BAB 5
KESIMPULAN DAN SARAN

5.1 Kesimpulan

Kesimpulan dari hasil penelitian ini adalah

1. Asetonitril – air merupakan medium reaksi paling baik.
2. Gliseraldehid dan dihidroksiaseton dapat diproduksi dari fosforilasi glukosa menggunakan bantuan katalis Mg-Zn Tripolifosfat dengan imidazol dan mononatrium glutamat.
3. Konversi glukosa tertinggi sebesar 94,1% dihasilkan pada kondisi reaksi 90 ^{o}C menggunakan katalis mononatrium glutamat dengan kadar 0,3 %-mol.
4. *Yield* dihidroksiaseton tertinggi sebesar 70,3% dihasilkan pada kondisi reaksi 90 ^{o}C menggunakan katalis mononatrium glutamat dengan kadar 0,05 %-mol.

5.2 Saran

Saran yang dapat diberikan dari hasil penelitian ini adalah

1. Analisis lebih baik dilakukan menggunakan instrumen juga agar hasil lebih akurat.
2. Analisis menggunakan metode titrasi sebaiknya dilakukan titrasi kasar terlebih dahulu, kemudian titrasi dilakukan sampai didapat perbedaan titrasi kurang lebih 0,1 mL.
3. Analisis dengan spektrofotometer lebih baik diperlukan pengenceran lebih lanjut agar sampel tidak terlalu pekat, tetapi tetap harus dalam rentang percobaan yang diteliti.

DAFTAR PUSTAKA

Academy, S. 2012. “General Chemistry: Principles, Patterns, and Applications.” diakses melalui https://saylordotorg.github.io/text_general-chemistry-principles-patterns-and-applications-v1.0/index.html pada 17 April 2021, 18:08.

Arcos, J.A., M. Bernabé, dan C. Otero. 1998. “Different Strategies for Selective Monoacylation of Hexoaldoses in Acetone.” *Journal of Surfactants and Detergents 1*(3):345 – 352.

Balogh, S., E. Kolos dan G. Grill. 1975. “Beitrage zur titrimetrischen Bestimmung von dimeren Hydroxyaldehyden.” *Zeitschrift fur Analytische Chemie 276*:201 – 204.

Bhosale, S.H., M.B. Rao, dan V.V. Deshpande. 1996. “Molecular and Industrial Aspects of Glucose Isomerase.” *Microbiological Reviews 60*(2):280 – 300.

Blacklow, S.C., Raines, R.T., Lim, W.A., Zamore, P.D., dan Knowles, J.R. 1988. “Triosephosphate isomerase catalysis is diffusion controlled.” Biochemistry 27(4):1158–1165.

Blanco, G. dan A. Blanco 2017. “*Medical Biochemistry.*” Chapter 14, Carbohydrate Metabolism, Academic Press – Elsevier, London, UK.

Bobtelsky, M. dan S. Kertes. 1954. “The polyphosphates of calcium, strontium, barium and magnesium: Their complex character, composition and behaviour.” *Journal of Applied Chemistry 4*(8):419 – 429.

Bobtelsky, M. dan S. Kertes. 1955. “The polyphosphates of cadmium, zinc and lead: The character, composition and behaviour of their complexes.” *Journal of Applied Chemistry 5*(3):125 – 133.

Bommarius, A.S., dan Riebel, B.R. 2004. “*Biocatalysis: Fundamentals and Applications.*” Wiley-VCH. Weinheim, 274.

Cardoso, G.dB., T. Mourão, F.M. Pereira, M.G. Freire, A.T. Fricks, C.M.F. Soares, dan Á.S. Lima. 2013. “Aqueous two-phase systems based on acetonitrile and carbohydrates and their application to the extraction of vanillin.” *Separation and Purification Technology 104*: 106 – 113.

Cornish-Bowden, A. dan Cárdenas, M.L. 1991. “Hexokinase and 'glucokinase' in liver metabolism.” Trends in Biochemical Sciences 16(8):281–282.

DeMan, J.M., J.W. Finley, W.J. Hurst, dan C.Y. Lee. 2018. *"Principles of Food Chemistry."* Edisi ke-4, Springer International Publishing, Basel, Switzerland.

