



## DAFTAR PUSTAKA

- Aehle W., dan Misset O. 1999. *Biotechnology*. 2<sup>nd</sup>ed. Wiley-VCH, Jerman.
- Anonim. 2017. Gene amyE *Bacillus subtilis* 168.  
<https://biocyc.org/gene?orgid=BSUB&id=BSU03040>. Diakses pada 26 Mei 2017.
- Asoodeh, A., S. Emtenani, S. Emtenani, R. Jalal, dan M.R. Housaindokht. 2014. Metagenomics of marine and mangrove sediments. *Journal of Molecular Catalysis* 99 : 114–120.
- Ayusawa, D., Yoneda Y., Yamane K., dan Maruo B. 1975. Pleiotropic phenomena in autolytic enzyme(s) content, flagellation, and simultaneous hyperproduction of extracellular alpha-amylase and protease in a *Bacillus subtilis* mutant. *Journal of Bacteriology* 124 : 459-69.
- Azad, M.A., Bae J.H., Kim J.S., Lim J.K., Song K.S., Shin B.S., dan Kim H.R. 2009. Isolation and characterization of a novel thermostable alpha-amylase from Korean pine seeds. *Journal of Biotechnology* 26 : 143–149.
- Bergmans, H.E.N., I. M. Van Die, dan W. P. M. Hoekstra. 1981. Transformation in *Escherichia coli*: stages in the process. *Journal of Bacteriology* 564-570.
- Bezzera, C.A., L.L.P. Macedo, T.M.L. Amorim, V.O. Santos, R.R. Fragoso, W.A. Lucena, A.M. Meneguim, A. Valencia-Jimenez, G. Engler, M.C.M. Silva, E.V.S. Albuquerque, dan M.F. Grossi-de-Sa. 2014. Molecular cloning and characterization of an  $\alpha$ -amylase cDNA highly expressed in major feeding stages of the coffee berry borer, *Hypothenemus hampei*. *Gene* 553 : 7–16.
- Burhan A., Nisa U., Gokhan C., Omer C., dan Ashabil A. 2003. Enzymatic properties of a novel thermophilic, alkaline and chelator resistant amylase from an alkaliphilic *Bacillus* sp. Isolate ANT-6. *Process Biochemistry* 38 : 1397–1403.
- Buisson G., Duée E., Haser R., dan Payan F. 1987. Three dimensional structure of porcine pancreatic alpha-amylase at 2.9 Å resolution, role of calcium in structure and activity. *EMBO Journal* 6 (13):3909-16.
- Campbell-Platt, G. 1994. Fermented foods – a world perspective. *Food Research International* 27: 253–257.
- Chen, Jing., Xianghua Chen, Jun Dai, Guangrong Xie, Luying Yan, Lina Lu, dan Jianhua Chen. 2015. Cloning, enhanced expression and characterization of an  $\alpha$ -amylase gene from a wild strain in *B. subtilis* WB800. *International Journal of Biological Macromolecules* 80 : 200–207.



