

DAFTAR PUSTAKA

- Abdemami, B., Shokrgozar, M. A., Shahreza, H. K., & Ghavami, M. (2011). Design and construction of two yeast shuttle vectors containing human procollagen genes expression cassette for expression in yeast. *Avicenna Journal of Medical Biotechnology*, 3(1), 11–18.
- Ahmad, M., Hirz, M., Pichler, H., & Schwab, H. (2014a). Protein expression in *Pichia pastoris*: recent achievements and perspectives for heterologous protein production. *Applied Microbiology and Biotechnology*, 98(12), 5301–5317. <https://doi.org/10.1007/s00253-014-5732-5>
- Ahmad, M., Hirz, M., Pichler, H., & Schwab, H. (2014b). Protein expression in *Pichia pastoris*: recent achievements and perspectives for heterologous protein production. *Applied Microbiology and Biotechnology*, 98(12), 5301–5317. <https://doi.org/10.1007/s00253-014-5732-5>
- Antar, S. A., Ashour, N. A., Sharaky, M., Khattab, M., Ashour, N. A., Zaid, R. T., Roh, E. J., Elkamhawy, A., & Al-Karmalawy, A. A. (2023a). Diabetes mellitus: Classification, mediators, and complications; A gate to identify potential targets for the development of new effective treatments. *Biomedicine & Pharmacotherapy*, 168, 115734. <https://doi.org/10.1016/j.biopha.2023.115734>
- Aroda, V. R., Arulandu, J. R., & Cannon, A. J. (2018). Insulin/Glucagon-Like Peptide-1 Receptor Agonist Combination Therapy for the Treatment of Type 2 Diabetes: Are Two Agents Better Than One? *Clinical Diabetes*, 36(2), 138–147. <https://doi.org/10.2337/cd17-0065>
- Athmaram, T. N., Singh, A. K., Saraswat, S., Srivastava, S., Misra, P., Kameswara Rao, M., Gopalan, N., & Rao, P. V. L. (2013). A simple *Pichia pastoris* fermentation and downstream processing strategy for making recombinant pandemic Swine Origin Influenza A virus Hemagglutinin protein. *Journal of Industrial Microbiology and Biotechnology*, 40(2), 245–255. <https://doi.org/10.1007/s10295-012-1220-z>
- Baeshen, N. A., Baeshen, M. N., Sheikh, A., Bora, R. S., Ahmed, M. M. M., Ramadan, H. A. I., Saini, K. S., & Redwan, E. M. (2014). Cell factories for insulin production. *Microbial Cell Factories*, 13(1), 141. <https://doi.org/10.1186/s12934-014-0141-0>
- Banday, M. Z., Sameer, A. S., & Nissar, S. (2020). Pathophysiology of diabetes: An overview. *Avicenna Journal of Medicine*, 10(04), 174–188. https://doi.org/10.4103/ajm.ajm_53_20

Benko, Z., & Zhao, R. Y. (2011). Zeocin for Selection of BleMX6 Resistance in Fission Yeast. *BioTechniques*, 51(1), 57–60. <https://doi.org/10.2144/000113706>

Bhatwa, A., Wang, W., Hassan, Y. I., Abraham, N., Li, X.-Z., & Zhou, T. (2021). Challenges Associated With the Formation of Recombinant Protein Inclusion Bodies in *Escherichia coli* and Strategies to Address Them for Industrial Applications. *Frontiers in Bioengineering and Biotechnology*, 9. <https://doi.org/10.3389/fbioe.2021.630551>

BKPK Kementerian Kesehatan Republik Indonesia. (2023). *Survei Kesehatan Indonesia Tahun 2023 Republik Indonesia*. Badan Kebijakan Pembangunan Kesehatan, Kementerian Kesehatan RI.