Dhamole, P.B., P. Mahajan, dan H. Feng. 2010. "Phase Separation Conditions for Sugaring-Out in Acetonitrile-Water Systems." *Journal of Chemical & Engineering Data 55*: 3803 – 3806.

Dusselier, M., P. van Wouwe, A. Dewaele, E. Makshina dan B.F. Sels. 2013. "Lactic acid as a platform chemical in the biobased economy: the role of chemocatalysis." *Energy & Environmental Science 6*:1415 – 1442.

Elshafei, A.M., Elsayed, M.A., Abdel-Fatah, O.M., Ali, N.H., dan Mohamed, L.A. 2005. "Some Properties of Two Aldolases in Extracts of *Aspergillus oryzae*." Journal of Basic Microbiology 45(1):31–40.

Fan, Y., C. Zhou, dan X. Zhu. 2009. "Selective Catalysis of Lactic Acid to Produce Commodity Chemicals." *Catalysis Reviews 51*(3):293 – 324.

Grand View Research. 2019. "Global Lactic Acid Market Size & Share Report." diakses melalui https://www.grandviewresearch.com/industry-analysis/lactic-acid-and-poly-lactic-acid-market pada 10 Maret 2021, 21:50.

Guangzhou ZIO Chemical Co., Ltd. 2020. "Factory price bulk lactic acid 88% food grade." Guangdong, China.

Guppy, M., P.V. Attwood, I.A. Hansen, R. Sabaratnam, J. Frisina, dan M E Whisson. 1992. "pH, temperature and lactate production in human red blood cells: implications for blood storage and glycolytic control." *Vox Sanguinis 62*(2):70 – 75.

Handoko, Donatus S. P., Triyono, Narsito, dan Tutik D. Wahyuningsih. 2009. "Pengaruh Temperatur Terhadap Kinerja Katalis Ni/Zeolit Pada Reaksi Hidrogenasi Katalitik." Reaktor 12(4):218 – 225.

Imbault, A.L., J. Gong dan R. Farnood. 2020. "Photocatalytic production of dihydroxyacetone from glycerol on TiO2 in acetonitrile." *RSC Advances 10*:4956 – 4968.

Jankowsky, M.D., C.S. Henry, L.J. Broadbelt, dan V. Hatzimanikatis. 2008. "Group Contribution Method for Thermodynamic Analysis of Complex Metabolic Network." *Biophysical Journal 95*(8):1487 – 1499; Data energi bebas Gibbs di dalam "Supporting Information".

Jin, L.-e., F. Chang, X. Wang, dan Q. Cao. 2013. "Optimization of synthesizing glucose 1-phosphate by sodium tripolyphosphate as a phosphorus acylating agent using response surface methodology." *Turkish Journal of Chemistry 37*: 765 – 774.

Jolimaitre, E., D. Delcroix, N. Essayem, C. Pinela and M. Besson. 2018. "Dihydroxyacetone conversion into lactic acid in an aqueous medium in the presence of metal salts: influence of the ionic thermodynamic equilibrium on the reaction performance." *Catalysis Science and Technology 8*:1349 – 1356.

Kline, G.M., dan S.F. Acree. 1930a. "A study of the method for titrating aldose sugars with standard iodine & alkali". *Bureau of Standards Journal of Research 5*(5):1063 – 1084.

Kline, G.M., dan S.F. Acree. 1930b. "Estimation of Aldose Sugars by Titrating with Standard Iodine and Alkali". *Industrial & Engineering Chemistry Analytical Edition 2*(4):413 – 415.

Krishna, B.S., Nikhilesh, G.S.S., Tarun, B., Saibaba K.V., N., dan Gopinadh, R. 2018. "Industrial production of lactic acid and its applications." *International Journal of Biotech Research 1*(1) 42 – 45.

Market Research Report. 2020. "Lactic Acid Market by Application (Biodegradable Polymers, Food & Beverages, Pharmaceutical Products), Form, and Region." diakses melalui https://www.marketsandmarkets.com/Market-Reports/polylacticacid-387.html pada 11 Maret 2021, 01:07.