- Das S., Singh S., Sharma V., dan Soni ML. 2011. Biotechnological applications of industrially important amylase enzyme. *International Journal of Pharmacy Biology Science* 2(1) : 486–496
- Demirci, A., Gulden Izmirlioglu, dan Duygu Ercan. 2014. *Food Processing: Principles and Applications*. John Wiley & Sons, AS.
- Demirkan, E.S., B. Mikami, M. Adachi, T. Higasa, dan S. Utsumi. 2005.  $\alpha$ -Amylase from *B. amyloliquefaciens*: purification, characterization, raw starch degradation and expression in *E. coli*. *Process Biochemistry* 40 (8) : 2629–2636.
- Donald, J.E., Kulp D.W., DeGrado W.F. 2011. Salt bridges: geometrically specific, designable interactions. *Proteins: Structure, Function, and Bioinformatics* 79: 898–915.
- Effio, P.C., E.F. Silva, dan M.T. Pueyo. 2000. A simple and rapid method for screening amylolytic bacteria. *Biochemical Education*, 28 : 47-49.
- Ferrari E., Jarnagin A.S., dan Schmidt B.F. 1993. *Bacillus subtilis* and Other Gram-Positive Bacteria: Biochemistry, Physiology, and Molecular Genetics. John Wiley & Sons, AS.
- Gabrisko M., dan Janecek S. 2009. Looking for the ancestry of the heavy-chain subunits of heteromeric amino acid transporters rBAT and 4F2hc within the GH13 alpha-amylase family. *FEBS Journal* 276(24):7265-78.
- Gasteiger E., Hoogland C., Gattiker A., Duvaud S., Wilkins M.R., Appel R.D., dan Bairoch A. 2005. *The Proteomics Protocols Handbook*. Humana Press, AS.
- Godfrey T., dan West S. 1996. *Industrial Enzymology*. 2<sup>nd</sup>ed. Stockton Press, AS.
- Garitty, G. M., J. A. Bell, dan T. G. Lilburn. 2013. *Taxonomic Outline of the Prokaryotes : Bergey's Manual of Systematic Bacteriology*. Springer-Verlag, AS.
- Gupta, R., Gigras, P., Mohapatra, H., Goswami, V.K., dan Chauhan, B. 2003. Microbial  $\alpha$ -amylases: a biotechnological perspective. *Process Biochemistry* 38 : 1599 – 1616
- Gupta, M., dan K. Krishnamurthy. 2014. Phosphorylation of DegU is essential for activation of amyE expression in *Bacillus subtilis*. *Journal of Bioscience* 39(5) : 747–752.
- Harwood, C.R. 1992. *Bacillus subtilis* and its relatives: molecular, biological and industrial workhorses. *Trends Biotechnology* 10 : 247–256
- Henrissat, B. 1991. A classification of glycosyl hydrolases based on amino acid sequence similarities. *Journal of Biochemistry* 280 : 309–316.



- Isoda Y, Shimizu Y, Hashimoto A, Fujiwara H, Nitta Y, dan Kagemoto A. 1992. Mechanism of hydrolyses of phenyl alpha-maltosides catalyzed by taka-amylase A. Journal Biochemistry 111(2):204-9.
- Iulek, J., Franco, O.L., Silva, M., Slivinski, C.T., Bloch, C. Jr., Rigden, D.J., dan Grossi de Sa, M.F. 2000. Purification, biochemical characterisation and partial primary structure of a new alpha-amylase inhibitor from *Secale cereale* (rye). *International Journal Biochemistry Cell Biology* 32 : 1195- 1204.
- Jacob, J., H. Duclohier, dan David S. C. 1999. The role of proline and glycine in determining the backbone flexibility of a channel-forming peptide. *Biophysical Journal*, 76 : 1367–1376.
- Janecek, S. 2002. How many conserved sequence regions are there in the a-amylase family. *Biologia (Bratislava)*, 57 : 29–41.
- Jeong-Ho Kim, Young-Ki Yang dan Glenn H. 2005. Evidence that *Bacillus* catabolite control protein CcpA interacts with RNA polymerase to inhibit transcription. *Molecular Microbiology* 56(1) : 155–162.
- Kandra, L. 2003.  $\alpha$ -Amylases of medical and industrial importance. *Journal of Molecular Structure (Theochem)* 666–667.
- Kanno, M. 1986. A *Bacillus acidocaldarius*  $\alpha$ -amylase that is highly stable to heat under acidic conditions. *Agricultural and Biological Chemistry* 50 : 23-31
- Kelly RM, Leemhuis H, dan Dijkhuizen L. 2007. Conversion of a cyclodextrin glucanotransferase into an alpha-amylase: assessment of directed evolution strategies. Biochemistry 39:11216-22.
- Kim J.H., Guvener Z.T., Cho J.Y., Chung K.C., dan Chambliss G.H. 1995. Specificity of DNA binding activity of the *Bacillus subtilis* catabolite control protein CcpA. *Journal of Bacteriology* 117 : 5129-34.
- Kimura A., dan Chiba S. 1983. Quantitative study of anomeric forms of maltose produced by  $\alpha$ - and  $\beta$ -amylases. *Agricultural and Biological Chemistry* 47(8): 1747-53.
- Konsoula, Z., dan Liakopoulou-Kyriakides, M. 2007. Co-production of alpha-amylase and beta-galactosidase by *Bacillus subtilis* in complex organic substrates. *Bioresource Technology* 98 : 150-157.
- Kuriki, T., H. Hondoh, dan Y. Matsuura. 2005. The conclusive proof that supports the concept of the a-amylase family: structural similarity and common catalytic mechanism. *Biologia (Bratislava)*, 60 : 13–16.
- MacGregor, E.A. 2005. An overview of clan GH-H and distantly-related families. *Biologia (Bratislava)*.