Blanchard, V., Gadkari, R. A., George, A. V. E., Roy, S., Gerwig, G. J., Leeflang, B. R., Dighe, R. R., Boelens, R., & Kamerling, J. P. (2008). High-level expression of biologically active glycoprotein hormones in *Pichia pastoris* strains—selection of strain GS115, and not X-33, for the production of biologically active N-glycosylated 15N-labeled phCG. *Glycoconjugate Journal*, 25(3), 245–257. <https://doi.org/10.1007/s10719-007-9082-8>

Boscari, F., & Avogaro, A. (2021). Current treatment options and challenges in patients with Type 1 diabetes: Pharmacological, technical advances and future perspectives. *Reviews in Endocrine and Metabolic Disorders*, 22(2), 217–240. <https://doi.org/10.1007/s11154-021-09635-3>

Chang, C.-H., Hsiung, H.-A., Hong, K.-L., & Huang, C.-T. (2018). Enhancing the efficiency of the *Pichia pastoris* AOX1 promoter via the synthetic positive feedback circuit of transcription factor Mxr1. *BMC Biotechnology*, 18(1), 81. <https://doi.org/10.1186/s12896-018-0492-4>

Chankova, S. G., Dimova, E., Dimitrova, M., & Bryant, P. E. (2007). Induction of DNA double-strand breaks by zeocin in *Chlamydomonas reinhardtii* and the role of increased DNA double-strand breaks rejoining in the formation of an adaptive response. *Radiation and Environmental Biophysics*, 46(4), 409–416. <https://doi.org/10.1007/s00411-007-0123-2>

Chen, W., Hu, Z., & Liu, D. (2025). Compared to MgSO₄, the Use of Magnesium Nanofertilizer Alleviates Potassium-Magnesium Antagonism in Tomato Roots. *Agriculture*, 15(4), 368. <https://doi.org/10.3390/agriculture15040368>

Chevallet, M., Luche, S., & Rabilloud, T. (2006). Silver staining of proteins in polyacrylamide gels. *Nature Protocols*, 1(4), 1852–1858. <https://doi.org/10.1038/nprot.2006.288>

- Chiang, J. L., Kirkman, M. S., Laffel, L. M. B., & Peters, A. L. (2014). Type 1 Diabetes Through the Life Span: A Position Statement of the American Diabetes Association. *Diabetes Care*, 37(7), 2034–2054. <https://doi.org/10.2337/dc14-1140>
- Choudhury, A. A., & Devi Rajeswari, V. (2021). Gestational diabetes mellitus - A metabolic and reproductive disorder. *Biomedicine & Pharmacotherapy*, 143, 112183. <https://doi.org/10.1016/j.biopha.2021.112183>
- Contreras-Zentella, M. L., Villalobos-García, D., & Hernández-Muñoz, R. (2022). Ethanol Metabolism in the Liver, the Induction of Oxidant Stress, and the Antioxidant Defense System. *Antioxidants*, 11(7), 1258. <https://doi.org/10.3390/antiox11071258>
- Davies, M. J., Aroda, V. R., Collins, B. S., Gabbay, R. A., Green, J., Maruthur, N. M., Rosas, S. E., Del Prato, S., Mathieu, C., Mingrone, G., Rossing, P., Tankova, T., Tsapas, A., & Buse, J. B. (2022). Management of Hyperglycemia in Type 2 Diabetes, 2022. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetes Care*, 45(11), 2753–2786. <https://doi.org/10.2337/dci22-0034>
- Derakhshan, P., Khatibi, A., Faiz, S. H. R., Rahimzadeh, P., & Nouri, N. (2021). Comparison of the effect of insulin glargine and regular insulin on perioperative glycemic control in patients with type 2 diabetes mellitus under insulin treatment during vitrectomy surgery under general anesthesia: A randomized clinical trial study. *Medical Journal of The Islamic Republic of Iran*. <https://doi.org/10.47176/mjiri.35.31>
- Dhayalan, B., Chatterjee, D., Chen, Y.-S., & Weiss, M. A. (2021). WITHDRAWN: Diabetes mellitus due to toxic misfolding of proinsulin variants. *Molecular Metabolism*, 101229. <https://doi.org/10.1016/j.molmet.2021.101229>
- Dilworth, L., Facey, A., & Omoruyi, F. (2021). Diabetes Mellitus and Its Metabolic Complications: The Role of Adipose Tissues. *International Journal of Molecular Sciences*, 22(14), 7644. <https://doi.org/10.3390/ijms22147644>
- Dunn, C. J., Plosker, G. L., Keating, G. M., McKeage, K., & Scott, L. J. (2003). Insulin Glargin. *Drugs*, 63(16), 1743–1778. <https://doi.org/10.2165/00003495-200363160-00007>
- Fan, W. (2017). Epidemiology in diabetes mellitus and cardiovascular disease. *Cardiovascular Endocrinology*, 6(1), 8–16. <https://doi.org/10.1097/XCE.0000000000000116>

