UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abubakr, M.A.S., Z. Hassan, M.M.A. Imdakim, and N.R.S.A. Sharifah, 2012. Antioxidant activity of lactic acid bacteria (LAB) fermented skim milk as determined by 1,1-diphenyl-2-picrylhydrazyl (DPPH) and ferrous chelating activity (FCA). Afr. J. Microbiol. Res. 6 (34):6358-6364.

Agrawal, H., R. Joshi, and M. Gupta, 2016. Isolation, purification and characterization of antioxidative peptide of pearl millet (Pennisetum glaucum) protein hydrolysate. Food Chem. 204:365-372.

Aiello, G., S. Ferruzza, G. Ranaldi, Y. Sambuy, A. Arnoldi, G. Vistoli, and C. Lammi, 2018. Behavior of three hypocholesterolemic peptides from soy protein in an intestinal model based on differentiated Caco-2 cell. Journal of Functional Foods 45:363–370.

Aissaoui, N., F. Abidi, J. Hardouin, Z. Abdelkafi, N. Marrakchi, T. Jouenne, and M. N. Marzouki, 2017. ACE inhibitory and antioxidant activities of novel peptides from Scorpaena notata by-product protein hydrolysate. Int J Pept Res Ther. 23:13–23.

Ajibola CF, J.B. Fashakin, T.N. Fagbemi, and R.E. Aluko, 2011. Effect of peptide size on antioxidant properties of African yam bean seed (Sphenostylis stenocarpa) protein hydrolysate fractions. Int J Mol Sci. 12:6685-6702.

Akpossan, R. A., Y. D. Digbeu, M. D. Koffi, J. P. E. N. Kouadio, E. A. Dué and P. L. Kouamé, 2015. Protein fractions and functional properties of dried Imbrasia oyemensis larvae full-fat and defatted flours. International Journal of Biochemistry Research & Review 5(2): 116-126.

Ali, M. M., M. M. Hossain, S. Akhter, M. S. Islam, M. A. Hashem, 2013. Effect of age on slaughterhouse by-product of indegenous cattle of Bangladesh. Bang. J. Anim. Sci. 42 (1): 62-66.

Aloglu, H.S., and Z. Oner, 2011. Determination of antioxidant activity of bioactive peptide fractions obtained from yogurt. J. Dairy Sci. 94 (11):5305-5314.

Aluko, R.E., and E. Manu, 2003. Functional and bioactive properties of quinoa seed protein hydrolysates. J. Food Sci. 68 (4):1254-1258.

Aluko, R. E., 2015. Amino acids, peptides, and proteins as antioxidants for food preservation. In S. Feridoon (Ed.), Handbook of antioxidants for food preservation (pp. 105–140). Woodhead Publishing. Cambridge.

Alvarez, C., V. Garcia, M. Rendueles and M. Diaz, 2012. Functional properties of isolated porcine blood proteins modified by Maillard's reaction. Food Hydrocolloids. 28:267-274.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Ambigaipalan, P., and F. Shahidi, 2017. Bioactive peptides from shrimp shell processing discards: Antioxidant and biological activities. Journal of Functional Foods. 34:7–17.

Amoo I. A., O. T. Adebayo, and A. O. Oyeleye, 2006. Chemical evaluation of winged beans (Psophocarous tetragonolabus), pitanga cherries (Eugenia uniflora) and orchid fruit (Orchid fruit myristica). African J food Agr.Nutr. Dvlpmnt. 2 :1-12.

Anand, S., S. Kamath, L. Chuang, S. Kasapis, and A.L. Lopata, 2013. Biochemical and thermo-mechanical analysis of collagen from the skin of Asian Sea bass (Lates calcarifer) and Australasian Snapper (Pagrus auratus), an alternative for mammalian collagen. Eur Food Res Technol. 236:873-882.

Andarwulan, N., F. Kusnandar, dan D. Herawati, 2011. Analisis pangan. Dian Rakyat. Jakarta.

Anonimus, 2016. Statistik peternakan dan kesehatan hewan 2016. Ditjen Peternakan dan Kesehatan Hewan. Jakarta.

AOAC International, 2005. Official methods of analysis of AOAC international 18th edition. Vol 2. Horwitz W and Latimer Jr., G.W. (editor). Gaithersburg, Maryland. USA.

Arihara, K., 2006. Strategies for designing novel functional meat products. Meat Sci. 74: 219-229.

Arrutia, F., A. Puente, F.A. Riera, C. Menendez, and U.A. Gonzalez, 2016. Influence of heat pre-treatment on BSA tryptic hydrolysis and peptide release. Food Chem. 202:40-48.

Asaduzzaman, A. K. M., and B-S. Chun, 2013. Recovery of functional materials with thermally stable antioxidative properties in squid muscle hydrolyzates by subcritical water. Journal of Food Science and Technology. 52(2):793–802.

Asaduzzaman, A. K. M. , and B-S. Chun, 2014. Hydrolyzates produced from mackerel Scomber japonicus skin by the pressurized hydrothermal process contain amino acids with antioxidant activities and functionalities. Fish Sci 80:369–380.

Ayyash, M., S-Q. Liu, A. Al Mheiri, M. Aldhaheri, B. Raeisi, A. Al-Nabulsi, T. Osaili, and A. Olaimat, 2019. In vitro investigation of health-promoting benefits of fermented camel sausage by novel probiotic Lactobacillus plantarum: a comparative study with beef sausages. LWT - Food Science and Technology, 99:346–354.

Baggio, S.R., and N. Bragagnolo, 2006. The effect of heat treatment on the cholesterol oxides, cholesterol, total lipid and fatty acid contents of processed meat products. Food Chem. 95:611-619.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Baglieri, A., V. Cadili, C. Mozzetti-Monterumici, M. Gennari, S. Tabasso, E. Montoneri, S. Nardi, and M. Negre, 2014. Fertilization of bean plants withtomato plants hydrolysates. Effect on biomass production, chlorophyll contentand N assimilation. Sci. Hortic. 176:194–199.

Bah, C.S.F., A. E.D. Bekhit, A. Carne, and M. A. McConnell, 2015. Production of bioactive peptide hydrolysates from deer, sheep and pig plasma using plant and fungal protease preparations. Food Chem. 176:54–63.

Bah, C.S.F., A.E.D. Bekhit, M.A. McConnell, and A. Carne, 2016. Generation of bioactive peptide hydrolysates from cattle plasma using plant and fungal proteases. Food Chem. 213:98-107.

Balaswamy, K., T. Jyothirmayi, and D. G. Galla, 2007. Chemical composition and some functional properties of fish egg (roes) protein concentrate of rohu (Labeo rohita). J. Food Sciences Technology. 44:293-296.

Banerjee, P., and C. Shanthi, 2012. Isolation of novel bioactive regions from bovine Achilles tendon collagen having angiotensin I-converting enzyme-inhibitory properties. Process Biochemistry. 47:2335–2346.

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):E2014–E2022.

Berlett, B.S., and R.L. Levine, 2014. Designing antioxidant peptides. Redox Rep. 19:80-86.

Bernabei, G., 2015. Costo energetico ed impatto ambientale relativo ai processiproduttivi degli idrolizzati proteici. Master thesis in Agricultural andEnvironmental Sciences at Tuscia University, Viterbo, Italy.

Bernardini, R.D., P. Harnedy, D. Bolton, J. Kerry, E. O'Neill, A.M. Mullen, and M. Hayes, 2011a. Antioxidant and Antimicrobial Peptidic hydrolysates from muscle protein sources and by-products. Food Chem. 124:1296-1307.

Bernardini, R.D., D.K. Rai, D. Bolton, J. Kerry, E. O'Neill, A.M. Mullen, P. Harnedy, and M. Hayes, 2011b. Isolation, purification and characterization of antioxidant peptidic fractions from a bovine liver sarcoplasmic protein thermolysin hydrolyzate. Peptides. 32:388-400.

Bernardini, R.D., A.M. Mullen, D. Bolton, J. Kerry, E. O'Neill, and M. Hayes, 2012. Assessment of the angiotensin-I-converting enzyme (ACE-I) inhibitory and antioxidant activities of hydrolysates of bovine brisket sarcoplasmic proteins produced by papain and characterization of associated bioactive peptidic fractions. Meat Sci. 90:226-235.

Bhaskar N., V.K. Modi, K. Govindaraju, C. Radha, and R.G. Lalitha, 2007. Utilization of meat industry by products: protein hydrolysate from sheep visceral mass. Bioresour Technol. 98 (2):388-394.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Bhat, Z.F and H. Bhat, 2011. Functional meat products: a review. International Journal of Meat Science. 1 (1):1-14.

Binsi, P. K., P. Viji, S. K. Panda, S. Mathew, A. A. Zynudheen, and C. N. Ravishankar, 2015. Characterisation of hydrolysates prepared from engraved catfish (Nemapteryx caelata) roe by serial hydrolysis. Journal of Food Science and Technology. 53(1):158–170.

Bouhamed, S.B.H., F. Krichen, and N. Kechaou, 2019. Feather protein hydrolysates: a study of physicochemical, functional properties and antioxidant activity. Waste and Biomass Valorization, https://doi.org/10.1007/s12649-018-0451-2.

Boukil, A., S. Suwal, J. Chamberland, Y. Pouliot, and A. Doyen, 2018. Ultrafiltration performance and recovery of bioactive peptides after fractionation of tryptic hydrolysate generated from pressure-treated β-lactoglobulin. Journal of Membrane Science. 556:42–53.

Bradford, M.A. 1976. A rapid and sensitive method for the quantification of microgram quantities of protein using the principle of protein – dye binding. Analytical Biochemistry. 72:48-254.

Broncano, J.M. , J. Otte , M.J. Petrón, V. Parra, and M.L. Timón, 2012. Isolation and identification of low molecular weight antioxidant compounds from fermented “chorizo” sausages. Meat Sci. 90:494–501.

Cai, M-Y., R-Z. Gu, C-Y. Li, Y. Ma, Z. Dong, W-Y. Liu, Z-T. Jin, J. Lu, and W-X. Yi, 2014. Pilot-scale production of soybean oligopeptides and antioxidant and antihypertensive effects in vitro and in vivo. J Food Sci Technol. 51(9):1866–1874.