- MacGregor EA, Janecek S, dan Svensson B. 2001. Relationship of sequence and structure to specificity in the alpha-amylase family of enzymes. *Biochimica Et Biophysica Acta* 1546(1):1-20.
- Marchler-Bauer A, Derbyshire MK, Gonzales N.R, Lu S, Chitsaz F, Geer L.Y, Geer R.C, He J, Gwadz M, Hurwitz D.I, Lanczycki C.J, Lu F, Marchler G.H, Song J.S, Thanki N, Wang Z, Yamashita R.A, Zhang D, Zheng C, Bryant S.H. 2015. CDD: NCBI's conserved domain database. *Nucleic Acids Research*.
- Mikami S., Iwano K., Shinoki S., dan Shimada T. 1987. Purification and some properties of acid-stable  $\alpha$ -amylases from Shochu koji (*Aspergillus kawachii*). *Agricultural and Biological Chemistry* 51 : 2495-2501.
- Mishra S., Noronha S.B., dan Kumar G.K.S. 2005. Increase in enzyme productivity by induced oxidative stress in *Bacillus subtilis* cultures and analysis of its mechanism using microarray data. *Process Biochemistry* 40 : 1863–1870
- Muralikrishna, G. dan Nirmala, M. 2005. Cereal  $\alpha$ -amylases – an overview. *Carbohydrate Polymers* 60 : 163-173.
- Nielsen, J.E., dan Borchert, T.V. 2000. Protein engineering of bacterial alpha-amylases. *Biochimica Et Biophysica Acta* 1543 : 253-274.
- O'Farrell, P.H. 1975. High Resolution two-dimensional electrophoresis of proteins. *Journal Biological Chemistry* 250(10): 4007–4021.
- Okstad, O. A. dan A. Kolsto. 2011. *Genomics of Foodborne Bacterial Pathogens: Food Microbiology and Food Safety*. Springer, Jerman.
- Pandey, A., Nigam, P., Soccol, C.R., Soccol, V.T., Singh, D., dan Mohan, R. 2000. Advances in microbial amylases. *Biotechnology and Applied Biochemistry* 31 :135-152.
- Payan, F. 2004. Structural basis for the inhibition of mammalian and insect alpha-amylases by plant protein inhibitors. *Biochimica Et Biophysica Acta* 171-180.
- Puspasari, F., O. K. Radjasa, dan A. S. Noer. 2013. Raw starch degrading  $\alpha$ -amylase from *Bacillus aquimaris* MKSC 6.2: isolation and expression of the gene, bioinformatics and biochemical characterization of the recombinant enzyme. *Journal of Applied Microbiology* 114 (1) : 108–120
- Qureshi, A.S. 2012. Production of pectinase by *Bacillus subtilis* EFRL 01 in a date syrup medium. *African Journal of Biotechnology* 11 (62) : 12563–12570.



