

DAFTAR PUSTAKA

- Adebowale, K. O., dan Lawal, O. S. (2003). Foaming, gelation and electrophoretic characteristics of mucuna bean (*Mucuna pruriens*) protein concentrates. *Food Chemistry*, 83(2), 237-246.
- Adler-Nissen, J. (1986). *Enzymic Hydrolysis of Food Proteins*. Elsevier Applied Science Publishers, Essex, UK.
- Aluko, R.E. (2012). Structure and Function of Plant Protein-Derived Antihypertensive Peptidas. *Curr. Opin. Food Sci.*, 4 : 44–50.
- Astawan, M. (2003). Tempe, Sumber Antioksidan dan Antibiotika. <http://www.gizi.net/cgi-bin/berita/fullnews.cgi?newsid1057040274,54505>. Diakses 2 September 2017.
- Astuti, M. (1995). Sejarah perkembangan tempe. *Proseding Pengembangan Tempe dalam Industri Pangan Modern*. Yayasan Tempe Indonesia. Jakarta.
- Astuti, M., Meliala, A., Dalais, F.S., dan Wahlqvist, M.L., (2000). Tempe, a nutritious and healthy food from Indonesia. *Asia Pacific Journal of Clinical Nutrition*, 9(4), pp.322-325
- Association of Official Analytical Chemist. (2005). *Official Method of Analysis of The Association Analytical of Chemist*. The Association of Official Analysis Chemist, Inc., Arlington
- Attwood M.R., Francis, R.J., Hassall C.H., Krohn A., Lawton G., Natoff I.L., Nixon J.S., Redshaw S., dan Thomas W.A. (1984). New potent inhibitors of angiotensin converting enzyme. *FEBS LETTERS*. Vol. 165 No 2, 201-206.
- Baker, R.W. (2004). *Membrane Technology and Applications*. John Wiley & Sons, Ltd. Menlo Park, California.
- Baumann, U., dan Bisping, B. (1995). Proteolysis during tempe fermentation. *Food Microbiology* 12:39-47.
- Benjakul, S., Yarnpakdee, S., Senphan, T., Halldorsdottir, S. M., dan Kristinsson, H. G. (2014). Fish protein hydrolysates: production, bioactivities and applications. *Antioxidants and functional components in aquatic foods, 1st ed. Reykjavik, Iceland: Matil Ltd*, 237A83.

- Boyer M, L. M., Hunt, J. R., dan Sitar, N. (1986). Particle transport through porous media. *Water Resources Research*, 22(13), 1901-1921.
- Byun, H. G., dan Kim, S. K. (2001). Purification and characterization of angiotensin I converting enzyme (ACE) inhibitory peptides from Alaska pollack (*Theragra chalcogramma*) skin. *Process Biochemistry*, 36(12), 1155-1162.
- Campos-Segura, Maira R., Espadas-Alcocer, Paul, Carlos., Chel-Guerrero dan Betancur-Ancona, D. (2013). ACE-I inhibitory peptide fractions from enzymatic hydrolysates of velvet bean (*Mucuna pruriens*). *Agricultural Science*. Vol.4, No.12, 767-773
- Charcosset, J. Y., dan Chauvet, E. (2001). Effect of culture conditions on ergosterol as an indicator of biomass in the aquatic hyphomycetes. *Appl. Environ. Microbiol.*, 67(5), 2051-2055.
- Chaudhary, S. K., De, A., Bhadra, S., dan Mukherjee, P. K. (2015). Angiotensin-converting enzyme (ACE) inhibitory potential of standardized *Mucuna pruriens* seed extract. *Pharmaceutical biology*, 53(11), 1614-1620.
- Chel-Guerrero L, Mario, Domínguez-Magaña, Alma, Martínez-Ayala, Dávila-Ortiz G, Betancur-Ancona. D. (2012). Lima Bean (*Phaseolus lunatus*) protein hydrolysates with ACE-I inhibitory activity. *Food and Nutrition Sciences*, 3 : 511-521
- Cheung, H. S., Wang, F. L., Ondetti, M. A., Sabo, E. F., dan Cushman, D. W. (1980). Binding of peptide substrates and inhibitors of angiotensin-converting enzyme. Importance of the COOH-terminal dipeptide sequence. *Journal of Biological Chemistry* 255 : 401-407
- Church, F.C., Swaisgood, H.E., Porter, D.H., dan Catignani, G.L.(1983). Spectrophotometric assay using o phthaldialdehyde for determination of proteolysis in milk and isolated milk proteins. *J. Dairy Sci.* 66: 1219- 1227.
- Cushman, D. W., dan Cheung, H. S. (1971). Spectrophotometric assay and properties of the angiotensin-converting enzyme of rabbit lung. *Biochemical pharmacology*, 20(7), 1637-1648.
- Chutrtong, J. dan Bussabun, T. (2014). Preparation of tempeh spore powder by freeze drying. World academy of science, engineering and technology. *Internaoional journal of biological veterainary, agricultural and food engineering* (8) :1
- Daskaya-Dikmen, Ceren, Aysun, Yucetepe, Funda, Karbancioglu-Guler, Hayrettin Daskaya dan Beraat, Ozcelik. (2017). Angiotensin-I-