Calvo, P., L. Nelson, and J.W. Kloepper, 2014. Agricultural uses of plant biostimulants. Plant Soil. 383:3–41.

Campbell, L., S. R. Euston, and M. A. Ahmed, 2016. Effect of addition of thermally modified cowpea protein on sensory acceptability and textural properties of wheat bread and sponge cake. Food Chem. 194:1230–1237.

Campos, M. A. and J. G. Areas. 1993. Protein nutritional value of extrusion cooking defatted lung flour. Food Chem. 47:61-66.

Cando, D., B. Herranz, A. J. Borderias, and H. M. Moreno, 2016. Different additives to enhance the gelation of surimi gel with reduced sodium content. Food Chem. 196:791-799.

Cao, Y., and Y. L. Xiong, 2015. Chlorogenic acid-mediated gel formation of oxidatively stressed myofibrillar protein. Food Chem. 180:235-243.

Castro, R.J.S.d., and H.H. Sato, 2014. Advantages of an acid protease from Aspergillus oryzae over commercial preparations for production of whey

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

protein hydrolysates with antioxidant activities. Biocatalysis and Agricultural Biotechnology. 3:58-65.

Chai, H-J., Y-L. Chan, T-L. Li, Y-C. Chen, C-H. Wu, C-Y. Shiau, and C-J. Wu, 2012. Composition characterization of Myctophids (Benthosema pterotum): Antioxidation and safety evaluations for Myctophids protein hydrolysates. Food Research International. 46:118-126.

Chai, T-T., Y-C. Law, F-C. Wong, and S-K. Kim, 2017. Enzyme-assisted discovery of antioxidant peptides from edible marine: a review. Mar. Drugs. 15: 42

Chakka, A.K., M. Elias, R. Jini, P.Z. Sakhare, and N. Bhaskar, 2015. In-vitro antioxidant and antibacterial properties of fermentatively and enzymatically prepared chicken liver protein hydrolysates. J Food Sci Technol. 52 (12):8059-8067.

Chalamaiah, M., K. Balaswamy, G. N. Galla, P. P. Galla, and T. Jyothirmayi. 2011. Chemical composition and functional properties of Mrigal (Cirrhinus mrigala) egg protein concentrates and their application in pasta. J. Food Sci Technol. DOI 10.1007/s13197-011-0357-5.

Chalamaiah, M., B. D. Kumar, R. Hemalatha, and T. Jyothirmayi, 2012. Fish protein hydrolysates: Proximate composition, amino acid composition, antioxidant activities and applications: a review. Food Chem. 135:3020–3038.

Chalamaiah, M., R. Hemalatha, T. Jyothirmayi, P.V. Diwan, K. Bhaskarachary, A. Vajreswari, R. R. Kumar, and B.D. Kumar, 2015. Chemical composition and immunomodulatory effects of enzymatic protein hydrolysates from common carp (Cyprinus carpio) egg. Nutrition 31:388–398.

Chalamaiah, M., W. Yu, and J. Wu, 2018. Immunomodulatory and anticancer protein hydrolysates (peptides) from food proteins: a review. Food Chem. 245:205–222.

Chen, H.M., K. Muramoto and F. Yamauchi, 1995. Structural analysis of antioxidative peptides from soybean β-conglycinin. J. Agric. Food Chem. 43: 574-578.

Chen, G.W., J.S. Tsai, and B.S. Pan, 2007. Purification of angiotensin I-converting enzyme inhibitory peptides and antihypertensive effect of milk produced by protease-ficilitated lactic fermentation. Int. Dairy J. 17:641-647.

Chen, S., D. Lin, Y. Gao, X. Cao, and X. Shen, 2017. A novel antioxidant peptide derived from wheat germ prevents high glucose-induced oxidative stress in vascular smooth muscle cells in vitro. Food & Function. 8:142–150.

Coffman, C. W., and V. V. Garcia, 1977. Functional properties and amino acid content of a protein isolate from Mung bean flour. Journal of Food Technology. 12:473–484.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Collaa, G., S. Nardi, M. Cardarelli, A. Ertani, L. Lucini, R. Canaguiere, and Y. Rouphael, 2015. Protein hydrolysates as biostimulants in horticulture. Scientia Horticulturae. 196:28–38.

Conti-Silva, A.C., M.E.M.P. Silva, and J.A.G. Areas, 2011. Sensory acceptability of raw and extruded bovine rumen protein in processed meat products. Meat Sci. 88:652-656.

Contreras-Castillo, C. J., D. Lomiwes, G. Wu, D. Frost, and M. M. Farouk, 2016. The effect of electrical stimulation on post mortem myofibrillar protein degradation and small heat shock protein kinetics in bull beef. Meat Sci. 113, 65–72.

Correa, A.P., D.J. Daroit, J. Coelho, S.M. Meira, F.C. Lopes, J. Segalin, P.H. Risso, and A. Brandelli, 2011. Antioxidant, antihypertensive and antimicrobial properties of ovine caseinate hydrolyzed with microbial protease. J. Sci Food Agr. 91:2247-2254.

Cortés-Ruiz, J. A., R. Pacheco-Aguilar, J. C. Ramírez-Suárez, M. E. Lugo-Sánchez, K. D. García-Orozco, R. R. Sotelo-Mundo, and A. Peña-Ramos, 2015. Conformational changes in proteins recovered from jumbo squid (Dosidicus gigas) muscle through pH shift washing treatments. Food Chem. 196:769–775.

Cumby, N., Y. Zoong, M. Naczk, and F. Shahidi, 2008. Antioxidant activity and water-holding capacity of canola protein hydrolysates. Food Chem. 109:144-148.

Dai, C., W. Zhang, R. He, F. Xiong, and H. Ma, 2017. Protein breakdown and release of antioxidant peptides during simulated gastrointestinal digestion and the absorption by everted intestinal sac of rapeseed proteins. LWT - Food Science and Technology. 86:424-429.

Damgaard, T.D., J.A.H. Otte, L. Meinert, K. Jensen, and R. Lametsch, 2014. Antioxidant capacity of hydrolyzed porcine tissues. Food Science & Nutrition. 2(3):282-288.

Damgaard, T., R. Lametsch and J. Otte, 2015. Antioxidant capacity of hydrolyzed animal by-products and relation to amino acid composition and peptide size distribution. J Food Sci Technol. 52 (10):6511-6519.

Day, L. 2013. Proteins from land plants-potential resources for human nutrition and food security. Trends in Food Science & Technology. 32:25-42.

de Oliveira, C.F., A.P.F. Correa, D. Coletto, D.J. Daroit, F. Cladera-Olivera, and A. Brandelli, 2015. Soy protein hydrolysis with microbial protease to improve antioxidant and functional properties. J Food Sci Technol. 52(5):2668-2678.

de Queiroz, A.L.M., T. K. A. Bezerra, S.d.F. Pereira, M.E.C. da Silva, C.A.d.A. Gadelha, T.S. Gadelha, M.T.B. Pacheco, and M.S. Madruga, 2017.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Functional protein hydrolysate from goat by-products: optimization and characterization studies. Food Bioscience, 20:19–27.

Devatkal, S., S.K. Mendiratta, N. Kondaiah, M.C. Sharma and A.S.R. Anjaneyulu, 2004. Physicochemical, functional and microbiological quality of buffalo liver. Meat Sci. 68:79-86.

Dewitt, C.A.M., G. Gomez and J.M. James, 2002. Protein extraction from beef heart using acid solubilization. J Food Sci. 67 (9): 3335-3341.

Diantari, E. 2008. Pengaruh asupan purin dan cairan terhadap kadar asam urat pada wanita usia 50-60 tahun di Kecamatan Gajah Mungkur, Semarang. Fakultas Kedokteran, Universitas Diponegoro. Semarang.

Doyen, A., L. Beaulieu, L. Saucier, Y. Pouliot, and L. Bazinet, 2011. Impact of ultrafiltration membrane material on peptide separation from a snow crab byproduct hydrolysate by electrodialysis with ultrafiltration membranes. J. Agric. Food Chem. 59:1784-1792.

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/final reportbio 2012 en.pdf.

Elavarasan, K., and B. A. Shamasundar, 2016. Effect of oven drying and freeze drying on the antioxidant and functional properties of protein hydrolysates derived from freshwater fish (Cirrhinus mrigala) using papain enzyme. J Food Sci Technol. 53(2):1303–1311.

Elias, R. J., S. S. Kellerby, and E. A. Decker, 2008. Antioxidant activity of proteins and peptides. Critical Reviews in Food Science and Nutrition. 48(5):430–441.

Elmalimadi, M.B., J. R. Jovanović, A. B. Stefanović, S. J. Tanasković, S. B. Djurović, B. M. Bugarski, and Z. D. Knežević-Jugović, 2017. Controlled enzymatic hydrolysis for improved exploitation of the antioxidant potential of wheat gluten. Industrial Crops & Products. 109:548–557.

Ertani, A., L. Cavani, D. Pizzeghello, E. Brandellero, A. Altissimo, C. Ciavatta, and S.Nardi, 2009. Biostimulant activities of two protein hydrolysates on the growth andnitrogen metabolism in maize seedlings. J. Plant. Nutr. Soil. Sci. 172:237–244.

Ertani, A., M. Schiavon, A. Muscolo, and S. Nardi, 2013. Alfalfa plant-derived biostimulant stimulate short-term growth of salt stressed Zea mays L. plants. Plant Soil. 364:145–158.

Escudero, E., M-C. Aristoy, H. Nishimura, K. Arihara, and F. Toldrá, 2012. Antihypertensive effect and antioxidant activity of peptide fractions extracted from Spanish dry-cured ham. Meat Sci. 91:306–311.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Escudero, E., L. Mora, P. D. Fraser, M. C. Aristoy, and F. Toldra, 2013. Identification of novel antioxidant peptides generated in Spanish dry-cured ham. Food Chem. 138:1282-1288.

