

DAFTAR PUSTAKA

- Ademark, P., A. Varga., V. Harjunpaa., T. Drakenberg., F. Tjerneld., and H. Stalbrand. 1998. Sofwood hemicellulose-degrading enzyme from *A. Niger*; purification and properties of a beta-mannanase. *J. Biotechnol.* 63:199-210.
- Abdolvahab, M.H., F. Jamsid, G. Sara, and S. Majid. 2010. Growth condition optimization of the Iranian Thermophilic *Geobacillus* sp MKK with the aim of characterizing the DNA Polymerase I enzyme and its applications in PCR. *World Applied Sciences Journal II* (3):354-361.
- Aganga, A. A., A. O, Aduku., M, Abdulmalik., and A, Sekoni. 1991. The effect of different protein sources and their levels on the production of breeding rabbits. *Journal of Applied Rabbit Research*, 14: 30-33.
- Amstrong, H. 1993. Nutritional implications of expanded feed. *Feed mix* 1(3): 24-27.
- Angular, A., T. Ingemansson. And E. Magnien. 1998. Extremophile microorganisms as cell factories: support from the European Union. *Extremophiles*, 2: 367-373.
- Akhmaloka, A., S. Suharto., I.N. Nurbaiti. And F.M. Warganegara. 2006. Ribotyping identification of thermophilic bacterium from papandayan crater. *Proc. ITB Eng. Science* 38: 1-10.
- Akino, T., N. Nakamura., and K. Horikoshi. 1988. Characterization of β -mannanase of an alkalophilic *Bacillus* sp. *Agricultural and Biological Chemistry* 52: 1459-1464.
- Aman, P., and H. Graham. 1990. Chemical evaluation of polysaccharides in animal feeds. p. 161-177 in *Feedstuff Evaluation*. J. Wiseman and D. J. A. Cole, ed. University Press, Cambridge, UK.
- Amerah, A.M., C. Gilbert., P.H. Simmins. and V. Ravindran. 2011. Influence of feed processing on the efficacy of exogenous enzymes in broiler diets. *World's Poultry Science journal*, Vol 67: 29-45.
- Andrade, C. 1996. Production and characterization of extremely thermostable xylanolytic enzymes from the hyperthermophilic archaeon *Pyrodictium abyssi*. Hamburg, Germany. Thesis, Technical University Hamburg-Harburg.

- Annison, G., and M. Choct. 1991. Anti-nutritive activities of cereal non-starch polysaccharides in broiler diets and strategies minimizing their effects. *J. World's Poultry Sci.* 47:233-241.
- Araba, M., and N. M. Dale. 1990. Evaluation of protein solubility as an indicator of overprocessing soybean meal. *Poultry Sci.* 69:76-83.
- Araujo, A. and O.P. Ward. 1990. Hemicellulases of *Bacillus* sp: preliminary comparative studies on production and properties of mannanases and galactanases. *J. Appl. Bacteriol.* 68:253-261.
- Aurora, D.D., Y. Lestari., and A. Meryandini. 2003. Identification of mannanase producing bacteria and characterization of the enzyme. *J. Microbiologi Indonesia*, 8(1):31-33.
- Aspinal, G.O. 1970. Polysaccharides. Pergamon Press, New York.
- Bailey, J. E and D.F. Ollis. 1981. *Biochemical Engineering Fundamentals*, New York, USA: McGraw-Hill Inc.
- Balasubramaniam, K. 1976. Polysaccharides of the kernel of maturing and mature coconuts. *Journal of Food Science*, 41: 1370-1373.
- Bedford, M. R., H. I. Clasen, and G. L. Campbell. 1991. The effect of pelleting, salt and pentosanase on the viscosity of intestinal contents and the performance of broilers fed rye. *Poult. Sci.* 70: 1571-1577.
- Bedford, M.R. 2002. The role of carbohydrases in feedstuff digestion. In: J.M. McNab. and K.N. Boorman (eds) *Poultry Feedstuffs*; SuBI Publishing, Wallingford, UK, pp 319-336.
- Bedford, M.R., E. Koepf., M. Lenahan., J. Tuan., and P.E.S. Street. 2003. Relative efficacy of a new thermotolerant phytase in wheat-based diets for broilers. *Poultry Science*, 82 (supplement 1): 149.
- Behnke, K. C. 1994. Factors affecting pellet quality. Maryland Nutrition Conference. Dept. of Poult. Sci and Anim. Sci. College of Agriculture, University of Maryland, College Park.
- Behnke, K. C. 1996. Feed manufacturing technologies: current issues and challenges. *Animal Feed Science and Technology* 62: 49-57.
- Behnke, K. C., and R. Scott Beyer. 2004. Effect of feed processing on broiler performance. PhD. Dissertation, Kansas State University, Manhattan.