- Freckmann, G., Pleus, S., Grady, M., Setford, S., & Levy, B. (2019). Measures of Accuracy for Continuous Glucose Monitoring and Blood Glucose Monitoring Devices. *Journal of Diabetes Science and Technology*, 13(3), 575–583. <https://doi.org/10.1177/1932296818812062>
- Fu, Z., Gilbert, E. R., & Liu, D. (2013). Regulation of insulin synthesis and secretion and pancreatic Beta-cell dysfunction in diabetes. *Current Diabetes Reviews*, 9(1), 25–53.
- Garrigós-Martínez, J., Nieto-Taype, M. A., Gasset-Franch, A., Montesinos-Seguí, J. L., García-Ortega, X., & Valero, F. (2019). Specific growth rate governs AOX1 gene expression, affecting the production kinetics of *Pichia pastoris* (Komagataella phaffii) PAOX1-driven recombinant producer strains with different target gene dosage. *Microbial Cell Factories*, 18(1), 187. <https://doi.org/10.1186/s12934-019-1240-8>
- Geng, T., Liu, G., & Pan, A. (2023). Modifiable Risk Factors in the Prevention and Management of Type 2 Diabetes: Implications and Future Directions for China. *China CDC Weekly*, 5(45), 999–1000. <https://doi.org/10.46234/ccdw2023.187>
- Gidijala, L., Uthoff, S., van Kampen, S. J., Steinbüchel, A., & Verhaert, R. M. D. (2018). Presence of protein production enhancers results in significantly higher methanol-induced protein production in *Pichia pastoris*. *Microbial Cell Factories*, 17(1), 112. <https://doi.org/10.1186/s12934-018-0961-4>
- Hardianto, D., Safarrida, A., Prayoga, G. S., Ananda Zr, Y. P., Munirah, Martius, E., Royani, J. I., & Hartuti, E. D. (2024). Increasing the production of insulin glargine in *Pichia pastoris* through medium modification. *BIO Web of Conferences*, 127, 06001. <https://doi.org/10.1051/bioconf/202412706001>
- Hilgenfeld, R., Seipke, G., Berchtold, H., & Owens, D. R. (2014). The Evolution of Insulin Glargine and its Continuing Contribution to Diabetes Care. *Drugs*, 74(8), 911–927. <https://doi.org/10.1007/s40265-014-0226-4>
- Home, P. D., & Ashwell, S. G. (2001). Insulin glargine: the first clinically useful extended-action insulin analogue. *Expert Opinion on Pharmacotherapy*, 2(11), 1891–1902. <https://doi.org/10.1517/14656566.2.11.1891>
- Hossain, M. B., Khan, Md. N., Oldroyd, J. C., Rana, J., Magliago, D. J., Chowdhury, E. K., Karim, M. N., & Islam, R. M. (2022). Prevalence of, and risk factors for, diabetes and prediabetes in Bangladesh: Evidence from the national survey using a multilevel Poisson regression model with a robust variance. *PLOS Global Public Health*, 2(6), e0000461. <https://doi.org/10.1371/journal.pgph.0000461>