Fakhfakh, N., N. Ktari, R. Siala and M. Nasri, 2013. Wool-waste valorization: production of protein hydrolysate with high antioxidative potential by fermentation with a new keratinolytic bacterium, Bacillus pumilus A1. Journal of Applied Microbiology. 115:424—433.

Farvin, S. K. H., L. L. Andersen, H. H. Nielsen, C. Jacobsen, G. Jakobsen, I. Johansson, and F. Jessen, 2014. Antioxidant activity of cod (Gadus morhua) protein hydrolysates: in vitro assays and evaluation in 5% fish oil-in-water emulsion. Food Chem. 149:326–334.

Febrisiantosa, A., B.P. Purwanto, I.I. Arief, dan Y. Widyastuti, 2013. Karakteristik fisik, kimia, mikrobiologi whey kefir dan aktivitasnya terhadap penghambatan angiotensin converting enzyme (ACE). J. Teknol. dan Industri Pangan. 24 (2):147-153.

Fennema, O. R., 1996. Food Chemistry 3rd Edition. Marcel Dekker, Inc. New York.

Florek, M., Litwińczuk, Skałecki, Kędzierska, and Grodzicki. 2012. Chemical composition and inherent properties of offal from calves maintained under two production systems. Meat Sci. 90:402-409.

Frandson, R. D., W. L. Wilke and A. D. Fails. 2009. Anatomy and physiology of farm animals. Wiley-Blackwell. New York.

Fu, Y., J. F. Young, M. M. Løkke, R. Lametsch, R. E. Aluko, and M. Therkildsen, 2016. Revalorisation of bovine collagen as a potential precursor of angiotensin I-converting enzyme (ACE) inhibitory peptides based on in silico and in vitro protein digestions. Journal of Functional Foods. 24:196–206.

Fu, Y., J.F. Young, and M. Therkildsen, 2017. Bioactive peptides in beef: Endogenous generation through postmortem aging. Meat Sci. 123:134–142.

Fukada, Y., S. Mizutani, S. Nomura, W. Hara, R. Matsui, K. Nagai, and M. Terashima, 2016. An antioxidant peptide against peroxyl radical derived from chicken dark meat. Journal of Food Science and Technology. 53:2476–2481.

Furlan, L.T.R., A.P. Padilla and M.E. Campderros, 2010. Functional and physical properties of bovine plasma proteins as a function of processing and pH, application in a food formulation. Advance Journal of Food Science and Technology. 2 (5):256-267.

Furlan, L. T. R., A.N. Rinaldoni, A.P. Padilla and M.E. Campderros, 2011. Assessment of functional properties of bovine plasma proteins compared with other protein concentrates, application in a Hamburger formulation. American Journal of Food Technology. pp. 1-13.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Galla, N.R., K. Balaswamy, A. Satyanarayana, and P. P. Galla, 2012. Physico-chemical, amino acid composition, functional and antioxidant properties of roe protein concentrates obtained from Channa striatus and Lates calcarifer. Food Chem. 132:1171-1176.

Gallego, M., L. Mora, M.C. Aristoy, and F. Toldrá, 2015. Evidence of peptide oxidation from major myofibrillar proteins in dry-cured ham. Food Chem. 187:230–235.

Gallego, M., L. Mora, M. Reig, and F. Toldrá, 2017. Stability of the potent antioxidant peptide SNAAC identified from Spanish dry-cured ham. Food Research International. https://doi.org/10.1016/j.foodres.2017.12.006.

Gallego, M., L. Mora, E. Escudero, and F. Toldrá, 2018. Bioactive peptides and free amino acids profiles in different types of European dry-fermented sausages. International Journal of Food Microbiology. 276: 71–78.

Garces-Rimon, M., I. Lopez-Exposito, R. Lopez-Fandino, and M. Miguel, 2016a. Egg white hydrolysates with in vitro biological multiactivities to control complications associated with the metabolic syndrome. Eur Food Res Technol. 242:61-69.

Garcés-Rimón, M., Gonzalez, C., Uranga, J.A., Lopez-Miranda, V., Lopez-Fandino, R., Miguel, M., 2016b. Pepsin egg white hydrolysate ameliorates obesity-related oxidative stress, inflammation and steatosis in zucker fatty rats. PLoS One. 11:e0151193.

Garcıa, M.C., P. Puchalska, C. Esteve, and M. L. Marina, 2013. Vegetable foods: a cheap source of proteins and peptides with antihypertensive, antioxidant, and other less occurrence bioactivities. Talanta. 106:328–49.

Garcia-Mora, P., E. Peñas, J. Frias, R. Gomez, and C. Martinez-Villaluenga, 2015. High-pressure improves enzymatic proteolysis and the release of peptides with angiotensin I converting enzyme inhibitory and antioxidant activities from lentil proteins. Food Chem. 171:224–232.

Ghosh, S., A. Gillis, J. Sheviryov, K. Levkov, and A. Golberg, 2019. Towards waste meat biorefinery: extraction of proteins from waste chicken meat with non-thermal pulsed electric fields and mechanical pressing. Journal of Cleaner Production, 208:220-231.

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.

Grossi, A., K. Olsen, T. Bolumar, Å. Rinnan, L. H. Øgendal, and V. Orlien, 2016. The effect of high pressure on the functional properties of pork myofibrillar proteins. Food Chem. 196:1005–1015.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Gu, Y., Y. Liang, J. Bai, W. Wu, Q. Lin, and J. Wu, 2019. Spent hen-derived ACE inhibitory peptide IWHHT shows antioxidative and anti-inflammatory activities in endothelial cells. Journal of Functional Foods 53:85–92.

Guan, H., X. Diao, F. Jiang, J. Han, and B. Kong, 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.

Guanghua, X., X. Zhang, Z. Dong, and X. Shen, 2017. Comparative study on the antioxidant activity of peptides from pearl oyster (Pinctada martensii) mantle type V collagen and tilapia (Oreochromis niloticus) scale type I collagen. J. Ocean Univ. China. 16(6):1175-1182.

Guimaraes, R. d. C. A., S. P. Favaro, A. C. A. Viana, J. A. B. Neto, V. A. Neves, and M. R. Honer, 2012. Study of the proteins in the defatted four and protein concentrate of baru nuts (Dipteryx alata Vog). Ciênc. Tecnol. Aliment., Campinas. 32 (3): 464-470.

Guo, L., H. Hou, B. Li, Z. Zhang, S. Wang, and Z. Xue, 2013. Preparation, isolation and identification of iron-chelating peptides derived from Alaska Pollock skin. Process Biochemistry. 48:988–993.

Guo, Z., D. Lin, J. Guo, Y. Zhang, and B. Zheng, 2017. In vitro antioxidant activity and in vivo anti-fatigue effect of sea horse (Hippocampus) peptides. Molecules. 22:482.

Halim, N.R.A., H.M. Yusof and N.M. Sarbon, 2016. Functional and bioactive properties of fish protein hydrolysates and peptides: a comprehensive review. Trends in Food Science and Technology 51:24-33.

Hamzeh, A., M. Rezaei, S. Khodabandeh, A. Motamedzadegan, and M. Noruzinia, 2017. Antiproliferative and antioxidative activities of cuttlefish (Sepia pharaonis) protein hydrolysates as affected by degree of hydrolysis. Journal of Food Measurement and Characterization. DOI: 10.1007/s11694-017-9685-0.

Han, K.H., K. Shimada, T. Hayakawa, T.J. Yoon, and M. Fukushima, 2014. Porcine splenic hydrolysate has antioxidant activity in vivo and in vitro. Korean J. Food Sci. An. 34 (3):325-332.

Hanachi, P., 2009. Using HPLC to determination the composition and antioxidant activity of Berberis vulgaris. European Journal of Scientific Research. 29(1):47-54.

Harnedy, P.A., V. Parthsarathy, C. M. McLaughlin, M. B. O'Keeffe, P. J. Allsopp, E. M. McSorley, F. P.M. O'Harte, and R. J. FitzGerald, 2018. Blue whiting (Micromesistius poutassou) muscle protein hydrolysate with in vitro and in vivo antidiabetic properties. Journal of Functional Foods. 40:137–145.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Hathwar, S.C., A.K. Rai, V.K. Modi and B. Narayan, 2012. Characteristics and consumer acceptance of healthier meat and meat product formulations – a review. J. Food Sci Technol. 49 (6):653-664.

He, S., C. Franco, and W. Zhang, 2013. Functions, applications and production of protein hydrolysates from fish processing coproducts (FPCP). Food Research International. 50(1):289–297.

Himaya, S.W.A., B.M. Ryu, D.-H. Ngo, and S.-K. Kim, 2012. Peptide isolated from Japanese flounder skin gelatin protects against cellular oxidative damage. J. Agric. Food Chem. 60:9112-9119.

Honikel, K.O., 2011. Composition and calories. In L.M.L. Nollet and F. Toldra (Eds), Handbook of analysis of edible animal by-products. CRC Press. Boca Raton FL, USA.

Hrynets, Y., D.A. Omana, Y. Xu and M. Betti, 2011. Comparative study on the effect of acid- and alkaline-aided extractions on mechanically separated turkey meat (MSTM): chemical characteristics of recovered proteins. Process Biochemistry. 46 (1):335-343.

Huang D., Ou B., and Prior RL., 2005. The chemistry behind antioxidant capacity assays-Reviews. J. Agric. Food Chem. 53:1841-1856.

Huda-Faujan, N., A. Noriham, A.S. Norrakiah, and A.S. Babji, 2007. Antioxidative activities of water extracts of some Malaysian herbs. ASEAN Food Journal. 14(1):61-68.

Ibrahim, M.S., 2009. Evaluation of production and quality of salt-biscuits supplemented with fish protein concentrate. World J. Dairy Food Sciences, 4 (1):28-31.

Indrawan, R., dan R.P. Yaniawati, 2014. Metodologi Penelitian Kuantitatif, Kualitatif, dan Campuran untuk Manajemen, Pembangunan, dan Pendidikan. PT. Refika Aditama. Bandung. 151-192.

Ishak, N.H., and N.M. Sarbon, 2018. A review of protein hydrolysates and bioactive peptides deriving from wastes generated by fish processing. Food Bioprocess Technol. 11:2–16.