- Bergey, D.H., J.G. Holt, N.R. Krieg, and P.H.A. Sneath. 1994. *Bergey's Manual of Determinative Bacteriology* 9th. Baltimore: Williams and Wilkins.
- Booth, I.R. 1985. Regulation of cytoplasm pH in bacteria. *Microbiological reviews. American Society for Microbiology* 49 (4):359-378.
- Bradford, M.M., 1976. A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye-binding. *Analytical Biochem.* 72:248-254.
- Brenes, A., R.R. Marquardt., W. Guenter., and B.A. Rotter. 1993. Effect of enzyme supplementation of the nutritional value of raw, autoclaved, and dehulled lupins (*Lupinus albus*) in chicken diets. *Poult. Sci*, 72: 2281-2293.
- Brock, T. D. 1978. *Biology of Microorganismes*. 2nd. Ed. Prentice hall, Inc Englewood clift. New Jersey.
- Brock, T. D. 1986. Introduction an overview of the thermophiles, in Brock, T. *Thermophiles general molecular and applied microbiology*, John Willey and Sons, New York: 2-15.
- Brown, I. 1996. Complex carbohydrates and resistant starch. *Nut. Rev.* 54: S115-S119.
- Buckeridge, M.S., H.P. Dos Santos., and M.A.S. Tine. 2000. Mobilization of storage cell wall polysaccharides in seeds. *Plant Physiology and Biochemistry* 38:141-156.
- Camire, M.E., A. Camire., and K. Krumhar. 1990. Chemical and nutritional changes in food during extrusion. *Critical Reviews in Food Science and Nutrition* 29: 35-57.
- Capuccino, J. G and N. Sherman. 2005. *Microbiology a Laboratory Manual*. 7th Ed. Pearson education inc. Publishing as Benjamin Cummings. San Fransisco.
- Champell, N.A., J. B. Reece., and L. G. Mitchell. 2000. *Biology*. Fifth Edition. Addison Wesley Longman. California.
- Chandra, M. R. S., Y.S.Lee, I.H. Park, Y. Zhou, K.K. Kim, and Y.L. Choi. 2011. Isolation, purification and characterization of a thermostable α - β -mannanase from *Paenibacillus* sp. DZ3. *J. Korean Soc. Appl. Biol. Chem.* 54 (3): 325-331.
- Chandrasekariah, M., K. T, Sampath., A, Thulasi., and S, Anandan. 2001. In situ protein degradability of certain feedstuff in cattle. *Indian Journal of Anim. Sci.* 71: 261-264..

- Choi, Y. M., H. J. Suh and J. M. Kim. 2001. Purification and properties of extracellular phytase from *Bacillus* sp. KHU-10. *Journal of Protein Chemistry* 20: 287-292.
- Cooney, G. 1999. Challenges and opportunities of post pellet liquid application. *Proceedings Eastern Nutrition Conference*, Ontario, Canada.
- Copeland, R.A. 2000. *Enzymes, a Practical Introduction to Structure Mechanism and data Analysis* (2nd ed.). New York: Wiley-VCH.
- Cowieson, A.J., M. Hruby. And M. Faurschou Isaksen. 2005. The effect of conditioning temperature and exogenous xylanase addition on the viscosity of wheat-based diets and the performance of broiler chicks. *Brit. Poultry Sci.* 46:717-724.
- Daskiran, M., R. G. Teeter., D. Fodge., and H. U. Hsiao. 2004. An evaluation of endo- β D- mannanase (Hemicell) effects on broiler performance and energy use in diets varying in β -mannan content. *Poult. Sci.*, 83: 662-668.
- Daud, M. J., and M. C. Jarvis. 1992. Mannan of oil palm kernel. *Phytochemistry*, 31:463-464.
- Davey, K.R. 1994. Review paper: Modelling the combined effect of temperature and pH on the rate coefficient for bacterial growth. *International Journal of Food Microbiology* 23:295-303.
- Dhawan, S., and J. Kaur. 2007. Microbial Mannanases: an overview of production and applications. *Critical Review in Biotechnology*, 27(4): 197-216.
- Dilworth, M.J, and A.R. Glenn. 1999. Problems of adverse pH and bacterial strategies to combat it. In D.J. Chadwick & G. Cardew (Eds), *Bacterial responses to pH* (pp.4-18). New York: John Willey & Son
- Dingle, J.G. 1995. The use of enzymes for better performance of poultry. In: *Queensland Poultry Science symposium*. The University of Queensland. Gatton.
- Duffaud. G.D., C.M, McCutchen., P. Leduc., K.N, Parker., and R.M, Kelly. 1997. Purification and characterization of extremely thermostable β -mannanase, β -mannosidase, and α -galactosidase from the hyperthermophilic eubacterium *Thermatoga neopolitana* 5068. *Appl. Environ Microbiol.* 63:169-177.
- Dusterhoft, E.M., M.A. Posthonus., A.G.J, Voragen. 1992. Non-starch polysaccharide from sunflower meal and palm kernel meal preparation of cell wall material and extraction of polysaccharide fraction. *J. of Sci of Food and Agriculture.* 59:151-160.