- Rafid, A.W., K. Imrana, A. B. Muhammad, A. S. Qureshi, dan A. Ayyaz. 2014. Xylanase production using fruit waste as cost effective carbon source from thermo-tolerant *Bacillus megaterium*. *African Journal of Microbiology Research* 8 (38) : 3463–3470.
- Rajagopalan, G., dan Krishnan, C. 2008. Alpha-amylase production from catabolite derepressed *Bacillus subtilis* KCC103 utilizing sugarcane bagasse hydrolysate. *Bioresource Technology* 99 : 3044-3050
- Reddy, N.S., Nimmagadda, A., dan Sambasiva Rao, K.R.S. 2003. An overview of the microbial  $\alpha$ -amylase family. *African Journal of Biotechnology* 2 : 645- 648.
- Saha K., Maity S., Roy S., Pahan K., Pathak R., Majumdar S., dan Gupta S. 2014. Optimization of amylase production from *Bacillus amyloliquefaciens* (MTCC 1270) using solid state fermentation. *International Journal of Microbiology* 1-7.
- Schallmeyer, M., Singh A., dan Ward O.P. 2004. Developments in the use of *Bacillus* species for industrial production. *Journal Microbiology* 50 : 1–17
- Sharma A., dan Satyanarayana T. 2010. High maltose-forming,  $\text{Ca}^{2+}$  - independent and acid stable  $\alpha$ -amylase from a novel acidophilic bacterium *Bacillus acidicola* TSAS1. *Biotechnology Letter* 32: 1503-1507.
- Sivaramakrishnan, S., D. Gangadharan, K. M. Nampoothiri, C. R. Soccol, dan A. Pandey. 2006.  $\alpha$ -amylases from microbial sources—an overview on recent developments. *Food Technology and Biotechnology* 44 (2) : 173–184.
- Sokalingam, S., G. Raghunathan, N. Soundrarajan, dan S. Lee. 2012. A Study on the effect of surface lysine to arginine mutagenesis on protein stability and structure using green fluorescent protein. *PLoS ONE* 7(7): e40410.
- Souza, P.M. dan P.O. Magalhaes. 2010. Application of microbial  $\alpha$ -amilase in industri – a review. *Brazilian Journal of Microbiology* 41 : 850 – 861.
- Takasaki Y., Furutani S., Hayashi S., dan Imada K. 1994. Acidstable and thermostable  $\alpha$ -amylase from *Bacillus licheniformis*. *Journal Fermentation Bioengineering* 77 : 94-96.
- Takata, H., T. Kuriki, S. Okada, Y. Takesada, M. Iizuka, N. Minamiura, dan T. Imanaka. 1992. Action of neopullulanase: neopullulanase catalyzes both hydrolysis and transglycosylation at a-(1–4)- and a-(1–6)-glucosidic linkages. *Journal Biological Chemistry* 267 : 18447–18452
- Tanyildizi, M.S., Ozer, D., dan Elibol, M. 2005. Optimization of  $\alpha$ -amylase production by *Bacillus* sp. using response surface methodology. *Process Biochem* 40 : 2291–2296.



- Tanyildizi, M.S., D. Ozer, dan M. Elibol. 2007. Production of bacterial  $\alpha$ -amilase by *B. amyloliquefaciens* under solid substrate fermentation. *Biochemical Engineering Journal*, 37 : 294-297.
- Tangphatsornruang, S., Naconsie, M., Thammarongtham, C., dan Narangajavana, J. 2005. Isolation and characterization of an alphaamylase gene in cassava (*Manihot esculenta*). *Plant Physiology Biochemistry* 43 : 821-827
- Uitdehaag J.C., Mosi R., Kalk K.H., van der Veen BA, Dijkhuizen L., Withers S.G., dan Dijkstra B.W. 1999. X-ray structures along the reaction pathway of cyclodextrin glycosyltransferase elucidate catalysis in the alpha-amylase family. *Nature Structural & Molecular Biology* (5) : 432-6.
- van der Maarel, M.J., van der Veen, B., Uitdehaag, J.C., Leemhuis, H., dan Dijkhuizen, L. 2002. Properties and applications of starch-converting enzymes of the alpha-amylase family. *Journal Biotechnol* 94 : 137-155.
- Whitcomb, D.C., dan Lowe, M.E. 2007. Human pancreatic digestive enzymes. *Digestive Diseases and Sciences* 52 : 1-17.
- Yang S.J., Min B.C., Kim Y.W., Jang S.M., Lee B.H., dan Park K.H. 2007. Changes in the catalytic properties of *Pyrococcus furiosus* thermostable amylase by mutagenesis of the substrate binding sites. *Applied of Environmental Microbiology* 17 : 5607-12.