Je, J.Y., KH. Lee, MH. Lee, and CB. Ahn, 2009. Antioxidant and antihypertensive protein hydrolysates produced from tuna liver by enzymatic hydrolysis. Food Res Int. 42:1266–1272.

Jiang, W., S. Hu, S. Li, and Y. Liu, 2017a. Biochemical and antioxidant properties of peptidic fraction generated from crab (Portunus trituberculatus) shells by enzymatic hydrolysis. Int Journal of Food Science and Technology. 52:2479-2488.

Jiang, B., X. Zhang, Y. Yuan, Y. Qu, and Z. Feng, 2017b. Separation of antioxidant peptides from pepsin hydrolysate of whey protein isolate by

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

ATPS of EOPO co-polymer (UCON)/phospahate. Scientific Reports. 7:13320.

Jidaeni, V. A., 2011. Functional properties of soybean food ingredients in food systems. Department of Food Technology, Cape Peninsula University of Technology.

Jung, H., Y.Y. Kim, B. Kim, H. Nam, and J.G. Suh, 2017. Improving glycemic control in model mice with type 2 diabetes by increasing superoxide dismutase (SOD) activity using silk fibroin hydrolysate (SFH). Biochemical and Biophysical Research Communications. 493:115-119.

Kangsanant, S., M. Murkovic, and C. Thongraung, 2014. Antioxidant and nitric oxide inhibitory activities of tilapia (Oreochromis niloticus) protein hydrolysate: effect of ultrasonic pretreatment and ultrasonicassisted enzymatic hydrolysis. International Journal of Food Science & Technology, 49(8):1932–1938.

Kannan, A., N. Hettiarachchy, M.G. Johnson, and R. Nannapaneni, 2008. Human colon and liver cancer cell proliferation inhibition by peptide hydrolysates derived from heat-stabilized defatted rice bran. J. Agric. Food Chem. 56:11643-11647.

Kannan, A., Hettiarachchy, N. and Narayan, S., 2009. Colon and breast anticancer effects of peptide hydrolysates derived from rice bran. The Open Bioactive Compounds Journal 2: 17-20.

Karkouch, I., O. Tabbene, D. Gharbi, M. A. B. Mlouka, S. Elkahoui, C. Rihouey, L. Coquet, P. Cosette, T. Jouenne, and F. Limam, 2017. Antioxidant, antityrosinase and antibiofilm activities of synthesized peptides derived from Vicia faba protein hydrolysate: a powerful agents in cosmetic application. Industrial Crops & Products. 109:310–319.

Karnila, R., M. Astawan, Sukarno, dan T. Wresdiyati, 2011. Karakteristik konsentrat protein teripang pasir (Holothuria scabra J.) dengan bahan pengekstrak aseton. Jurnal Perikanan dan Kelautan 16, 1 : 90-102.

Ketnawa, S., and A. M. Liceaga, 2017. Effect of microwave treatments on antioxidant activity and antigenicity of fish frame protein hydrolysates. Food Bioprocess Technol. 10:582–591.

Kim, S. dan I. Wijesekara, 2010. Development and biological activities of marine-derived bioactive peptides: a review. Journal of Functional Foods 2: 1-9.

Kim, H.K., Y.H. Kim, Y.E. Kim, S.K. Jung, N.H. Lee, and K-M. Song, 2018. Effects of salts on ultrasonic extraction of protein from porcine myocardium. Food and Bioproducts Processing, 108:12-17.

Ko, J. Y., H. Lee, K. Samarakoon, J. S. Kim, and Y. J. Jeon, 2013. Purification and determination of two novel antioxidant peptides from flounder fish

KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

(Parlichthys olivaceus) using digestive proteases. Food and Chemical Toxicology. 52:113–120.

Koesoemawardani, 2009. Kajian hidrolisat protein dari ikan rucah sebagai bahan fortifikasi makanan. Thesis. Universitas Lampung.

Kondjoyan, A., J. D. Daudin, and V. Sante-Lhoutellier, 2015. Modelling of pepsin digestibility of myofibrillar proteins and of variations due to heating. Food Chem.172:265–271.

Korhonen, H., and A. Pihlanto, 2003. Food-derived bioactive peptides: Opportunities for designing future foods. Curr. Pharm. Des. 9:1297-1308.

Kralik, G., G. Kusec, M. Grcevic, I. Durkin and I. Kralik, 2012. Animal products as conventional and functional food – an overview. Acta argiculturae Slovenica, Supplement 3:17-25.

Kumar, K.S., K Ganesan, S Kandasamy and P. V. S Rao, 2014. Study on the functional properties of protein concentrates of Kappapphycus alvarezii (Doty) an edible seaweed. Food Chem. 153:356-360.

Kurniati, E. 2009. Pembuatan konsentrat protein dari biji kecipir dengan penambahan HCl. Jurnal Penelitian Ilmu Teknik. 9(2):115-122.

Kuroda, M., Y. Kato, J. Yamazaki, Y. Kai, T. Mizukoshi, H. Miyano, and Y. Eto, 2013. Determination and quantification of the kokumi peptide, γ-glutamyl-valyl-glycine, in commercial soy sauces. Food Chem. 141:823-828.

Lafarga, T., and M. Hayes, 2014. Bioactive peptides from meat muscle and by-products: generation, functionality and application as functional ingredients. Meat Sci. 98(2):227–239.

Lafarga, T., P. O'Connor, and M. Hayes, 2014. Identification of novel dipeptidyl peptidase-IV and angiotensin-I-converting enzyme inhibitory peptides from meat proteins using in silico analysis. Peptides, 59:53-62.

Lafarga, T., P. O'Connor, and M. Hayes, 2015. In silico methods to identify meat-derived prolyl endopeptidase inhibitors. Food Chem., 175:337-343.

Lantto, R., E. Puolanne, K. Kruus, J. Buchert, and K. Autio, 2007. Tyrosinase-aided protein cross-linking: effects on gel formation of chicken breast myofibrils and texture and water-holding of chicken breast meat homogenate gels. J Agric Food Chem. 55:1248–1255.

Latorres, J. M., D. G. Rios, G. Saggiomo, W. Wasielesky Jr., and C. Prentice-Hernandez, 2017. Functional and antioxidant properties of protein hydrolysates obtained from white shrimp (Litopenaeus vannamei). J Food Sci Technol. https://doi.org/10.1007/s13197-017-2983-z.

Lawrie, R.A., 2003. Ilmu Daging Edisi Kelima. Diterjemahkan oleh Aminuddin Parakkasi. UI-Press. Jakarta.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Lee, S.-H., Z.-J. Qian, and S.-K. Kim, 2010. A novel angiotensin I converting enzyme inhibitory peptide from tuna frame protein hydrolysate and its antihypertensive effect in spontaneously hypertensive rats. Food Chem. 118:96-102.

Lee, J.H., S.H. Moon, H.S. Kim, E. Park, D.U. Ahn, and H-D. Paik, 2017. Antioxidant and anticancer effects of functional peptides from ovotransferrin hydrolysates. J Sci Food Agric. 97:4857-4864.

Lestari, C.M.S., Y. Hudoyo and S. Dartosukarno, 2010. Proporsi karkas dan komponen-komponen nonkarkas sapi Jawa di RPH swasta Kec. Ketanggungan Kab. Brebes. Makalah Seminar Nasional Teknologi Peternakan dan Veteriner. 296-300.

Li, B., F. Chen, X. Wang, B.P. Ji, and Y. Wu, 2007. Isolation and identification of antioxidative peptides from porcine collagen hydrolysate by consecutive chromatography and electrospray ionizationmass spectrometry. Food Chem 102:1135–1143.

Li, X., J. Deng, S. Shen, T. Li, M. Yuan, R. Yang, and C. Ding, 2015. Antioxidant activities and functional properties of enzymatic protein hydrolysates from defatted Camellia oleifera seed cake. J Food Sci Technol. doi:10.1007/s13197-014-1693.

Liang, R., Z. Zhang, and S. Lin, 2017. Effects of pulsed electric field on intracellular antioxidant activity and antioxidant enzyme regulating capacities of pine nut (Pinus koraiensis) peptide QDHCH in HepG2 cells. Food Chem. 237:793–802.

Lisiecka, J., M. Knaflewski, T. Spizewski, B. Fraszczak, A. Kaluzewicz, and W. Krzesinski, 2011. The effect of animal protein hydrolysate on quantity and quality ofstrawberry daughter plants cv. ‘Elsanta’. Acta Sci. Pol. Hortorum Cultus. 10:31–40.

Litaay, C. dan J. Santoso, 2013. Pengaruh perbedaan metode perendaman dan lama perendaman terhadap karakteristik fisiko-kimia tepung ikan cakalang (Katsuwonus Pelamis). Jurnal Ilmu dan Teknologi Kelautan Tropis, Vol. 5(1): 85-92.

Liu, Q., B. Kong, Y. L. Xiong and X. Xia, 2010. Antioxidant activity and functional properties of porcine plasma protein hydrolysate as influenced by the degree of hydrolysis. Food Chem. 118:403-410.

Liu, R., S. M. Zhao, B. J. Xie, and S. B. Xiong, 2011. Contribution of protein conformation and intermolecular bonds to fish and pork gelation properties. Food Hydrocolloids. 25(5):898–906.

Liu, J., Y. Huang, Y. Tian, S. Nie, J. Xie, Y. Wang, and M. Xie, 2013. Purification and identification of novel antioxidative peptide released from Black-bone silky fowl (Gallus gallus domesticus Brisson). Eur Food Res Technol. 237:253–263.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Liu, R., L. Xing, Q. Fu, G-H. Zhou, and W-G. Zhang, 2016. A review of antioxidant peptides derived from meat muscle and by-products. Antioxidants. 5:32.

Liu, Q, H. Niu, J. Zhao, J. Han, and B. Kong, 2016. Effect of the reactant ratio on the characteristics and antioxidant activities of maillard reaction products in a porcine plasma protein hydrolysate-galactose model system. International Journal of Food Properties. 19:99–110.

Liu, D., X. Chen, J. Huang, M. Huang, and G. Zhou, 2017. Generation of bioactive peptides from duck meat during post-mortem aging. Food Chem. 237:408-415.