- converting enzyme (ACE)-inhibitory peptides from plants. *Nutrients*. 9 : 315-334.
- de Reu, J. C., ten Wolde, R. M., de Groot, J., Nout, M. J. R., Rombouts, F. M., dan Gruppen, H. (1995). Protein Hydrolysis during Soybean Tempe Fermentation with *Rhizopus oligosporus*. *Journal of Agricultural and Food Chemistry*, 43(8), 2235–2239.
- Donati, D., Lampariello, L.R., Pagani, R., Guerranti, R., Cinci, G. dan Marinello, E. (2005). Antidiabetic oligocyclitols in seeds of *Mucuna pruriens*. *Phytotherapy Research*, 19(12), pp.1057-1060.
- Egountley, M. dan O.C. Aworh. (2003). Effect of soaking, dehulling, cooking, and fermentation with *Rhizopus oligosporus* on the oligosaccharides, Trypsin inhibitor, Phytic acid, and Tannins of Soybean (*Glycine max* Merr.), Cowpea (*Vigna unguiculata* L. Walp.) and Groundbean (*Macrotyloma geocarpa* Harms). *Journal of Food Engineering* 56, 249-254.
- Eke, C. U., Asoegwu, S. N., dan Nwandikom, G. I. (2007). Some physical properties of jackbean seed (*Canavalia ensiformis*). *Agricultural Engineering International: CIGR Journal*.
- Elegado B., Fransisco dan Fujio Y. (1993). Growth of *Rhizopus* strains on soybean and their protease formation . *J. Fat. Agr.* , 37 (34), 315-324
- Fadly, Irman. (2014) Aktivitas inhibisi enzim pengubah angiotensin pada hidrolisat tempe koro pedang (*Canavalia ensiformis* l.) secara *in vitro*. Skripsi. Fakultas matematika dan ilmu pengetahuan Alam. Bogor. Institut Pertanian Bogor
- Fell, J. W., dan Kurtzman, C. P. (1998). *The Yeasts; a Taxonomic Study*. Elsevier.
- Feng, X. M., Eriksson, A. R., dan Schnürer, J. (2005). Growth of lactic acid bacteria and *Rhizopus oligosporus* during barley tempeh fermentation. *International Journal of Food Microbiology*, 104(3), 249-256.
- FitzGerald RJ, Murray BA, Walsh DJ. (2004). Hypotensive peptides from milk proteins. *J Nutr* 134 (4):980–988.
- FitzGerald R, Murray BA. (2006). Bioactive peptides and lactic fermentations. *Int J Dairy Technol*. 59 : 118-125.