- Dusterhoft, E.M., A.W. Bonte., A.G.J, Voragen. 1993. Solubilisation of non-starch polysaccharide from oil seed meals by and palm kernel meal polysaccharide degrading enzymes. J. of Sci of Food and Agriculture. 63: 211-220.
- El-Helow, E.R., and A.A. El-Khatib. 1996. The development of a *Bacillus subtilis* 168 culture condition for enhanced and accelerated mannanase production. Acta Microbiol. Immunol. Hungarica, 42: 289-299.
- Engberg, R. M., M. S. Hedemann, and B. B. Jensen. 2002. The influence of grinding and pelleting of feed on the microbial composition and activity in the digestive tract of broiler chickens. Br. Poult. Sci, 43: 569-579.
- Elnasser, B., A. Maraqa., W. Owais., and A. Khraisat. 2007. Isolation and characterization of New Thermophilic Bacteria in Jordan. Internet Journal of Microb, 3(2).expression
- Ethier, N., G. Talbot., and J. Sygusch. 1998. Gene cloning, DNA sequencing, and expression of thermostable β -mannanase from *Bacillus stearothermophilus*. Appl environ Microbial 64:4428-4432.
- Everly, C, and J. Alberto. 2000. Stressors, stress and survival: Overview. Front. Biosci. 5: 780-786.
- Falk. D. 1985. Pelleting cost centre. R.R. McElhiney, Ed. Feed Manufacturing Technol III. American Feed Manufacturers Association, Arlington, pp:167-190.
- Fardiaz, S. 1988. Fisiologi Fermentasi. PAU, Pangan Gizi. IPB. Bogor.
- Ferreira, H.M and E.X.F. Filho. 2004. Purification and characterization of β -mannanase from *Trichoderma harzianum* strain T4. Carbohydr. Polym. 57:23-29.
- Friedman, S. M. 1992. Thermophilic Microorganisms. In Encyclopedia of Microbiology. Academic Press.
- Gibbs, M.D., R.A. Reeves., A. Sunna., and P.L. Bergquist. 1999. Sequencing and expression of a β -mannanase gen from the extreme thermophilic *Dictyoglomus thermophilum* Rt46BI, and characteristics of the recombinant enzyme. Curr.Microbiol 39:351-357.
- Gibbs, P.A., R.J. Seviour. And F. Schmid. 2002. Critical Reviews in Biotechnology, 20 (1): 17-48.
- Gibson, G.R., P.B. Ottaway., and R.A. Rastall. 2000. Prebiotic: New development in functional food. Chandos Publish, Oxford. UK.

- Garcia, M., R. Lazaro., M.A. Latorre., M.I. Gracia. G.G. Mateos. 2008. Influence of enzyme supplementation and heat processing of barley on digestive traits and productive performance of broiler. *Poultry Science* 87:940-948.
- Greenwood, M.W., and R.S. Beyer. 2003. Effect of manufacturing practices on nutrient availability and feed quality. *Proceeding of 30th Annual Carolina Poultry Nutrition Conference*, Raleigh, NC. pp:7-16.
- Gubitz, G.M., M. Hayn., G. Urbanz, and W. Steiner. 1996. Purification and properties of an acid β -mannanase from *Sclerotium rolfsii*. *J. Biotechnol.* 45: 165-17.
- Gusmanizar, N. 2006. Purification and Characterization of Acrylamide Degrading Enzyme from *Burkholderia* sp. Strain DR.Y27. *Disertation. Faculty of Biotechnology and Science Biomolecule. Uiversity Putra Malaysia.*
- Haki, G.D and S.K. Rakshit. 2003. Developments in industrially important thermostable enzymes: a review. *Bioresour. Technol.* 89: 17-34.
- Herbert, R and R.Sharp. 1992. *Molecular Biology and Biotechnology of Extremophiles.* Chapman and Hall, New York.
- Hilge, M., S.M, Gloor., W. Rypniewski., O. Sauer., T.D. Heightman., W.Zimmermann., K.Winterhalter., and K. Piontek. 1998. High-resolution native and complex structures of thermostable mannanase from *Thermomonospora fusca*-substrate specificity in glycosil hydrolase family 5. *Structure* 6: 1433-1444.
- Holt, J.G., N.R, Krieg., P.H.A, Sneath., J.T, Staley., and S.T, Williams. 1994. *Bergey's Manual of Determinative Bacteriology.* 9th Ed. Baltimore:Williams and Wilkins.
- Hossain, H.Z., J. A. Abe., and S, Hizukuri. 1996. Multiple forms of β -mannanase from *Bacillus* sp. KK01. *Enzyme Microb. Technol.* 18: 95-98.
- Inbarr, J., and M. R. Bedford. 1994. Stability of feed enzymes to steam pelleting during feed processing. *Anim. Feed Sci. Technol.* 46: 179-196.
- Ishihara, N., D. C. Chu., S. Akachi., andL. R. Juneja. 2000. Preventive effect of partially hydrolysed guar gum on infection of *Salmonella enteritidis* in young andlaying hens. *Poult. Sci.* 79:689-697.
- Jackson, M.E., D.W. Fodge., and H.Y. Hsiao. 1999. Effects β -mannanase in corn soybean meal diets on laying hen performance. *Poultry Science*, 7: 1737-1741.