Lomiwes, D., M. M. Farouk, D. A. Frost, P. M. Dobbie, and O. A. Young, 2013. Small heat shock proteins and toughness in intermediate pHu beef. Meat Sci., 95(3):472–479.

Lomiwes, D., M. M. Farouk, G. Wu, and O. A. Young, 2014. The development of meat tenderness is likely to be compartmentalised by ultimate pH. Meat Sci. 96(1):646–651.

Lopez-Enriquez, R. L., V. M. Ocano-Higuera, W. Torres-Arreola, J. M. Ezquerra-Brauer, and E. Marquez-Rios, 2015. Chemical and functional characterization of sarcoplasmic proteins from giant squid (Dosidicus gigas) mantle. Journal of Chemistry. Article ID 538721, 10 pages http://dx.doi.org/10.1155/2015/538721.

Lund, M. N., M. Heinonen, C. P. Baron, and M. Estévez, 2011. Protein oxidation in muscle foods: a review. Molecular Nutrition and Food Research, 55(1), 83–95.

Lynch, S.A., A.M. Mullen, E. E. O'Neill, and C.A. Garcıa, 2017. Harnessing the potential of blood proteins as functional ingredients: a review of the state of the art in blood processing. Comprehensive Reviews in Food Science and Food Safety, 16(2): 330-344.

Lynch, S.A., C. Álvarez, E.E O'Neill, D.F. Keenan, and A.M. Mullen, 2018. Optimization of protein recovery from bovine lung by pH shift process using response surface methodology. Journal of the Science of Food and Agriculture, 98 (5):1641-1648.

Maestri, E., M. Marmiroli, and N. Marmiroli, 2016. Bioactive peptides in plant-derived foodstuffs. Journal of Proteomics. 147:140–155.

Mamone, G., G. Picariello, S. Caira, F. Addeo, and P. Ferranti, 2009. Analysis of food proteins and peptides by mass spectrometry-based techniques. Journal of Chromatography. A. 1216 (43):7130-7142.

Martínez-Alvarez, O., S. Chamorro, and A. Brenes, 2015. Protein hydrolysates from animal processing by-products as a source of bioactive molecules with interest in animal feeding: a review. Food Res Int. 73:204–212.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

McCarthy, A.L., Y. C. O'Callaghan and N. M. O'Brien, 2013. Protein hydrolysates from agricultural crops—bioactivity and potential for functional food development. Agriculture. 3:112-130.

Meshginfar,N., A. Sadeghi-Mahoonak, A.M. Ziaiifar, M. Ghorbani and M. Kashaninejad, 2014. Study of antioxidant activity of sheep visceral protein hydrolysate: optimization using response surface methodology. ARYA Atheroscler. 10(4):179-184.

Milan, B.Z., B. Marija, I. Jelena, J. Jelena, D. Marija, M. Radmila and T. Baltic, 2014. Bioactive peptides from meat and their influence on human health. Tehnologija mesa. 55(1):8-21.

Minkiewicz P., J. Dziuba, and J. Michalska, 2011. Bovine meat proteins as potential precursors of biologically active peptides - a computational study based on the BIOPEP database. Food Science and Technology International. 17:39-45.

Miralles, B., L. Amigo, and I. Recio, 2018. Critical review and perspectives on food-derived antihypertensive peptides. J.Agric.Food Chem., 66:9384-9390.

Molina, M. I., S. Petruccelli, and M. C. Anon, 2004. Effect of pH and ionic strength modifications on thermal denaturation of the 11S globulin of sunflower (Helianthus annuus). J Agric Food Chem. 52:6023–6029.

Molyneux, P., 2004. The use of stable free radical diphenylpycryl-hydrazyl (DPPH) for estimating antioxidant activity. J. Sci. Technol. 26 (2): 211-219.

Montone, C.M., A. L. Capriotti, C. Cavaliere, G. L. Barbera, S. Piovesana, R. Z. Chiozzi, and A. Laganà, 2018. Characterization of antioxidant and angiotensin-converting enzyme inhibitory peptides derived from cauliflower by-products by multidimensional liquid chromatography and bioinformatics. Journal of Functional Foods. 44:40–47.

Mora, L., M.A. Sentandreu, and F. Toldra, 2011. Intense degradation of myosin light chain isoforms in Spanish dry-cured ham. J. Agric. Food Chem. 59:3884–3892.

Mora, L., M. Gallego, M. Reig, and F. Toldra, 2017. Challenges in the quantitation of naturally generated bioactive peptides in processed meats. Trends in Food Science & Technology. 69: 306-314.

Moure, A., Sineiro, B., Herminia, D., Parajo, J.C., 2006. Functionality of oilseed protein products: a review. Food Res Int. 39: 945-963.

Mundi, S., and R.E. Aluko, 2014. Inhibitory properties of kidney bean protein hydrolysate and its membrane fractions against renin, angiotensin converting enzyme, and free radicals. Austin J Nutri Food Sci. 2(1):1-11.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Mun'im, A., O. Negishi, and T. Ozawa, 2003. Antioxidative compounds from Crotalaria sessiliflora. Biosci. Biotechnol. Biochem. 67 (2): 410-414.

Nagodawithana, T., L. Nelles, and N. Trivedi, 2010. Protein hydrolysates as hypoallergenic, flavors and palatants for companion animals. In V. K. Pasupuleti, and A. L. Demain (Eds.), Protein hydrolysates in biotechnology (pp. 191-207). Springer. Netherlands.

Najafian, L., and A.S. Babji, 2019. Purification and identification of antioxidant peptides from fermented fish sauce (Budu). Journal of Aquatic food product technology, 28 (1):14–24.

Nasri, R., I. Younes, M. Jridi, M. Trigui, A. Bougatef, N. Nedjar-Arroume, P. Dhulster, M. Nasri, and M. Karra-Chaabouni, 2013. ACE inhibitory and antioxidative activities of Goby (Zosterissessor ophiocephalus) fish protein hydrolysates: effect on meat lipid oxidation. Food Res Int. 54:552-561.

Naveena, B.M., A.R. Sen, and N. Kondaiah, 2010. Ensuring activity and bioavailability, nutritive value. Fleisch wirtschaft Int. 25 (4):21-28.

Niculescu, M., S. Bajenaru, C. Gaidau, D. Simion, and L. Felipescu, 2009. Extraction ofthe protein components as amino-acids hydrolysates from chrome leatherwastes through hydrolytic processes. Rev. Chim. 60:1070–1078.

Nielsen, P.M., D. Petersen, and C. Dambmann, 2001. Improved method for determining food protein degree of hydrolysis. J Food Sci. 66(5):642-646.

Nikolaev, I.V., S. Sforza, F. Lambertini, D. Y. Ismailova, V.P. Khotchenkov, V.G. Volik, A. Dossena, V.O. Popov, and O.V. Koroleva, 2016. Biocatalytic conversion of poultry processing leftovers: optimization of hydrolytic conditions and peptide hydrolysate characterization. Food Chem. 197:611-621.

Nimalaratne, C., N. Bandara, and J. Wu, 2015. Purification and characterization of antioxidant peptides from enzymatically hydrolyzed chicken egg white. Food Chem. 188:467–472.

Nollet, L.M.L., and F. Toldra, 2011. Introduction, offal meat: definitions, regions, cultures, generalities. In L.M.L. Nollet and F. Toldra (Eds), Handbook of analysis of edible animal by-products. CRC Press. Boca Raton FL, USA.

Nongonierma, A.B., and R.J. FitzGerald, 2015. Bioactive properties of milk proteins in humans: a review. Peptides. 73:20-34.

Nugraheni, M., U. Santoso, Suparmo and H. Wuryastuti, 2011a. In vitro antioxidant, antiproliferative and apoptosis effect of Coleus tuberosus L. African Journal of Food Science. 5(4):232-241.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Nugraheni, M., U. Santoso, Suparmo and H. Wuryastuti, 2011b. Potential of Coleus tuberosus as an antioxidant and cancer chemoprevention agent. International Food Research Journal. 18(4):1471-1480.

Ockerman, H.W., and C.L. Hansen, 2000. Animal By-product Processing and Utilization. CRC Press. Boca Raton, Florida.

Ogunwolu, S. O., F. O. Henshaw, H-P. Mock, A. Santros, and S. O. Awonorin, 2009. Functional properties of protein concentrate and produced from cashew (Anacardium occidentale L.) nut. Food Chem. 115:852-858.

Ohata, M., S. Uchida, L. Zhou, and K. Arihara, 2016. Antioxidant activity of fermented meat sauce and isolation of an associated antioxidant peptide. Food Chem. 194:1034-1039.

Omana, D.A., Y. Xu, V. Moayedi and M. Betti, 2010. Alkali-aided protein extraction from chicken dark meat: chemical and functional properties of recovered proteins. Process Biochemistry. 45 (3):375-381.

Onuh, J. O., A. T. Girgih, R. E. Aluko, and M. Aliani, 2014. In vitro antioxidant properties of chicken skin enzymatic protein hydrolysates and membrane fractions. Food Chem. 150:366–373.

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. J. Agric. Food Chem. 50:3122-3128.

Paiva, L., E. Lima, A.I. Neto, and J. Baptista, 2017. Angiotensin I-converting enzyme (ACE) inhibitory activity, antioxidant properties, phenolic content and amino acid profiles of Fucus spiralis L. protein hydrolysate fractions. Mar. Drugs. 15:311.

Pares, D., M. Toldra, E. Saguer and C. Carretero, 2014. Scale-up of the process to obtain functional ingredients based in plasma protein concentrates from porcine blood. Meat Sci. 96:304-310.

Park, Y.W., and M.S. Nam, 2015. Bioactive peptides in milk and dairy products: a review. Korean J Food Sci Anim Resour. 35(6):831–40.

Pasupuleti, V.K., and S. Braun, 2010. State of the art manufacturing of protein hydrolysates. In: Pasupuleti, V.K., Demain, A.L. (Eds.), Protein Hydrolysates in Biotechnology. Springer, Dordrecht Heidelberg, New York. pp. 11–32.