- FitzGerald RJ, Meisel H. (2000). Milk protein-derived peptide inhibitors of angiotensin i - converting enzyme. *Br J Nutr.* 83 : 33-37.
- Fujita, H., Yamagami, T., dan Ohshima, K. (2001). Efficacy and safety of touchi extract an a-glucosidase inhibitor derived from fermented soybeans, in non-insulin- dependent diabetic mellitus. *Journal of Nutrition Biochemistry*, 12: 351–356.
- Gandjar, I., (2006). *Mikologi dasar dan terapan*. Yayasan Obor Indonesia.
- Gibbs, B. F. (1999). Production and Characterization of Bioactive Peptides from Soy Fermented Foods and Their Hydrolysates. Dissertation. Department Of Food Science And Agricultural Chemistry, Macdonald Campus, Mcgill University. Canada.
- Gibbs, B. F., Zougman, A., Mase, R., dan Mulligan, C. (2004). Production and characterization of bioactive peptides from soy hydrolysate and soy-fermented food. *Food Research International*, 37(2), 123–131.
- Gu, Y. dan Wu, J. (2013). LC-MS/MS coupled with QSAR modeling in characterising of angiotensin I-converting enzyme inhibitory peptides from soybean proteins. *Food Chem.*, 141 : 2682–2690.
- <https://balitkabi.litbang.pertanian.go.id/infotek/potensi-tersembunyi-koro-bengkuk/>. Diakses September 2017.
- Handajani, S. (2001). Indigenous mucuna tempe as functional food. *Asia Pacific. J. Clin. Nutr.* 10(3): 222-225.
- Haliza, W., Purwani EY, dan Thahir R. (2007). Pemanfaatan Kacang-kacangan local sebagai substitusi bahan baku temped an tahu. *Buletin Teknologi Pasca Panen Pertanian*. 2007: 3
- Hamzah, F., dan Hamzah, F. H. (2011). Kadar Zat Gizi dalam Tempe Bengkuk. *Agriplus*, Vol. 21 N0. 01 Januari 2011, ISSN 0854-0128. 26-29.
- Harris E.L.V., dan Angal S. (1990). Protein purification aplications : a practical approach. IRL Press. Oxford.
- Hartmann R, dan Meisel H.(2007). Food-derived peptides with biological activity :from research to food applications. *Curr Opin Biotechnol.* 18 : 163-169.

- Hermana, M. Karmini, dan D. Karyadi. (1996). Komposisi Gizi Tempe Serta Manfaatnya dalam Peningkatan Gizi Pangan. Dalam Bunga Rampai Tempe Indonesia, Yayasan Tempe Indonesia
- Hidayat, N. (2009). Tahapan proses pembuatan tempe. <http://lecture.brawijaya.ac.id/nurhidayat>. Diakses tanggal 15 Maret 2018.
- Hidayat, Nur, M.C.Padaga dan S.Suhartini.(2006). Mikrobiologi Industri. ANDI. Yogyakarta
- Himaya S .WA, Ryu B, dan Kim. (2012). An active peptide purified from gastrointestinalenzyme hidrolisate of Pasific cod skin gelatin attenuates angiotensin I converting enzyme activity and cellular oxidative stress. *Food Chem* 132 :1872-1882
- Huang WY, Davidge ST, dan Wu J. (2013.) Bioactive natural constituents from food sources potensial use in hypertension prevention and treatment. *Crit Rev Food Sci Nutr*. 53 : 615-630.
- Hui, Y.H . (2004). Handbook of Food Science, Technology, and Engineering Vol.1. CRC Press, Taylor & Francis Group. Boca Raton
- Ibe S, Yoshida K, Kumada K, Tsurushin S, Furusho T, dan Otohe K .(2009). Antihypertensive effects of natto, a traditional Japanese fermented food, in spontaneously hypertensive rats. *Food sci. technol. res*. 15: 199-202.
- Ikasari, L., dan Mitchell, D. A., (1998). Mimicking gas and temperature changes during enzyme production by *Rhizopus oligosporus* in solid-state fermentation. *Biotechnology letters*, Vol. 20, NO. 4. pp. 349-353.
- Iwaniak, A, Minkiewicz, P dan Darewicz, M. (2014). Food - Originating ACE Inhibitors, Including Antihypertensive Peptides, as Preventive Food Components in Blood Pressure Reduction. *Cemprehensive Review in Food Science and Food Safety*. Vol 13.
- Janardhanan K, dan Lakshmanan KK. (1985). Studies on pulse, *Mucuna utilis* : Chemical composition and antinutritional factors. *Journal of Food Science and Technology* 22 (5), 369-371.
- Jansman, A. J. (1996). Bioavailability of proteins in legume seeds. *Grain Legumes (AEP)*, 11, 19.
- Jao, Chia-Ling., Huang, Shih-Li., dan Hsu, Kuo-Chiang. (2012). Angiotensin I- converting enzyme inhibitory peptides: Inhibition