- Hossain, Md. J., Al-Mamun, Md., & Islam, Md. R. (2024). Diabetes mellitus, the fastest growing global public health concern: Early detection should be focused. *Health Science Reports*, 7(3). <https://doi.org/10.1002/hsr2.2004>
- Hulse, A., Rai, S., & Prasanna Kumar, K. (2016). Evaluation of accuracy of ambulatory glucose profile in an outpatient setting in children with type 1 diabetes. *Indian Journal of Endocrinology and Metabolism*, 20(5), 643. <https://doi.org/10.4103/2230-8210.190546>
- Hussain, N., Yasmeen, A., & Bilal, M. (2022). The application of ammonium sulphate and amino acid on cotton: effects on can improve growth, yield, quality and nitrogen absorption. *Brazilian Journal of Biology*, 82. <https://doi.org/10.1590/1519-6984.240133>
- Hwang, J., Kim, Y., Huh, S., Shim, J., Park, C., Kimm, K., Choi, D. K., Park, T., & Kim, S. (2005). The Time-Dependent Serial Gene Response to Zeocin Treatment Involves Caspase-Dependent Apoptosis in HeLa Cells. *Microbiology and Immunology*, 49(4), 331–342. <https://doi.org/10.1111/j.1348-0421.2005.tb03737.x>
- Hyun, M. K., Park, J. H., Kim, K. H., Ahn, S.-K., & Ji, S. M. (2021). Incidence and Risk Factors for Progression to Diabetes Mellitus: A Retrospective Cohort Study. *International Journal of Environmental Research and Public Health*, 19(1), 123. <https://doi.org/10.3390/ijerph19010123>
- IDF. (2021). *IDF Diabetes Atlas 10th Edition* (10th ed.). International Diabetes Federation.
- Ingram, Z., Patkar, A., Oh, D., Zhang, K. K., Chung, C., Lin-Cereghino, J., & Lin-Cereghino, G. P. (2021). Overcoming Obstacles in Protein Expression in the Yeast *Pichia pastoris*: Interviews of Leaders in the Pichia Field. *Pacific Journal of Health*, 4(1). <https://doi.org/10.56031/2576-215X.1010>
- International Diabetes Federation. (2021). *IDF Diabetes Atlas* (10th ed.). International Diabetes Federation.
- Invitrogen. (2010). *EasySelect Pichia Expression Kit*.
- Jeon, J. Y., Ko, S.-H., Kwon, H.-S., Kim, N. H., Kim, J. H., Kim, C. S., Song, K.-H., Won, J. C., Lim, S., Choi, S. H., Jang, M., Kim, Y., Oh, K., Kim, D. J., & Cha, B.-Y. (2013). Prevalence of Diabetes and Prediabetes according to Fasting Plasma Glucose and HbA1c. *Diabetes & Metabolism Journal*, 37(5), 349. <https://doi.org/10.4093/dmj.2013.37.5.349>

- Joseph, J. A., Akkermans, S., & Van Impe, J. F. M. (2022). Effects of Temperature and pH on Recombinant Thaumatin II Production by *Pichia pastoris*. *Foods*, 11(10), 1438. <https://doi.org/10.3390/foods11101438>
- Kahanovitz, L., Sluss, P. M., & Russell, S. J. (2017). Type 1 Diabetes—A Clinical Perspective. *Point of Care: The Journal of Near-Patient Testing & Technology*, 16(1), 37–40. <https://doi.org/10.1097/POC.0000000000000125>
- Karbalaei, M., Rezaee, S. A., & Farsiani, H. (2020). *Pichia pastoris*: A highly successful expression system for optimal synthesis of heterologous proteins. *Journal of Cellular Physiology*, 235(9), 5867–5881. <https://doi.org/10.1002/jcp.29583>
- Kawahara, M., Kato-Negishi, M., & Tanaka, K. (2023). Dietary Trace Elements and the Pathogenesis of Neurodegenerative Diseases. *Nutrients*, 15(9), 2067. <https://doi.org/10.3390/nu15092067>
- Kemenkes. (2023). Profil kesehatan indonesia 2023. In *Kementerian Kesehatan Republik Indonesia*. Kementerian Kesehatan Republik Indonesia.
- Kjeldsen, T., Andersen, A. S., Hubálek, F., Johansson, E., Kreiner, F. F., Schluckebier, G., & Kurtzhals, P. (2024). Molecular engineering of insulin for recombinant expression in yeast. *Trends in Biotechnology*, 42(4), 464–478. <https://doi.org/10.1016/j.tibtech.2023.09.012>
- Krainer, F. W., Dietzsch, C., Hajek, T., Herwig, C., Spadiut, O., & Glieder, A. (2012). Recombinant protein expression in *Pichia pastoris* strains with an engineered methanol utilization pathway. *Microbial Cell Factories*, 11(1), 22. <https://doi.org/10.1186/1475-2859-11-22>
- Kumar, J., Bhat, S. U., & Rathore, A. S. (2022). Slow post-induction specific growth rate enhances recombinant protein expression in *Escherichia coli*: Pramlintide multimer and ranibizumab production as case studies. *Process Biochemistry*, 114, 21–27. <https://doi.org/10.1016/j.procbio.2022.01.009>
- Kurien, B. T., & Scofield, R. H. (2012). *Accelerated Coomassie Blue Staining and Destaining of SDS-PAGE Gels with Application of Heat* (pp. 471–479). https://doi.org/10.1007/978-1-61779-821-4_41
- Lagree, K., Woolford, C. A., Huang, M. Y., May, G., McManus, C. J., Solis, N. V., Filler, S. G., & Mitchell, A. P. (2020). Roles of *Candida albicans* Mig1 and Mig2 in glucose repression, pathogenicity traits, and SNF1 essentiality. *PLOS Genetics*, 16(1), e1008582. <https://doi.org/10.1371/journal.pgen.1008582>