Pearson, A.M. and T.R. Dutson, 1988. Edible Meat By-products Advances in Meat Research Volume 5. Elsevier Applied Science. London.

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.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Pena-Ramos, E.A. and Y.L. Xiong, 2001. Antioxidative activity of whey protein hydrolysates in a liposomal system. J. Dairy Sci. 84: 2577-2583.

Peng, X.Y., Y.L. Xiong, and B.H. Kong, 2009. Antioxidant activity of peptide fractions from whey protein hydrolysates as measured by electron spin resonance. Food Chem. 113:196-201.

Phongthai, S., S. D'Amico, R. Schoenlechner, W. Homthawornchoo, and S. Rawdkuen, 2018. Fractionation and antioxidant properties of rice bran protein hydrolysates stimulated by in vitro gastrointestinal digestion. Food Chem. 240:156–164.

Picot, L., R. Ravallec, M. Fouchereau-Peron, L. Vandanjon, P. Jaouen, M. Chaplain-Derouiniot, F. Guerard, A. Chabeaud, Y. LeGal, O.M. Alvarez, J. Berge, I. Batista, C. Pires, G. Thorkelsson, C. Delannoy, G. Jakobsen, I. Johansson, and P. Bourseau, 2010. Impact of ultrafiltration and nanofiltration of an industrial fish protein hydrolysate on its bioactive properties. J.Sci Food Agr. 90:1819-1826.

Pihlanto, A., 2006. Review antioxidative peptides derived from milk proteins. International Dairy Journal. 16:1306-1314.

Pihlanto A., 2016. Milk proteins: bioactive peptides. In: Reference module in food science. Elsevier. Amsterdam.

Power, O., P. Jakeman, and R. J. FitzGerald, 2013. Antioxidative peptides: enzymatic production, in vitro and in vivo antioxidant activity and potential applications of milk-derived antioxidative peptides. Amino Acids.44:797–820.

Powers, S.K., and M.J. Jackson, 2008. Exercise-induced oxidative stress: cellular mechanisms and impact on muscle force production. Physiol Rev 88(4):1243–1276

Pownall, T.L., C.C. Udenigwe, and R.E. Aluko, 2010. Amino acid composition and antioxidant properties of pea seed (Pisum sativum L.) enzymatic protein hydrolysate fractions. J. Agric Food Chem. 58:4712-4718.

Prior, R.L., X. Wu and K. Schaich, 2005. Standardized methods for the determination of antioxidant capacity and phenolics in foods and dietary supplements. J. Agric. Food Chem. 53:4290-4302.

Purnomo, H., 2010. Modern technology in livestock products processing – an overview. International Seminar on Prospects and Challenges of Animal Production in Developing Countries in the 21st Century, Faculty of Animal husbandry, University of Brawijaya, Malang. 23-25 March 2010.

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 catesbeina Shaw. Bioresource Technology. 99:1690-1698.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Raghavan, S., and H. G. Kristinsson, 2008. Conformational and rheological changes in catfish myosin during alkali-induced unfolding and refolding. Food Chem. 107(1):385–398.

Rahman, M.S., J-K. Seo, S-G. Choi, K. Gul, and H-S. Yang, 2018. Physicochemical characteristics and microbial safety of defatted bovine heart and its lipid extracted with supercritical-CO2 and solvent extraction. LWT - Food Science and Technology, 97:355–361.

Rajaram, D. dan A.R. Nazeer, 2010. Antioxidant properties of protein hydrolysates obtained from marine fishes Lepturacanthus savala and Sphyraena barracuda. International Journal of Biotechnology and Biochemistry. 6(3):435-444.

Ramezanzade, L., S. F. Hosseini, and M. Nikkhah, 2017. Biopolymer-coated nanoliposomes as carriers of rainbow trout skin-derived antioxidant peptides. Food Chem. 234:220–229.

Rayaprolu, S.J., N. S. Hettiarachchy, R. Horax, G. K. Phillips, M. Mahendran, and P. Chen, 2017. Soybean peptide fractions inhibit human blood, breast and prostate cancer cell proliferation. J Food Sci Technol. 54(1):38–44.

Roblet, C., J. Amiot, C. Lavigne, A. Marette, M. Lessard, J. Jean, C. Ramassamy, C. Moresoli, and L. Bazinet, 2012. Screening of in vitro bioactivities of a soy protein hydrolysate separated by hollow fiber and spiral-wound ultrafiltration membranes. Food Res Int. 46:237-249.

Reddy, G. V., P. K. Mandal, A. R. Sen, and K. S. Reddy, 2015. Developments in science, technology, quality and constraints of restructured meat products-a review. International Journal of Meat Science. 5(1):14.

Ren, J.Y., MM. Zhao, J. Shi, JS. Wang, YM. Jiang, C. Cui, Y. Kakuda, and SJ. Xue, 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.

Rieuwpassa, F.J., S. Joko, dan T. Wini, 2013. Karakterisasi sifat fungsional kosentrat protein telur ikan cakalang (Katsuwonus pelamis). Jurnal Ilmu dan Teknologi Kelautan Tropis. 5 (2): 299-309.

Rizzetti, D.A., A. Martin, P. Corrales, F. Fernandez, M. R. Simoes, F. M. Pecanha, D. V. Vassallo, M. Miguel, and G.A. Wiggers, 2017. Egg white-derived peptides prevent cardiovascular disorders induced by mercury in rats: role of angiotensin-converting enzyme (ACE) and NADPH oxidase. Toxicology Letters. 281:158-174.

Rocha, G.F., F. Kise, A. M. Rosso, and M.G. Parisi, 2017. Potential antioxidant peptides produced from whey hydrolysis with an immobilized aspartic protease from Salpichroa origanifolia fruits. Food Chem. 237:350-355.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Roy, B.C., D.A. Omana, M. Betti, and H.L. Bruce, 2017a. Extraction and characterization of gelatin from bovine lung. Food Science and Technology Research, 23 (2):255-266.

Roy, B.C., C. Das, H. Hong, M. Betti, and H.L. Bruce, 2017b. Extraction and characterization of gelatin from bovine heart. Food Bioscience, 20:116-124.

Rutherfurd, SM. 2010. Methodology for determining degree of hydrolysis of proteins in hydrolysates: a review. J AOAC Int. 93 (5):1515–1522.

Ryder, K., A.E.D. Bekhit, M. McConnell, and A. Carne, 2016. Towards generation of bioactive peptides from meat industry waste proteins: generation of peptides using commercial microbial proteases. Food Chem. 208:42-50.

Saiga, A., S. Tanabe, and T. Nishimura, 2003. Antioxidant activity of peptides obtained from porcine myofibrillar proteins by protease treatment. J. Agric. Food Chem. 51:3661-3667.

Salvador, P., E. Saguer, D. Pares, C. Carretero and M. Toldra, 2010. Foaming and emulsifying properties of porcine red cell protein concentrate. Food Sci Tech Int. 16 (4):289-296.

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, U., 2016. Antioksidan Pangan. Gadjah Mada University Press. Yogyakarta.

Sarmadi, B.H. dan A. Ismail, 2010. Antioxidative peptides from food proteins: a review. Peptides. 31:1949-1956.

Sastrosupadi, A., 2000. Rancangan Percobaan Praktis Bidang Pertanian Edisi Revisi. Penerbit Kanisius. Yogyakarta.

Sayari, N., A. Sila, A. Haddar, R. Balti, S. Ellouz-Chaabouni and A. Bougatef, 2016. Valorisation of smooth hound (Mustelus mustelus) waste biomass through recovery of functional, antioxidative and antihypertensive bioactive peptides. Environ Sci Pollut Res. 23:366–376.

Selmane, D., C. Vial, and G. Djelveh, 2008. Extraction of proteins from slaughterhouse by-products: influence of operating conditions on functional properties. Meat Sci. 79:640–647.

Selmane, D., V. Christophe and D. Gholamreza, 2010. Production and functional properties of beef lung protein concentrates. Meat Sci. 84:315-322.

Selmane, D., V. Christophe and D. Gholamreza, 2011. Emulsification properties of proteins extracted from beef lungs in the presence of xanthan gum using a continuous rotor/stator system. LWT Food Science and Technology. 44: 1179-1188.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Sentandreu, M. A., G. Coulis, and A. Ouali, 2002. Role of muscle endopeptidases and their inhibitors in meat tenderness. Trends in Food Science and Technology. 13:400–421.

Seo, H-W., E-Y. Jung, G-W. Go, G-D. Kim, S-T. Joo, and H-S. Yang, 2015. Optimization of hydrolysis conditions for bovine plasma protein using response surface methodology. Food Chem. 185:106-111.

Shelf, L.A., 1975. Microbiological spoilage of fresh refrigerated beef liver. Journal of Applied Bacteriology. 39:273-280.

Shevkani, K., N. Singh, A. Kaur, and J. C. Rana, 2015. Structural and functional characterization of kidney bean and field pea protein isolates: a comparative study. Food Hydrocolloids. 43:679-689.

Sheih, I.C., T.K. Wu, and T.J. Fang, 2009. Antioxidant properties of a New antioxidative peptide from algae protein waste hydrolysate in different oxidation systems. Bioresource Technology. 100:3419-3425.

Sheih, I. C., T. J. Fang, T. Wu, and P. Lin, 2010. Anticancer and antioxidant activities of the peptide fraction from algae protein waste. J Agric Food Chem. 58:1202–1207.

Singh, B. P., and S. Vij, 2017. Growth and bioactive peptides production potential of Lactobacillus plantarum strain C2 in soy milk: a LC-MS/MS based revelation for peptides biofunctionality. LWT-Food Science and Technology. 86:293–301.

Singh, B.P., and S. Vij, 2018. In vitro stability of bioactive peptides derived from fermented soy milk against heat treatment, pH and gastrointestinal enzymes. LWT - Food Science and Technology. 91:303–307.

Sinthusamran, S., S. Benjakul, K. Kijroongrojana, T. Prodpran, and H. Kishimura, 2019. Protein hydrolysates from pacific white shrimp cephalothorax manufactured with different processes: compositions, characteristics and antioxidative activity. Waste and Biomass Valorization, https://doi.org/10.1007/s12649-018-0517-1.