- Jensen, L.S. 2000. Influence of pelleting on the nutritional needs of poultry. *Asian-Aust. J. Anim. Sci*, 13: 35-46.
- Jiang, Z.Q, Y. Wei, D. Li, L. Li, P. Chai and I. Kusakake. 2006. High-level production, purification and characterization of a thermostable β -mannanase from the newly isolated *Bacillus subtilis* WY34. *Carhyd. Poly*. 66:88-96.
- Jones, F.T., K.E. Anderson., and P.R. Ferket. 1995. Effect of extrusion on feed characteristics and broiler chicken performance. *Journal of Applied Poultry Research* 4; 300-309.
- Jung, K., G. Bitton. And B. Koopman. 1995. Assessment of urease inhibition assays for measuring toxicity of environmental samples. *Water Reseach* 29: 1929-11933.
- Kanjasnavas. P., P. Khawsak, A. Pakpitcharoen, S. Areekit, T. Sriyaphai, K. Pothivejkul, S. Santiwatanakul, K. Matsui, T. Kajiwara, and K. Chasiri. 2009. Over-expression and characterization of the alkalophilic, organic solvent-tolerant, and thermotolerant endo-1,4-mannanase from *Bacillus licheniformis* isolate THCM 3.1. *Science Asia* 35:17-23.
- Kataoka, N., and Y. Tokiwa. 1998. Isolation and characterization of an active mannanase-producing anaerobic bacterium *Clostridium tertium* KT-5A, from lotus soil. *J. Appl. Microbiol* 84: 357-367.
- Kanzoh, A.I., and Z.A. Nagieb. 2004. Xylanase and mannanase enzymes from *Sreptomycetes galbus* NR and their use in biobleaching of softwood kraft pulp. *Antonie Van Leeuwenhock*, 85: 103-114.
- Khanongnuch, C., K. Asada., H. Tsuruga., T. Ooi., S. Kinoshita., and S. Lumyong. 1998. β -mannanase and xylanase of *Bacillus subtilis* 5H active for bleaching of crude pulp. *J. Ferment. Boeing*, 5: 461-466.
- Khanongnuch, C., C. Sa-nguansook., and S. Lumyong. 2006. Nutritive quality of mannanase treated copr meal in broiler diets and effectiveness on some fecal bactria. *International Journal of Poultry Science* 5(11): 1087-1091.
- Klingeberg, M., B.Galunsky., C.Sjoholm., V.Kasche., G.Antranikian. 1995. Purification and Properties of a Highly Thermostable.Sodium Dodecyl Sulphate-Resistantand Stereospesific Proteinase from the Extreamly Thermophilic Archaeon *Thermococcus stetteri*. *Appl. Environ. Microbiol.*61(8):3098-3104.
- Knudsen, K.E.B. 1997. Carbohydrate and lignin contents of plant materials use in animal feeding. *Feed. Sci. Technol*, 67: 319-338.

