consisted first. A standard curve for the turbidity model in pure water, and the second, a significant turbidity factor at multiple regressions was the cell particles and time interval of multiplied cells in the medium.

Saccharomyces cerevisiae cell was considered a suspended particle in purified water or cell growth medium. The only one cell particle in purified water contributes to the additional light scattering $(1.433 - 1.507).10^{-5}$ NTU, whereas the population of growing cells in the medium is $(1.171 - 1.201).10^{-5}$ NTU. The time of cell population growth, which every hour contributes to an additional value of $(3.27 - 4.974)$ NTU. Moreover, random bivariate data in each data set is considered reproducible and required bivariate transformation suitable with the count of particles.

REFERENCES

[1] D. Weintrop *et al.*, "Defining Computational Thinking for Mathematics and Science Classrooms," *J. Sci. Educ. Technol.*, vol. 25, no. 1, pp. 127–147, Feb. 2016, doi: 10.1007/s10956-015-9581-5.

[2] A. V. Aho, "Computation and Computational Thinking," *Comput. J.*, vol. 55, no. 7, pp. 832–835, Jul. 2012, doi: 10.1093/comjnl/bxs074.

[3] I. D. Mienye, Y. Sun, and Z. Wang, "Prediction performance of improved decision tree-based algorithms: a review," *Procedia Manuf.*, vol. 35, pp. 698–703, 2019, doi: 10.1016/j.promfg.2019.06.011.

[4] M. Nickaeen *et al.*, "A free-boundary model of a motile cell explains turning behavior," *PLOS Comput. Biol.*, vol. 13, no. 11, p. e1005862, Nov. 2017, doi: 10.1371/journal.pcbi.1005862.

[5] S. Waldherr, "Estimation methods for heterogeneous cell population models in systems biology," *J. R. Soc. Interface*, vol. 15, no. 147, p. 20180530, Oct. 2018, doi: 10.1098/rsif.2018.0530.

[6] Q. Ye and M. H. MacGregor, "Using simulation to test formally verified protocols in complex environments," *Math. Comput. Model.*, vol. 53, no. 3–4, pp. 538–551, Feb. 2011, doi: 10.1016/j.mcm.2010.03.039.

[7] Z. Zukhri, *Genetic Algorithm of Evolutionary Computational Method for Optimize Problem Solving*, I. Yogyakarta: Andi, 2014.

[8] A. Syauqi, H. Santoso, and S. N. Hasana, "Measurement of Action Result of Eliminating Bivariate based Cook's D: Cell Concentration and Turbidity," in *Proceeding of The 9th International Conference on Green Technology 2018*, 2018, pp. 1–5, [Online]. Available: http://conferences.uin-malang.ac.id/index.php/ICGT/article/view/841/338.

[9] J. Thomann and G. Eichfelder, "Numerical results for the multiobjective trust region algorithm MHT," *Data Br.*, vol. 25, p. 104103, Aug. 2019, doi: 10.1016/j.dib.2019.104103.

[10] O. K. Oyebamiji *et al.*, "Gaussian process emulation of an individual-based model simulation of microbial communities," *J. Comput. Sci.*, vol. 22, pp. 69–84, Sep. 2017, doi: 10.1016/j.jocs.2017.08.006.

[11] D. Liao and T. D. Tlsty, "Evolutionary game theory for physical and biological scientists. II. Population dynamics equations can be associated with interpretations," *Interface Focus*, vol. 4, no. 4, p. 20140038, Aug. 2014, doi: 10.1098/rsfs.2014.0038.

[12] A. Syauqi, "Cell Quantity Determining of Saccharomyces cerevisiae by Turbidimetry," *J Biosaintropis*, vol. 2, no. 2, pp. 1–9, 2017, [Online]. Available: http://biosaintropis.unisma.ac.id/index.php/biosaintropis/article/view/84/38.

[13] A. Zapata and S. Ramirez-Arcos, "A Comparative Study of McFarland Turbidity Standards and the Densimat Photometer to Determine Bacterial Cell Density," *Curr. Microbiol.*, vol. 70, no. 6, pp. 907–909, Jun. 2015, doi: 10.1007/s00284-015-0801-2.

[14] G. E. Lozano, S. R. Beatriz, F. M. Cervantes, G. N. P. María, and J. M. C. Francisco, "Low accuracy of the McFarland method for estimation of bacterial populations," *African J. Microbiol. Res.*, vol. 12, no. 31, pp. 736–740, Aug. 2018, doi: 10.5897/AJMR2018.8893.