Smialowska, A., L. Matia-Merino, and A.J. Carr, 2017. Oxidative stability of iron fortified goat and cow milk and their peptide isolates. Food Chem. 237:1021-1024.

Sohaib, M., F.M. Anjum, A. Sahar, M.S. Arshad, U.U. Rahman, A. Imran, and S. Hussain, 2017. Antioxidant proteins and peptides to enhance the oxidative stability of meat and meat products: a comprehensive review. International Journal Of Food Properties. 20(11):2581–2593.

Song, S., S. Li, L. Fan, K. Hayat, Z. Xiao, L. Chen, and Q. Tang, 2016. A novel method for beef bone protein extraction by lipase-pretreatment and its application in the maillard reaction. Food Chem. 208:81-88.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Sonklin, C., N. Laohakunjit and O. Kerdchoechuen, 2018. Assessment of antioxidant properties of membrane ultrafiltration peptides from mungbean meal protein hydrolysates. PeerJ 6:5337.

Sonklin, C., N. Laohakunjit, O. Kerdchoechuen, and K. Ratanakhanokchai, 2018. Volatile flavour compounds, sensory characteristics and antioxidant activities of mungbean meal protein hydrolysed by bromelain. J Food Sci Technol. 55(1):265–277.

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.

Stack, J., P.R. Tobin, A. Gietl, P.A. Harnedy, D.B.Stengel, and R.J. FitzGerald, 2017. Seasonal variation in nitrogenous components and bioactivity of protein hydrolysates from Porphyra dioica. J Appl Phycol. 29:2439-2450.

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 Technol. 9:970–980.

Stefanucci, A., A. Mollica, G. Macedonio, G. Zengin, A. A. Ahmed, and E. Novellino, 2017. Exogenous opioid peptides derived from food proteins and their possible uses as dietary supplements: a critical review. Food Reviews International. http://dx.doi.org/10.1080/ 87559129.2016.1225220.

Stratil, P., B. Klejdus and V. Kuban, 2006. Determination of total content of phenolic compounds and their antioxidant activity in vegetables evaluation of spectrophotometric methods. J. Agric. Food Chem. 54:607-616.

Su, G., W. He, M. Zhao, G. I.N. Waterhouse, and D. Sun-Waterhouse, 2018. Effect of different buffer systems on the xanthine oxidase inhibitory activity of tuna (Katsuwonus pelamis) protein hydrolysate. Food Res Int. 105:556–562.

Subagio, A., 2006. Characterization of hyacinth bean (Lablab purpureus (L.) sweet) seeds from Indonesia and their protein isolate. Food Chem. 95:65-70.

Sudhakar, S., and R. A. Nazeer, 2017. In vitro preparation and assessment of radical reducing peptide from Octopus aegina using digestive proteases. Journal of Bioscience and Bioengineering. 124:36–42.

Suetsuna, K., H. Ukeda, and H. Ochi, 2000. Isolation and characterization of free radical scavenging activities peptides derived from casein. J. Nutr. Biochem. 11:128-131.

Sugijanto, V.V., dan M. Manullang, 2001. Pembuatan protein konsentrat wheat pollard sebagai pemanfaatan hasil samping penggilingan gandum. Jurnal Teknol. Dan Industri Pangan. 12(1): 54-60.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Sujith, P. A., and T. V. Hymavathi, 2010. Recent developments with debittering of protein hydrolysates. Asian Journal Food and Agro-Industry. 4(6):365-381.

Sun,W., H. Zhao, Q. Zhao, M. Zhao, B. Yang, and N. Wu, 2009. Structural characteristics of peptides extracted from Cantonese sausage during drying and their antioxidant activities. Innovative Food Science & Emerging Technologies. 10:558–563.

Sun, X.D., and R. A. Holley, 2011. Factors influencing gel formation by myofibrillar proteins in muscle foods. Comprehensive Reviews in Food Science and Food Safety. 10:33-51.

Sun, Q., Y. Luo, H. Shen, X . Li, and L. Yao, 2012. Purification and characterization of a novel antioxidant peptide from porcine haemoglobin hydrolysate. Int J Food Sci Technol. 47:148–154.

Sun, Y., D. Pan, Y. Guo, and J. Li, 2012. Purification of chicken breast protein hydrolysate and analysis of its antioxidant activity. Food and Chemical Toxicology. 50(10):3397–3404.

Suryanti, S., Rizal, E.I. Hari, dan Sukarno, 2011. Pengaruh pencucian terhadap sifat fungsional daging lumat ikan Patin Siam (Pangasius hypothalamus). Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan. 5 (2).

Susilo, A. dan K.U. Al Awwaly, 2005. Tinjauan kualitas fisik bakso dari pemanfaatan edible meat (hati sapi) sebagai substitusi daging dan sodium tripolyphosphate (STPP) sebagai bahan pengenyal. Jurnal Ilmu-ilmu Hayati (Life Science). 17 (2): 107-116.

Tanaskovic, S.J., N. Lukovic, S. Grbavcic, A. Stefanovic, J. Jovanovic, B. Bugarski, and Z. Knezevic-Jugovic, 2018. Production of egg white protein hydrolysates with improved antioxidant capacity in a continuous enzymatic membrane reactor: optimization of operating parameters by statistical design. J Food Sci Technol. 55(1):128-137.

Tang, W-l., M. Zhang, and Z. Fang, 2015. Optimization of ultrasound-assisted-extraction of porcine placenta water-soluble proteins and evaluation of the antioxidant activity. J Food Sci Technol. 52(7):4042–4053.

Tang, C. H., and X. Sun, 2011. A comparative study of physicochemical and conformational properties in three vicilins from Phaseolus legumes: implications for the structure-function relationship. Food Hydrocolloids. 25:315-324.

Tapal, A., and P. K. Tiku, 2012. Complexation of curcumin with soy protein isolate and its implications on solubility and stability of curcumin. Food Chem. 130 (4):960–965.

Teng, D., Y. Fang, X. Song, and Y. Gao, 2011. Optimization of enzymatic hydrolysis parameters for antioxidant capacity of peptide from goat placenta. Food and Bioproducts Processing. 89:202-208.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Tierney, M.S., A.K. Croft and M. Hayes, 2010. A review of antihypertensive and antioxidant activities in macroalgae. Botanica Marina. 53:387-408.

Torres-Fuentes, C., M. Alaiz, and J. Vioque, 2012. Iron-chelating activity of chickpea protein hydrolysate peptides. Food Chem. 134(3):1585–1588.

Thawornchinsombut, S., and J.W. Park, 2007. Effect on NaCl on gelation characteristics of acid- and alkali-treated Pacific whiting fish protein isolates. Journal of Food Biochemistry. 31(4):427–455.

Toldra, F., 2010. Innovation for healthier processed meats. International Conference on Food Innovation – Foodinnova 2010, Valencia (Spain), 25-29 October 2010.

Toldra, F., L. Mora and M. Reig, 2016. New insights into meat by-product utilization. Meat Sci. 120:54-59.

Toldrà, M., D. Parés, E. Saguer, and C. Carretero, 2019. Recovery and Extraction of Technofunctional proteins from porcine spleen using response surface methodology. Food and Bioprocess Technology, 12:298–312.

Tsermoula, P., C. Virgili, R.G. Ortega, A.M. Mullen, C. Álvarez, N.M. O'Brien, E.A.A. O'Flaherty, and E.E. O'Neill, 2019. Functional protein rich extracts from bovine and porcine hearts using acid or alkali solubilisation and isoelectric precipitation. International Journal of Food Science and Technology, https://doi.org/10.1111/ijfs.14065.

Tsuge N., Y. Eikawa, Y. Nomura, M. Yamamoto and K. Sugisawa, 1991. Antioxidative activity of peptides prepared by enzymatic hydrolysis of egg-white albumin. Nippon Nogei Kagaku Kaishi. 65:1635-1641.

Tu, M., S. Cheng, W. Lu, and M. Du, 2018. Advancement and prospects of bioinformatics analysis for studying bioactive peptides from food-derived protein: Sequence, structure, and functions. Trends in Analytical Chemistry 105:7-17.

Udenigwe, C. C., and R. E. Aluko, 2011. Chemometric analysis of the amino acid requirements of antioxidant food protein hydrolysates. International Journal of Molecular Sciences. 12(5).

Udenigwe, C.C., and R.E. Aluko, 2012. Food protein-derived bioactive peptides: production, processing, and potential health benefits. J Food Sci. 77(1):R11–24.

Udenigwe, C. C., and A. Howard, 2013. Meat proteome as source of functional biopeptides. Food Res Int. 54(1):1021–1032.

Udenigwe, C. C., S. Wu, K. Drummond, and M. Gong, 2014. Revisiting the prospects of plastein: thermal and simulated gastric stability in relation to the antioxidative capacity of casein plastein. J Agric Food Chem. 62(1):130–135.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

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.

Uluko, H., S. Zhang, L. Liu, M. Tsakama, J. Lu, and J. Lv, 2015. Effects of thermal, microwave, and ultrasound pretreatments on antioxidative capacity of enzymatic milk protein concentrate hydrolysates. Journal of Functional Foods. 18:1138–1146.

Utrera, M., M. Armenteros, S. Ventanas, F. Solano, and M. Estévez, 2012. Pre-freezing raw hams affects quality traits in cooked hams: potential influence of protein oxidation. Meat Sci. 92:596–603.

Vandanjon, L., R. Johannsson, M. Derouiniot, P. Bourseau, and P. Jaouen, 2007. Concentration and purification of blue whiting peptide hydrolysate by membrane processes. J. Food Eng. 83:581-589.

Vastag, Z., L. Popovic, S. Popovic, L. Petrovic, and D. Pericin, 2010. Antioxidant and angiotensin-I converting enzyme inhibitory activity in the water-soluble protein extract from Petrovac Sausage (Petrovska Kolbasa). Food Control. 21(9): 1298-1302.

Vercruysse, L., J. V. Camp, and G. Smagghe, 2005. ACE inhibitory peptides derived from enzymatic hydrolysates of animal muscle protein: a review. J Agric Food Chem. 53:8106–8115.