mode, bioavailability, and antihypertensive effects . *Biomedicine* : 130 -136

- Kalidass, C., dan Mahapatra, A. K. (2014). Evaluation of the proximate and phytochemical compositions of an underexploited legume *Mucuna pruriens* var. utilis (Wall ex Wight) LH Bailey. *International Food Research Journal*, 21(1).
- Karmini, M., Sutopo, D., dan Hermana. (1996). Aktivitas enzim hidrolis kapang *Rhizopus* sp pada proses fermentasi tempe. *Penelitian Gizi dan Makanan* 19:93-102.
- Kasmidjo R. B. (1990). Tempe : Mikrobiologi dan Kimia Pengolahan serta Pemanfaatannya. PAU Pangan dan Gizi UGM. Yogyakarta.
- Katzenschlager, R., Evans, A., Manson, A., Patsalos, P. N., Ratnaraj, N., Watt, H., dan Lees, A. J. (2004). *Mucuna pruriens* in Parkinson's disease: a double blind clinical and pharmacological study. *Journal of Neurology, Neurosurgery & Psychiatry*, 75(12), 1672-1677.
- Kitts, D dan Weiler, K. (2003). Bioactive Proteins and Peptides from Food Sources. Applications of Bioprocesses used in Isolation and Recovery. *Curr Pharm.* 9 : 1309-1323.
- Korhonen, H., dan Pihlanto, A. (2006). Bioactive peptides: Production and functionality. *International Dairy Journal*, 16: 945–960.
- Kuba M, Tanaka K, Tawata S, Takeda Y, dan Yasuda M. (2003). Angiotensin I-converting enzyme inhibitory peptides isolated from tofuyo fermented soybean food. *Biosci Biotechnol Biochem* 67: 1278-1283
- Kurniawan, A., Wulandri, S, Yuliana, dan Supriyantini, E. (2012) Pengaruh perebusan dengan abu sekam dan waktu perendaman air terhadap kadar HCN pada buah mangrove. *Journal of Marine Research* (1) :80-87
- Laemmli.(1970). Cleavage of Structural Proteins during the Assembly of the Head of Bacteriophage T4. *Nature*, 227: 680-685.
- Lee, Yun, Seung dan Hu, Jun, Sun. (2017). Antihypertensive peptides from animal products, marine organisms, and plants. *Food Chemistry* 228 : 506–517.
- Lin, H., dan Alashi A.M. (2017). Antihypertensive properties of tilapia (*Oreochromis spp* .) frame and skin enzymatic protein hydrolysates. *Food Nutr. Res.*, 61.

- Maes W, Van Camp J, Vermeirssen V, Hemeryck M, Ketelslegers JM, Schrezenmeir J, Oostveldt PV, dan Huyghebaert A. (2004). Influence of the lactokinin Ala-Leu-Pro-Met-His-Ile-Arg (ALPMHIR) on the release of endothelin - i by endothelial cells. *Regul Pept.* 118(1-2) : 105-109.
- Malaguti M., Dinelli G., Leoncini E., Bregola V., Bosi S., Cicero A.F.G., Hrelia S. (2014). Review : Bioactive peptides in cereals and legume : agronomical, biochemical and clinical aspects. *International Journal of Molecular Sciences.* 15 : 21120-21135.
- Mirdhayati, I., Hermanianto, J., Wijaya, C. H., Sajuthi, D., dan Arihara, K. (2016). Angiotensin converting enzyme (ACE) inhibitory and antihypertensive activities of protein hydrolysate from meat of Kacang goat (*Capra aegagrus hircus*). *Journal of the Science of Food and Agriculture*, 96(10), 3536-3542.
- Muchtadi D. (2004). Komponen bioaktif dalam pangan fungsional. *Gizi Medik Ind.* 3(7) : 4-6.
- Murata K., Ikehata H., Miyamoto T. (1967) Studies on the nutritinional Value of tempeh. *Journal of Food Science.* 32 (5), 580-586
- Murray BA, FitzGerald RJ. (2007). Angiotensin converting enzyme inhibitory peptides derived from food proteins : biochemistry, bioactivity and production. *Curr Pharm Des.* 13 : 773-791
- Muzdalifah, D., Athaillah, Z. A., Nugrahani, W., dan Devi, A. F. (2017). Colour and pH changes of tempe during extended fermentation. In *AIP conference proceedings* (Vol. 1803, No. 1, p. 020036). AIP Publishing.
- Nakajima N, Nozaki N, Ishihara K, Ishikawa A, dan Tsuji H. (2005). Analysis of isoflavone content in tempe, a fermented soybean and preparation of a new isoflavone-enriched tempe. *J Biosci Bioeng* 100: 685-687.
- Natesh, R., Schwagert, L.U., Sylva, Sturrock D. E., dan Archarya, R., K. (2003). Crystal structure of the human angiotensin-converting enzyme–lisinopril complex. *Nature* 421 : 551-554.
- Nielsen, P. M., Petersen, D., dan Dambmann, C. (2001). Improved method for determining food protein degree of hydrolysis. *Journal of food science*, 66(5), 642-646.