- Kote, N.V., A.G.G, Patil., and V.H, Mulimani. 2009. Optimization of the production of thermostable endo- β -mannanases from a newly isolated *Aspergillus niger* gr and *Aspergillus flavus* gr. Appl Biochem Biotechnol. 152:213-223.
- Kumar, S., R. Nussinov. 2001. How do thermophilic protein deal with heat ?. A review. Cell. Mol. Life. Sci. 58: 1216-1233.
- Kusakabe, L., and R. Takashi. 1988. Enzymatic preparation β -1,4-glucomannooligosaccharides. Methods in Enzymology, 160: 377-380.
- Lan, G.Q., Y. W. Ho and N. Abdullah. 2002. *Mitsuokella jalaludinii* sp. nov., from the rumens of cattle in Malaysia. International Journal of Systematic and Evolutionary Microbiology 52: 713–718.
- Leeds, A.R., S.S, Kang., A.G, Low., and I.E, Sambrook. 1980. The pig as a model for studies on the mode of action of guar gum in normal and diabetic man. Proceedings of the Nutrition Society 39, 44.
- Leuschner. C.and G. Antranikian. 1995. Heat-stable enzyme from extremely thermophilic and hyperthermophilic microorganisms. World. J. Microbiol. Biotechnol 11: 95-114.
- Li, Y., P, Yang., K, Meng., Y, Wang., H, Luo., N,Wu., Y, Fan., and B, Yao. 2008. Gene cloning, expression, and characterization of a novel β -mannanase from *Bacillus circulans* CGMCC 1416. J. Microbiol Biotechnol. 18: 160-166.
- Lin, S., W.F. Dou., H.Y. Xu., H.Z. Li., Z.A.Xu., and Y.H. Ma. 2007. Optimazation of medium composition for the production of alkaline β -mannanase by alkaliphilic *Bacillus* sp N16-5 using response surface methodology. Appl. Microbiol. Biotechnol, 75: 1015-1022.
- Lin, C., and T. Chen. 2004. Enhanced Mannanase Production by Submerged Culture of *Aspergillus niger* NCH-189 Using Defatted Copra Based Media. Process Biotechnol, 39: 1103-1109.
- Luis, E.B. 2000. Use of hemicell in palm kernel meal rations to improve broiler performance. In: Hemicell feed enzyme-Field and Penn trial data for swine, broilers, ducks, laying hens and turkeys, pp: 43-45. Chemgen, U.S.A.
- Luis, E.B. 2000. Use of Hemicell in copra meal rations to improve broiler performance. [Http://www.chemgen.com/coprameal.html](http://www.chemgen.com/coprameal.html).
- Lundqvist, J., A. Teleman., L. Junel., G. Zaachi., O. Dahlman., F. Tjerneld., and H. Stålbrand. 2000. Isolation and characterization of galactoglucomannan from Spruce (*Picea abies*). Crbohydr. Polym 48(1): 29-39.

- Luthi, E., N.B, Jasmat., R.A, Grayling., D.R, Love., and P.L, Bergquist. 1991. Cloning, sequence analysis, and expression in *Escherichia coli* of a gene coding for β -mannanase from the extremely thermophilic bacterium *Caldocellum saccharolyticum*. *Appl Environ Microbiol.* 57:694-700.
- Ma, Y., Y. Xue., Y. Dou., Z. Xu., W. Tao., and P. Zhou. 2004. Characterization and gene cloning of a novel β -mannanase from alkaliphilic *Bacillus sp.* N16-5. *Extremophiles* 8, 447-454.
- Mabrouk, M.E.M and A. M. D. El-Ahwany. 2008. Production of β -mannanase by *Bacillus amylolequifaciens* 10A1 cultured on potato peels. *African Journal of Biotechnology.* Vol.7 (8),pp 1123-1128.
- Mateos, G.G., R. Lazaro. and M.I. Gracia. 2002. The feasibility of using nutritional modifications to replace drugs in poultry feeds. *Journal of applied Poultry Research* 11:437-452.
- Madigan, M.T. and B.L. Marss. 1977. *Extremophiles*. *Journal Science American* 276: 66-71.
- McCleary, B.V. 1988. Synthesis of β -D-mannopyranosides for assay of β -D-mannosidase and exo- β -D-mannanase. *Methods in Enzymol.* 160:515-518.
- McCutchen, C. M., G.D. Duffaud., P. Ledue., A.R.H. Peters on., A. Tayal., S.A. Khan, and R.M. Kelly. 1996. Characterization of extremely thermostable enzymatic breaker (α -1,6-Galactosidase and β -1,4-Mannanase) from the hyperthermophilic Eubacterium *Thermatoga neopolitana* 5068 for hydrolysis of guar gum. *Biotechnol. Bioeng.* 52: 332-339.
- McNaughton, J. 2002. Improvement of energy utilization. In: Hemicell feed enzyme-Field and Penn trial data for swine, broilers, ducks, laying hens and turkeys, pp: 14-17. Chemgen, U.S.A.
- Mendoza, N.S., M. Arai., T. Kawaguchi., F.S. Cubol., E.G. Panerio., and T. Yoshida. 1994. Isolation of mannan-utilizing bacteria and the culture conditions for mannanase production. *World J. Microbiol. Biotechnol.* 10: 51-54.
- Mendoza, N.S., M. Arai., T. Kawaguchi., T. Yoshida., and L.M, Joson. 1994b. Purification and properties of mannanase from *Bacillus subtilis*. *World.J. Microbiol Biotechnol* 10: 551-555.
- Meenakshi, G. Singh, A. Bhalla, and G.S. Hoondal. 2010. Solid state fermentation and characterization of partially purified thermostable mannanase from *Bacillus sp.* MG-33. *Bioresources. Com.*