Marsden, W.L., P.P. Gray, G.J. Nippard, dan M.R. Quinlan. 1982. "Evaluation of the DNS Method for Analysing Lignocellulosic Hydrolysates". *Journal of Chemical Technology and Biotechnology* 32:1016 – 1022.

McKee, J.R., dan T. McKee, 2019. "*Biochemistry: The Molecular Basis of Life"*. Edisi ke-7, Chapter 8, Carbohydrate Metabolism. Oxford University Press, Oxford, UK.

Parvin, R dan N. Kalant. 1973. "Stimulation of glycolysis by imidazole". *Life Sciences 13*: 1347 – 1352.

Rasrendra, C.B., B.A. Fachri, I.G.B.N. Makertihartha, S. Adisasmito, dan H.J. Heeres. 2011. "Catalytic Conversion of Dihydroxyacetone to Lactic Acid Using Metal Salts in Water". *ChemSusChem 4*(6):768 – 777.

Sechi, N.dS.M. dan P.T. Marques. 2017. “Preparation and Physicochemical, Structural and Morphological Characterization of Phosphorylated Starch”. *Materials Research 20*(Suppl. 2) 174 – 180.

Setyaningsih, L.W.N., U.M. Rizkiyaningrum, R. Andi. 2017. Pengaruh Konsentrasi Katalis dan Reusability Katalis pada Sintesis Triasetin Dengan Katalisator Lewatit. Teknoin 23(1):56-62.

Shanghai Group Limited. 2019. “Heat Stable Grade Lactic Acid 90% Price.” Trading Company, China.

Simon, L.M., Nagy, M., Ábrahám, M., Szaján̈i, B., dan Boross, L. 1985. “Comparative Studies on Soluble and Immobilized Yeast Hexokinase.” Enzyme and Microbial Technology 7(6):275–278.

Sin, L.T. dan B.S. Tueen. 2019. *“Polylactic Acid: A Practical Guide for the Processing, Manufacturing, and Applications of PLA”*. Edisi ke-2, Elsevier Publ. Co., Oxford, UK, 68 – 69.

Solomons, J.T.G., Zimmerly, E.M., Burns, S., Krishnamurthy, N., Swan, M.K., Krings, S., Muirhead, H., Chirgwin, J., Davies, C. 2004. "The crystal structure of mouse phosphoglucose isomerase at 1.6A resolution and its complex with glucose 6-phosphate reveals the catalytic mechanism of sugar ring opening". *Journal of Molecular Biology 342*(3): 847 – 860.

Somogyi, M.J. 1952. Notes on Sugar Determination. Journal of Biological Chemistry 195:19–23.

Sudarmo, U. 2015. *“Kimia untuk SMA/MA Kelas XII”*. Jilid 3. Erlangga. Jakarta. 281 – 283.

Sugih, A.K., J. Loanda, S. Prasetyo. 2019. “Synthesis of Phosphorylated Sugar Palm (Aren) Starch Using Low Level Sodium Tripolyphosphate (STPP)”. *Jurnal Bahan Alam Terbarukan 8*(1):28 – 33.

Vilonen, K.M., A. Vuolanto, J. Jokela, M.S.A. Leisola, dan A.O.I. Krause. 2004. “Enhanced Glucose to Fructose Conversion in Acetone with Xylose Isomerase Stabilized by Crystallization and Cross-Linking”. *Biotechnology Progress 20*:1555 – 1560.

Wang, B., H. Feng, T. Ezeji dan H. Blaschek. 2008. “Sugaring-Out Separation of Acetonitrile from Its Aqueous Solution”. *Chemical Engineering & Technology 31*(12):1869 – 1874.

Xie, S., S. Zhang, X. Qiu, C. Yi, Y. Hu, F. Li, dan J. Quan. 2015. “Sugaring-Out Effects of Sucrose and Glucose on the Liquid–Liquid Equilibria for the (Water + Acetone + 1-Butanol + Ethanol) System”. *Journal of Chemical & Engineering Data 60*(8):2434 – 2441.

Zhang, J., Li, C., Shi, T., Chen, K., Shen, X., dan Jiang, H. 2009. “Lys169 of Human Glucokinase Is a Determinant for Glucose Phosphorylation: Implication for the Atomic Mechanism of Glucokinase Catalysis.” PLoS ONE 4(7):1-12