- Nout, M.J.R., dan Kiers, J.L. (2005). Tempe fermentation, innovation and functionality: update into third millennium. *Journal of Applied Microbiology* 98: 789–805.
- Nwokolo, E. dan Smartt, J. (1996). *Food and feed from legumes and oilseeds*. London, UK: Chapman & Hall.
- Okamoto A, Hanagata H, Matsumoto E, Kawamura Y, Koizumi Y, dan Yanagida F. (1995). Angiotensin I-converting enzyme inhibitory peptides isolated from tofuyo fermented soybean. *Food. Biosci. biotech. biochem* 59: 1147-1149.
- Owens, J.D. (2014). *Indigenous Fermented Foods of Southeast Asia*. CRC press:New York. Palmer. Trevor. 1991. *Understanding Enzyme Third editon*. Ellis Horword Limited. Great Britain
- Pihlanto L. (2001). Bioactive peptide derived from bovine whey protein : opioid and ACE-inhibitory. *Trends Food Sci Technol.* 11 : 347-356.
- Pohl, T. (1990). Concentration of protein and removal of solute. In : *Guide to protein purification*. Ed.M.P. Deutscher. Academic Press Inc. California.
- Pripp AH. (2005). Initial proteolysis of milk proteins and its effect on formation of ACE-inhibitory peptides during gastrointestinal proteolysis: a bioinformatic, in silico, approach. *Eur food res technol* 221:712–6.
- Puchalska PA. (2014). *Analytical strategies for the characterization, identification and quantification of peptides and proteins of interest in the prevention and understanding of hypertension* [Disertasi]. Madrid (ES): Universitas de Alcalá.
- Pugalenthi, M., Vadivel, V., dan Siddhuraju, P. (2005). Alternative food/feed perspectives of an underutilized legume *Mucuna pruriens* var. utilis— a review. *Plant foods for human nutrition*, 60(4), 201.
- Rokhmah, L.N. (2008) Kajian kadar asam fitat dan kadar protein selama pembuatan tempe koro benguk (*Mucuna pruriens*.) dengan variasi pengecilan ukuran dan lama fermentasi. Skripsi. Fakultas Pertanian. Universitas Sebelas Maret. Surakarta.
- Rusdah. (2016). *Antioxidative Peptides of Tempe from Indonesia*. Thesis. Graduate School Bogor Agricultural University. Bogor.
- Saiga A., Okumura T., Makihara T., Katsuda S., Morimatsu F., dan Nishimura T. (2006). Action mechanism of an angiotensin I-