- Montiel, M.D., M. Hernandez., J. Rodrigues., and M.E,Arias. 2002. Evaluation of an endo- β -mannanase produced by *Sreptomycetes ipomoea* CECT 3341 for the biobleaching of pinekraft pulps. *Appl. Micbiol. Biotechnol.* 58: 67-72..
- Nakajima. T., K.M, Shyamal., E.B, Clinton. 1976. An Endo- α 1-6-D-mannanase from a soil bacterium. *J. Biological Biochemistry.* Vol, 251(1):174-181.
- Nir, I., and R. Hillel. 1995. Effect of particle size on performance. Grinding pelleting interactions. *Poult. Sci.* 74;771-783.
- Nissinen, V. 1994. Enzymes and processing: The effects and interactions of enzymes and hydrothermal pre-treatments and their contribution to feeding value. *Int. Milling Flour and Feed.*
- Nunes, F. M., A, Reis., M. R, Domingues., and M. A, Coimra. 2006. Characterization of galactomannan derivatives in roasted coffee beverages. *Journal of Agricultural and Food Chemistry* 54 (9): 3428-3439.
- Ooi, T. And D. Kikuchi. 1995. Purification and some properties of β -mannanase from *Bacillus* sp. *World J. Microbiol. Biotechnol.* 11:310-314.
- Pedersen, G., H.A. Hangen., L. Asferg., and E. Sorensen. 1995. Removal of printing paste thickener and excess dye after textile printing. Patent Novo Nordisk A/S, 5405414.
- Peisker. M. 1994. Influence of expansion on feed component. *Feed Mix*, 2: 26-31.
- Peisker, M. 2006. Feed processing-impacts on nutritive value and hygienic status in broiler feeds. *Processings of the Australian Poultry Science Symposium* 18: 7-16.
- Pelczer, M. J. J., dan E. C. S. Chan. 1986. *Dasar-dasar mikrobiologi*. Terjemahan R. S Hadioetomo T. Tjirosomono. UI. Press, Jakarta.
- Petty, L. A., S. D, Carter., B. W. Senne., and J. A, Shriver. 1999. Effects of Hemicell[®] addition to nursery diets on growth performance of weanling pigs. *Journal. Anim. Sci.* 77:195 (Abstr).
- Phothichitto.K., S. Nitisinprasert, and S. Keawsompong. 2006. Isolation, screening and identification of mannanase producing. *Kasetsart. J.(Nat.Sci)* 40:26-38.
- Pickford, J.R. 1992. Effects of processing on the stability of heat labile nutrients in animal feeds. P:177-192 in: *Recent advances in animal nutrition*. P.C. Garnsworthy, W. Haresign, D.J.A, ed. Butterworth-Heinemann, Oxford, U.K.

- Politz, O., M. Krah., K.K. Thomsen., and R. Borriss. 2000. A highly thermostable endo-(1,4)- β -mannanase from the marine bacterium *Rhodothermus marinus*. *J. Appl. Microbiol Biotechnol* 53:715-721.
- Puchart, V., M. Vrsanska., P. Svoboda., J. Pohl., Z.B. Ogel .,and P. Biely. 2004. Purification and characterization of two forms of endo- β -1-4-mannanase from a thermotolerant of fungus, *A. Fumigatus* IMI 385708 (formerly *Thermomyces lanuginosus* IMI 158749). *Biochem. Biophys. Acta* 1674:239-250.
- Panda, A. K., and A. Kumar. 2006. Non-starch polysaccharides in poultry diets and counteracting their effects through enzymes supplementation. Project Directorate on Poultry Rajendranagar, Hyderabad-30.
- Puls, J., and J. Schuseil. 1993. Chemistry of hemicelluloses: relationship between hemicellulose structure and enzymes required for hydrolysis. In: *Hemicellulose and Hemicelluloses*. Coughland, MP and GP.Hazell (Eds), pp. 1-28.
- Sabini, E., K.S. Wilson., S. Matti., C. Boisset., and H. Chanzy. 2000. Digestion of single crystal of mannan I by an endo-mannanase from *T. reesei*. *European.J. of Biochemistry*, 267: 2340-2344.
- Sachtlehner, A., and D. Haltrich. 1999. Purification and some properties of a thermostable acidic endo β -1,4-D-mannanase from *Sclerotium roolfsii* (Athelia). *FEMS Microbial. Lett*, 177(1): 47-55.
- Saki, A.A., M.T. Mazugi., A. Kamyap. 2005. Effect of mannanase on broiler performance, ileal and in-vitro protein digestibility, uric acid and litter moisture in broiler feeding. *International Journal of Poultry Science* 4(1): 21-26.
- Samarasinghe, K., R. Messikommer. And C. Wenk. 2000. Activity of supplemental enzymes and their effect on nutrient utilization and growth performance of growing chickens as affected by pelleting temperature. *Archives of Animal Nutrition* 53:45-58.
- Sambrook, I.E., and A.L. Rainbird. 1985. The effect of guar gum level and source of dietary fat on glucose tolerance in growing pigs. *British Journal Science*. 46:602-606.
- Santoso, U., K. Kubok., T. Ota., T. Tadokoro. And A. Maekawa. 1996. *Food Chemistry*. 57(2):299-304.