Wang, T., R. Jonsdottir and G. Olafsdottir, 2009. Total phenolic compounds, radical scavenging and metal chelation of extracts from Icelandic seaweeds. Food Chem. 116:240-248.

Wang, L. S., J. C. Huang, Y. L. Chen, M. Huang, and G. H. Zhou, 2015. Identification and characterization of antioxidant peptides from enzymatic hydrolysates of duck meat. J Agric Food Chem. 63(13):3437–3444.

Wang, X., H. Yu, R. Xing, X. Chen, S. Liu, and P. Li, 2017. Optimization of the extraction and stability of antioxidative peptides from Mackerel (*Pneumatophorus japonicus*) protein. BioMed Research International. Volume 2017, Article ID 6837285, 14 pages.

Williams, P.G., 2007. Nutritional composition of red meat. Papers-Faculty of Health and behavioural Sciences. University of Wollongong. Sydney.

Wiriyaphan, C., B. Chitsomboon, and J. Yongsawadigul, 2012. Antioxidant activity of protein hydrolysates derived from threadfin bream surimi byproducts. Food Chem. 132:104–111

Wu, H. -C., H. -M. Chen, and C. -Y. Shiau, 2003. Free amino acids and peptides as related to antioxidant properties in protein hydrolysates of mackerel (Scomber austriasicus). Food Res Int. 36:949–957.

UNIVERSITAS GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

Wu, G., Y-Z. Fang, S. Yang, J.R. Lupton, and N.D. Turner, 2004. Glutathione metabolism and its implications for health. J Nutr. 134(3):489–492

Wu, R., L. Chen, D. Liu, J. Huang, J. Zhang, X. Xiao, M. Lei, Y. Chen, and H. He, 2017. Preparation of antioxidant peptides from salmon byproducts with bacterial extracellular proteases. Mar. Drugs. 15:4.

Xie, Z., J. Huang, X. Xu, and Z. Jin, 2008. Antioxidant activity of peptides isolated from alfalfa leaf protein hydrolysate. Food Chem. 111:370-376.

Xing, L. J., Y. Y. Hu, H. Y. Hu, Q. F. Ge, G. H. Zhou, and W. G. Zhang, 2016. Purification and identification of antioxidative peptides from dry-cured Xuanwei ham. Food Chem. 194:951-958.

Xing, L., R. Liu, S. Cao, W. Zhang, and Z. Guanghong, 2019. Meat protein based bioactive peptides and their potential functional activity: a review. International Journal of Food Science and Technology, https://doi.org/10.1111/ijfs.14132.

Xiong, Y.L., 2010. Antioxidant Peptides. In: Mine Y, Li-Chan E (eds) Bioactive Proteins and Peptides as Functional Foods and Nutraceuticals, vol 1. Blackwell Publishing Iowa, USA, pp 29–42.

Xue, S., X. Yu, X. Li, X. Zhao, M. Han, X. Xu, and G. Zhou, 2019. Structural changes and emulsion properties of goose liver proteins obtained by isoelectric solubilisation/precipitation processes. LWT - Food Science and Technology, 102:190–196.

Yang, B., H. Yang, J. Li, Z. Li and Y. Jiang, 2011. Amino acid composition, molecular weight distribution and antioxidant activity of protein hydrolysates of soy sauce lees. Food Chem. 124:551-555.

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.

Yang, T.S.S., Q. Lin, M. Ma, F. Luo, and J. Liu, 2013. Effects of microwave irradiation pre-treatment of egg white proteins on antioxidative activity of their hydrolysates prepared with pepsin. Advance Journal of Food Science and Technology. 5(07):936–940.

You, L., M. Zhao, C. Cui, H. Zhao and B. Yang, 2009. Effect of degree of hydrolysis on the antioxidant activity of loach (Misgurnus anguillicaudatus) protein hydrolysates. Innovative Food Science and Emerging Technologies 10:235-240.

You, L., M. Zhao, J.M. Regenstein, and J. Ren, 2010. Changes in the antioxidant activity of loach (Misgurnus anguillicaudatus) protein hydrolysates during a simulated gastrointestinal digestion. Food Chem. 120:810-816.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

You, L., M. Zhao, R.H. Liu, and J.M. Regenstein, 2011. Antioxidant and antiproliferative activities of Loach (Misgurnus anguillicaudatus) peptides prepared by papain digestion. J. Agric. Food Chem. 59:7948-7953.

Yu, J., A. Mohamed, and G. Ipek, 2007. Peanut protein concentrate: production and functional properties as affected by processing. Food Chem. 103:121-129.

Yu, W., C.J. Field, and J. Wu, 2018. Purification and identification of anti-inflammatory peptides from spent hen muscle proteins hydrolysate. Food Chem. doi: https://doi.org/10.1016/j.foodchem.2018.01.093.

Zahin, M., F. Aqil, and I. Ahmad, 2009. The in vitro antioxidant activity and total phenolic content of four Indian medicinal plants. International Journal of Pharmacy AND Pharmaceutical Science, 1, Suppl. 1 Nov-Des.

Zambrowicz, A., E. Eckert, M. Pokora, A. Dabrowska, M. Szoltysik, L. Bobak, T. Trziszka, and J. Chrzanowska, 2015. Biological activity of egg-yolk protein by-product hydrolysates obtained with the use of non-commercial plant protease. Ital. J. Food Sci. 27:450-458.

Zarei, M., A. Ebrahimpour, A. Abdul-Hamid, F. Anwar, and N. Saari, 2012. Production of defatted palm kernel cake protein hydrolysate as a valuable source of natural antioxidants. Int. J. Mol. Sci.13:8097-8111.

Zavareze, E. d. R., A. C. Telles, S. L. M. E. Halal, M. d. Rocha, R. Colussi, L. M. d. Assis, L. A. S. d. Castro, A. R. G. Dias, and C. Prentice-Hernández, 2014. Production and characterization of encapsulated antioxidative protein hydrolysates from Whitemouth croaker (Micropogonias furnieri) muscle and byproduct. LWT - Food Science and Technology. 59:841-848.

Zayas, J.F., 1997. Functionality of Proteins in Food. Springer-Verlag. Berlin.

Zhang, Q., C. Wu, G. Fan, T. Li, and Y. Sun, 2018. Improvement of antioxidant activity of Morchella esculenta protein hydrolysate by optimized glycosylation reaction. CYTA – Journal Of Food. 16(1):238–246.

Zhang, N., C. Zhang, Y. Chen, and B. Zheng, 2017. Purification and characterization of antioxidant peptides of Pseudosciaena crocea protein hydrolysates. Molecules. 22:57.

Zhang, L., Y. Liu, D. Lu, J. Han, X. Lu, Z. Tian, and Z. Wang, 2015. Angiotensin converting enzyme inhibitory, antioxidant activities, and antihyperlipidaemic activities of protein hydrolysates from Scallop mantle (Chlamys farreri). International Journal of Food Properties. 18:33–42.

Zhang, Q-X., H. Wu, Y-F. Ling, and R-R. Lu, 2013. Isolation and identification of antioxidant peptides derived from whey protein enzymatic hydrolysate by consecutive chromatography and Q-TOF MS. Journal of Dairy Research. 80:367-373.

UNIVERSITAS
GADJAH MADA
KAJIAN SIFAT FUNGSIONAL DAN AKTIVITAS ANTIOKSIDAN PROTEIN DAN HIDROLISAT JEROAN SAPI SECARA IN VITRO
KHOTHIBUL UMAM AL AWWALY, Ir. Yuny Erwanto, S.Pt., M.P., Ph.D., IPM.; Prof. Dr. drh. Wayan Tunas Artama; Ir
Universitas Gadjah Mada, 2019 | Diunduh dari http://etd.repository.ugm.ac.id/

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.

Zhang, F., J. Qua, K. Thakur, J-G. Zhang, A. Mocan, Z-J. Wei, 2019. Purification and identification of an antioxidative peptide from peony (Paeonia suffruticosa Andr.) seed dreg. Food Chem., 285:266–274.

Zhao, G., Y. Liu, M. Zhao, J. Ren, and B. Yang, 2011. Enzymatic hydrolysis and their effects on conformational and functional properties of peanut protein isolate. Food Chem. 127:1438-1443.

Zhao, X., T. Xing, X. Chen, M. Han, S. Deng, X. Xu, and G. Zhou, 2017. Changes of molecular forces during thermo-gelling of protein isolated from PSE-like chicken breast by various isoelectric solubilization/precipitation extraction strategies. Food Bioprocess Technol. DOI 10.1007/s11947-017-1893-4.

Zhao, Q., H. Xu, S. Hong, N. Song, J. Xie, Z. Yan, R. Wang, P. Yang, and X. Jiang, 2019. Rapeseed protein-derived antioxidant peptide RAP ameliorates nonalcoholic steatohepatitis and related metabolic disorders in mice. Mol. Pharmaceutics, 16:371−381.

Zhu, K., H. Zhou, and H. Qian, 2006. Antioxidant and free radical-scavenging activities of wheat germ protein hydrolysates (WGPH) prepared with alcalase. Process Biochemistry. 41:1296-1302.

Zhu, Y.P., J.F. Fan, and L.T. Cheng, 2008. Improvement of antioxidant activity of Chinese traditional fermented Okara (Meitauza) using Bacillus subtilis B2. Food Control. 19:654-661.

Zhu, C. Z., W. G. Zhang, G. H. Zhou, X. L. Xu, Z. L. Kang, and Y. Yin, 2013. Isolation and identification of antioxidant peptides from Jinhua ham. J Agric Food Chem. 61:1265-1271.

Zouari, N., N. Fakhfakh, W.B. Amara-Dali, M. Sellami, L. Msaddak, and M.A. Ayadi, 2011. Turkey liver: physicochemical characteristics and functional properties of protein fractions. Food and Bioproducts Processing. 89:142-148.

Zukefli, S.J., L.S. Chua, and Z. Rahmat, 2017. Protein extraction and identification by gel electrophoresis and mass spectrometry from edible bird's nest samples. Food Anal. Methods, 10:387-398.