[15] B. Vestergaard, "Static and Dynamic Light Scattering for Biological Macromolecules in Solution," Suwon Korea, 2016. [Online]. Available: https://www.embl-hamburg.de/biosaxs/courses/embo2016skku/slides/vestergaard-light-scattering.pdf.

[16] J. Mauer, M. Peltomäki, S. Poblete, G. Gompper, and D. A. Fedosov, "Static and dynamic light scattering by red blood cells: A numerical study," *PLoS One*, vol. 12, no. 5, p. e0176799, May 2017, doi: 10.1371/journal.pone.0176799.

[17] L. Z. H. Daphne, Low Hui Xiang;Utomo, Handojo Djati; Kenneth, "Correlation between Turbidity and Total Suspended Solids in Singapore Rivers," *J. Water Sustain.*, vol. 1, no. 3, pp. 313–322, 2011, [Online]. Available: http://www.jwsponline.com/uploadpic/Magazine/313-322.pdf.

[18] T. Q. W. Real, "Establishing A Relationship between Turbidity And Total Suspended Solids – A Student Project.," 2011.

[19] A. Hannouche, G. Chebbo, G. Ruban, B. Tassin, B. J. Lemaire, and C. Joannis, "Relationship between turbidity and total suspended solids concentration within a combined sewer system," *Water Sci. Technol.*, vol. 64, no. 12, pp. 2445–2452, Dec. 2011, doi: 10.2166/wst.2011.779.

[20] T. Wriedt, "Mie Theory: A Review," in *The Mie Theory*, T. Hergert, W; Wriedt, Ed. Springer, 2012, pp. 53–71.

[21] A. Syauqi, H. Santoso, and S. N. Hasana, "Turbidity of Saccharomyces cerevisiae : a proposed cell quantification method," *IOP Conf. Ser. Earth Environ. Sci.*, vol. 456, no. 1, p. 012031, Apr. 2020, doi: 10.1088/1755-1315/456/1/012031.

[22] A. A. Duina, M. E. Miller, and J. B. Keeney, "Budding Yeast for Budding Geneticists: A Primer on the Saccharomyces cerevisiae Model System," *Genetics*, vol. 197, no. 1, pp. 33–48, May 2014, doi: 10.1534/genetics.114.163188.

[23] E. V. Soares, "Flocculation in Saccharomyces cerevisiae: a review," *J. Appl. Microbiol.*, vol. 110, no. 1, pp. 1–18, Jan. 2011, doi: 10.1111/j.1365-2672.2010.04897.x.

[24] A. Syauqi, H. Santoso, and S. N. Hasana, "Agregate Dispersion of suspended cell of Saccharomyces cerevisiae in water by chemical-physical effect," in *National Seminar Proceeding of Biology 2018-Biodiversity: Learning, Research, and Application on Environmental Management*, 2018, pp. 41–47.

[25] R. K. Sembiring, *Analisis Regresi*, 3rd ed. Bandung: ITB, 2003.

[26] U. of California-Davis, "Excel 2007: Multiple Regressions," *Web Page*, 2009. http://cameron.econ.ucdavis.edu/excel/ex61multipleregression.html.

[27] A. Majid, M. Aslam, and S. Altaf, "Efficient estimation of distributed lag model in presence of heteroscedasticity of unknown form: A Monte Carlo evidence," *Cogent Math. Stat.*, vol. 5, no. 1, Oct. 2018, doi: 10.1080/25742558.2018.1538596.

[28] A. Bin Omar and M. Bin MatJafri, "Turbidimeter Design and Analysis: A Review on Optical Fiber Sensors for the Measurement of Water Turbidity," *Sensors*, vol. 9, no. 10, pp. 8311–8335, Oct. 2009, doi: 10.3390/s91008311.

[29] I. J. Georgescu, Ramona;Khismatullin, Damir;Holt, R. Glynn;Castagner, Jean Luc;A'amar, Ousama;Bigio, "Design of a system to measure light scattering from individual cells excited by an acoustic wave," *J. Opt. EXPRESS*, vol. 16, no. 6, 2008, [Online]. Available: https://www.bu.edu/bmo/files/2011/01/Georgescu-2008.pdf.

[30] C. Trihendradi, *Enlighten Regression the Accurate Strategy for Causal Relation Analysis*, I. Yogyakarta: ANDI, 2007.

[31] R. Al-Ali, N. Kathiresan, M. El Anbari, E. R. Schendel, and T. A. Zaid, "Workflow optimisation of performance and quality of service for bioinformatics application in high performance computing," *J. Comput. Sci.*, vol. 15, pp. 3–10, Jul. 2016, doi: 10.1016/j.jocs.2016.03.005.