- SAS Institute. 1998. Statistical Analysis System user's guide (7th. ed). SAS Institute Inc. Cary, N. C. USA.
- Saunders, R. M., H.G. Walker, and G. O. Kohler. 1969. Aleuron cells the digestibility of wheat mill feeds. *Poult. Sci*, 48: 1497-1503.
- Scheideler, S. E. 1991. Pelleting is important for broiler. Proceeding of the North Carolina Poultry Nutrition Conference, Carolina Feed Industry Association, Sanford, NC.
- Scopes, R.K. 1994. Protein Purification, Principles and Practice (3rd ed.). New York. Springer-Verlag.
- Sekoni, A.A., J.J. Omage., G.S. Bawa., and P.M, Esuga. 2008. Evaluation of enzyme (Maxigrain®) treatment of graded levels of palm kernel meal (PKM) on nutrient retention. *Pakistan Journal Nutrition* 7(4):614-619.
- Shanab, R. A. I. A. 2007. Characterization and 16S rDNA identification of thermo-tolerant bacteria isolated from hot spring. *Journal of Applied Sciences Research* 3(10) : 994-1000.
- Sibbald, I. R. 1976. A bioassay for true metabolizable energy in feedingstuffs. *Poult. Sci*. 55:303-308.
- Silversides, F.G and M.R. Bedford. 1999. Effect of pelleting temperature on the recovery and efficacy of a xylanase enzyme in wheat-based diets. *Poultry Sci*. 78:1184-1190.
- Singh, S. P. 2006. Extreme Environments and Extremophiles. In National Science Digital Library (CSIR): Book *Environmental Microbiology*. CSIR, India: 1-35.
- Shukor, Y., N.A. Baharom., F.A. Rahman., M.P. Abdullah., N. Shmaan. And M.A. Syed. 2006. Development of a heavy metals enzymatic-based assay using papain. *Analytica Chimica Acta*. In Press, Corrected Proof.
- Somogyi, N. 1944 Notes on sugar determination. *J. Biol. Chem*, 19-23.
- Spring, P., K. E. Newman., C. Wenk., R. Messikommer., and M. Vukic Vranjes. 1996. Effect of pelleting temperature on the activity of different enzymes. *Poult. Sci*, 75: 357-361.
- Steel, R. G. D., and J. H. Torrie. 1980. Principles and Procedures of Statistics. McGraw-Hill Book Company, New York.
- Stetter, K.O. 1996. Hyperthermophiles in the history of life. *Ciba Foundation Symposium*, 202: 1-10..

- Stetter, K.O. 1999. Extremophiles and their adaptation to hot environment. *FEBS Lett.* 452:22-25.
- Stoll, D., H. Stålbrand., and R.A.J. Warren. 1999. Mannan-degrading enzymes from *Cellulomonas fimi*. *Appl. Environ. Microbiol* 65: 2598-2605.
- Sudarmaji, S. Bambang, H. Suhardi. 1984. *Prosedur Analisa Untuk Bahan Makanan dan Pertanian*, Yogyakarta.
- Suhartono, M.P. 1989. *Enzim dan Bioteknologi*. PAU Bioteknologi IB. Bogor.
- Sumardi., S. Antonius., T. Maggy, and P. Tresnawati. 2005. Isolation and characterization of mannanolytic thermophilic bacteria from palm oil shell and their mannase enzyme production properties. *Biotropia* No. 25:1-10.
- Sumardi., S. Antonius., T.S. Maggy, and P. Tresnawati. 2006. Purification and characterization of extracellular β -mannanase from a thermophilic bacterium, *Geobacillus stearotherophilus* L-07. *Journal Mikrobiologi Indonesia*. p:57-62. ISSN 0853-358X.
- Sun, C.W., Z.W Chen., Z.G. He., P.J. Zhou., and S.J. Liu. 2003. Purification and properties of the sulfur oxygenase/reductase from the acid acidothermophilic archaeon, *Acidianus* strain 55. *Extremophiles*. 7: 131-134.
- Sundu, B., A. Kumar., J. Dingle. 2006. Response of broiler chick fed increasing levels of copra meal and enzymes. *International Journal of Poultry Science* 5(10): 13-18.
- Svihus, B. 2006. The rule of feed processing of gastrointestinal function and health in poultry, in Perry. G.C. (ed) *Avian gut function in health and disease*, pp 183-194 (CAB International, Wallingford, UK).
- Talbot, G and J, Sygusch. 1990. Purification and characterization of thermostable β -mannanase and α -galactosidase from *Bacillus stearotherophilus*. *Appl Environ Microbiol*. 56: 3305-3510.
- Takeda,N., K.Hirasawa., K.Uchimura., Y.Nogi., Y.Hatada., R.Usami., Y. Yosida., and W.D, Grant. 2004. Purification and enzymatic properties of a highly alkaline mannanase from alkaliphilic *Bacillus* sp. strain JAMB-750. *J. Biol. Macromol*. 4: 67-74.
- Takashi. R. I. Kusakabe., H. Kobayashi., K. Murakami., A. Maekawa., anf T. Suzuki. 1984. Purification and some properties of mannanase from *Sterptomyces* sp. *agriculture and Biological Chemistry*, 48: 2189-2195.