- converting enzyme inhibitory peptide derived from chicken breast muscle. *Journal of Agricultural and Food Chemistry*. Vol. 54: issue. 3 : 942-945.
- Santosa IG. 1996. Perubahan sensoris dan kimiawi selama terjadinya tempe busuk [disertasi]. Yogyakarta : UGM
- Sewald N, dan Jakobke H. (2009). *Introduction and background in peptides : chemistry and biology 2nd edition*. Weinheim (DE): Willey
- Sher, M.G., Nadeem, M., Syed, Q., Abass, S. dan Hassan, A. (2011). Study on protease from barley tempeh and in vitro protein digestibility. *Jordan Journal of Biological Sciences*. Vol. 4. No. 4. 257-264.
- Siddhuraju, P., Vijayakumari, K. dan Janardhanan, K. (1996). Chemical composition and protein quality of the little-known legume, velvet bean (*Mucuna pruriens* (L.) DC.). *Journal of Agricultural and Food Chemistry*, 44(9), pp.2636-2641.
- Silva R de Barros. (2011). Hypertension and renin-angiotensin system. *Antihypertensive Drug Article*. Sao Paulo (BR): Pharmaceutical Sciences Faculty of Ribeirao Preto FCFRP/USP.
- Sparringa R.A., Kendall M., Westby A, dan Owens J.D. (2002). Effects of temperature, pH, water activity and CO₂ concentration on growth of *Rhizopus oligosporus* NRRL 2710. *Journal of Applied Microbiology*. 92 (2), 329-337.
- Sridhar, K.R, dan Seena, S. (2006). Nutritional and antinutritional significance of four unconventional legumes of the genus *Canavalia* - a comparative study. *Food Chemistry* 99: 267-288.
- Starzyńska-Janiszewska, Stodolak, Bozena., dan Wikiera A. (2015). Proteolysis in tempeh-type products obtained with *Rhizopus* and *Aspergillus* strain from grass pea (*Lathyrus sativus*) seed. *Acta Sci. Pol. Technol. Aliment.* 14(2) : 125–132
- Steinkraus, K.H. (1995). Handbook of Indigenous Fermented Foods, 2nd revised and expanded edn. New York: Marcel Dekker.
- Steinkraus. (2002). Fermentation in world food processing. *Comprehensive reviews in Food Science and Food Safety*. Vol 1, April 2002
- Sturrock D. E., Natesh, R., Rooyen, van, M.J., dan Archarya, R. (2004). Structure of angiotensin I-converting enzyme . *Cell. Mol. Life Sci.* 61 : 2677–2686.

- Thanh, N. V., dan Nout, M. J. R. (2004). Dormancy, activation and viability of *Rhizopus oligosporus* sporangiospores. *International journal of food microbiology*, 92(2), 171-179.
- Valabha, V.S., dan Tiku, P.K. (2013). Antihypertensive peptides derived from soy protein by fermentation. *International Journal of Ppetide Research and Therapeutics*, 20:161-168.
- Wang D, Wang L, Zhu F, Zhu J, Chen XD, Zou L, Saito, M, dan Li L (2008). In vitro and in vivo studies on the antioxidant activities of the aqueous extracts of Douchi (a traditional Chinese salt-fermented soybean food. *Food chem.* 107:1421-1428.
- Wang, L., Saito, M., Tatsumi, E., dan Li, L. (2003). Antioxidative and angiotensin I-converting enzyme inhibitory activities of sufu (fermented tofu) extracts. *Japan Agricultural Research Quarterly: JARQ*, 37(2), 129-132.
- Weng, T. M. dan Chen, M. T. (2011). Effect of two step fermentation by *Rhizopus oligosporus* and *Bacillus substilis* on protein of fermented soybean. *Food Science Technology. Res.* 17 (5). 393-400
- [WHO] World Health Organization. (2013). *Years of healthy life can be increased 5- 10 years.*
<http://www.who.int/mediacentre/releases/pr84/en/>. Diakses 23 Januari 2018
- [WHO] World Health Organization. (2016). *A global brief on hypertension : silent killer, global public health crisis.*
http://who.int/cardiovascular_diseases/publications/global_brief_hypertension. Diakses 23 Januari 2018.
- Winarno, F.G., S. Fardiaz dan D. Fardiaz, (1980). Pengantar Teknologi Pangan. Gramedia Pustaka Utama, Jakarta.
- Winarno, F.G. (1985). Tempe making on various substrates-including unconventional legunes. In *Proceedings, Asian Symposium on Non-salted Soybean Fermentation. Tsukuba, Japan* (pp. 125-141).
- Wu J, dan Aluko RE. (2007). Quantitative structure-activity relationship study of bitter di- and tripeptides including relationship with angiotensin I-converting enzyme inhibitory activity. *J Pept Sci* 13:63-9.
- Zhang JH, Tatsumi E, Ding CH, dan Li LT .(2006). Angiotensin I-converting enzyme inhibitory peptides in Douchi, a Chinese traditional fermented soybean product. *Food chem.* 98: 551-557.