J.F., 1997. *Functionality of Proteins in Food*. Springer-Verlag, Berlin.
- Zavareze, E., Silva, C. M., Sallas-Mellado, M., & Prentice-Hernández, C. 2009. Funcionalidade de hidrolisados proteicos de cabrinha (*Prionotus punctatus*) obtidos a partir de diferentes proteases microbianas. *Química Nova*, 32, 1739–1743.
- Zhang, Q.X., Y-F. Ling, Z. Sun, L. Zhang, H.X. Yu, S.M. Kamau, and R.R. Lu, 2012. Protective effect of whey protein hydrolysates against hydrogen peroxide-induced oxidative stress on PC12 cells. *Biotechnology Letters*, 34, 2001-2006.
- Zhou, Z.-F., Ren, Z.-X., Yu, H.-Y., Jia, J.-Q. and Gui, Z.-Z., 2017. Effects of different modification techniques on molecular structure and bioactivity of *Bombyx mori* pupa protein. *Journal of Asia-Pacific Entomology*, 20, 35-41.
- Zielinska, E., Karas, M., Baraniak, B., 2018. Comparison of functional properties of edible insects and protein preparations thereof. *LWT Food Science and Technology*, 91, 168-174.