- Teves, F.G., A.F. Zamora, M.R. Calapardo, and E. S. Luis. 1989. Nutritional value of copra meal treated with bacterial mannanase in broiler diets. *Philippine Agri.* 72: 7-14.
- Thomas, M., T.V. Vliet. And A.F.B. Van Der Poul. 1998. Physical quality of pelleted animal feed 3. Contribution of feedstuff component. *Animal Feed Science and Technology* 70: 59-78.
- Titapoka, S., S. Keawsompong., D. Haltrich., S. Nitisinprasert. 2008. Selection and characterization of mannanase-producing bacteria useful for the formation of prebiotic mannooligosaccharides from copra meal. *World. J. Microbiol and Biotetchnol.* Vol.24:1425-1433.
- Torrie, J.P., D.J. Senior., and J.N. Saddler. 1990. Production of β -mannanase by *Trichoderma harzianum* E58. *Appl. Microbiol, Biotechnol.* 34:303-307.
- Tucker, G.A. 1995. Fundamentals of enzyme activity. In Tucker and Wood (Eds.). *Enzyme in Food Processing.* Chapman and Hall. India.
- Ulusu, N.N. and E.F.Tezcan. 2001. Cold Shock Proteins. *Turkish Journal of Medical Science*, 31:283-290.
- Van de Burg, B. 2003. Extremophiles as a source for novel enzymes. *Current Opinion in Microbiol*, 6: 213-218.
- Van Soest, P. J., and R. H, Wine. 1967. Use of detergentin the analysis of fibrous feed. IV. Determination of plant cell wall constituents. *J. Assoc. Anal. Chem.* 50: 50-55.
- Vohra, A., and T. Satyanarayana. 2002. Purification and characterization of a thermostable and acid stable phytase from *Pichia anomala*. *World journal of microbiology ang biotechnology* 18 : 687-691.
- Voragen, A.G.J., H. Gruppen., G.J.P. Marsman., and A.J. Mul. 1995. Effect of some manufacturing technologies on chemical, physical and nutritional properties of feed. In: Gamsworthy, P.C and Cole, D.J.A. (eds), *Recent advances in Animal Nutrition*, University of Nottingham, Feed Manufacturers Conference. Nottingham University Press, pp: 93-126.
- Warren, R.A.J. 1996. Microbial hydrolysis of polysaccharides. *Annual Review of Microbiology*, 50: 183-212.
- Woo, K.H., O. K Young., H. L Jeong., K. K Kyung., J. K Yung. 2003. Isolation and charaterization of a phytase with improved properties from *Citrobacter braakii*. *Biotechnology*.

- Wood, J.F. 1987. The functional properties of feed raw materials and their effect on the production and quality of feed pellets. *Anim. Feed and Technol*, 18: 1-17.
- Yang, Z.B., W.R. Yang., S.Z. Jiang., G.G. Zhang., Q.Q. Zhang., and K.C. Siow. 2010. Effects of thermotolerant multi-enzyme product on nutrient and energy utilization of broilers fed mash or crumbled corn-soybean meal diets. *J. Appl. Poult. Res.* 19:38-45.
- Yoshida, S., C.H. Tan., T. Turakainen., and L. Kusakabe. 1997. Substrate specificity of galactosidase from yeasts. *Bioscience, Biotechnology and Biochemistry*, 61: 359-361.
- Youssef. A.S., M.Y. El-Naggar., S.A. El-Assar., and E.A. Beltagy. 2006. Optimization of cultural conditions for beta-mannanase production by a local *A. niger* isolate. *International Journal of Agricultur & Biology*, 08:539-545.
- Zakaria, M.M., M. Ashiuchi., S. Yamamoto., and T. Yagi. 1998. Optimization for β -mannanase production of a psychrophilic bacterium, *Flavobacterium* sp. *Biocsi. Biotechnol. Biochem.* 62:655-660.
- Zhang, Y., J. Ju., and H. Peng. 2008. Biochemical and structure characterization of the intracellular mannanase AaManA of *Alicyclobacillus acidocaldarius* reveals a novel glycoside hydrolase family belonging to clan GH-A. *Journal of Biological Chemistry*. 283(46).
- Zelenka. J. 2003. Effect of pelleting on digestibility and metabolizable energy values of poultry diet. *Czech J. Anim. Sci.*, 48 (6): 239-242.
- Zigger, D. 2003. Die determines pellet production. *Feed Technol*, 7: 17-19.