- Lapierre, F. M., Schmid, J., Ederer, B., Ihling, N., Büchs, J., & Huber, R. (2020). Revealing nutritional requirements of MICP-relevant *Sporosarcina pasteurii* DSM33 for growth improvement in chemically defined and complex media. *Scientific Reports*, 10(1), 22448. <https://doi.org/10.1038/s41598-020-79904-9>
- Liang, S., Wang, B., Pan, L., Ye, Y., He, M., Han, S., Zheng, S., Wang, X., & Lin, Y. (2012). Comprehensive structural annotation of *Pichia pastoris* transcriptome and the response to various carbon sources using deep paired-end RNA sequencing. *BMC Genomics*, 13(1), 738. <https://doi.org/10.1186/1471-2164-13-738>
- Lin, N.-X., He, R.-Z., Xu, Y., & Yu, X.-W. (2021). Oxidative stress tolerance contributes to heterologous protein production in *Pichia pastoris*. *Biotechnology for Biofuels*, 14(1), 160. <https://doi.org/10.1186/s13068-021-02013-w>
- Lin-Cereghino, G. P., Godfrey, L., de la Cruz, B. J., Johnson, S., Khuongsathiene, S., Tolstorukov, I., Yan, M., Lin-Cereghino, J., Veenhuis, M., Subramani, S., & Cregg, J. M. (2006). Mxr1p, a Key Regulator of the Methanol Utilization Pathway and Peroxisomal Genes in *Pichia pastoris*. *Molecular and Cellular Biology*, 26(3), 883–897. <https://doi.org/10.1128/MCB.26.3.883-897.2006>
- Lv, W., & Cai, M. (2025). Advancing Recombinant Protein Expression in *Komagataella phaffii*: Opportunities and Challenges. *FEMS Yeast Research*. <https://doi.org/10.1093/femsyr/foaf010>
- Michael Weiss, D. F. S. L. H. P. (2014). *Insulin Biosynthesis, Secretion, Structure, and Structure-Activity Relationships* (Leslie J. De Groot, Ed.). MDText.com, Inc.
- Modzelewski, R., Stefanowicz-Rutkowska, M. M., Matuszewski, W., & Bandurska-Stankiewicz, E. M. (2022). Gestational Diabetes Mellitus—Recent Literature Review. *Journal of Clinical Medicine*, 11(19), 5736. <https://doi.org/10.3390/jcm11195736>
- Moore, D., Leibel, N., Polonsky, W., & Rodriguez, H. (2024). Recommendations for Screening and Monitoring the Stages of Type 1 Diabetes in the Immune Therapy Era. *International Journal of General Medicine*, Volume 17, 3003–3014. <https://doi.org/10.2147/IJGM.S438009>
- Munekawa, C., Okada, H., Hamaguchi, M., Habu, M., Kurogi, K., Murata, H., Ito, M., & Fukui, M. (2022). Fasting plasma glucose level in the range of 90–99 mg/dL and the risk of the onset of type 2 diabetes: Population-based Panasonic cohort study 2. *Journal of Diabetes Investigation*, 13(3), 453–459. <https://doi.org/10.1111/jdi.13692>

- Munirah, M., Hardianto, D., Martius, E., Nasution, U. J., & Safarrida, A. (2025). Insulin production in *Pichia pastoris*: Mini-review of biotechnological advancements and process optimization. *Process Biochemistry*, 149, 277–287. <https://doi.org/10.1016/j.procbio.2024.12.013>
- Murphy, L., Lynch, C. D., & O'Connell, D. J. (2024). Valorisation of Spent Yeast Fermentation Media through Compositional-Analysis-Directed Supplementation. *Applied Microbiology*, 4(2), 959–971. <https://doi.org/10.3390/applmicrobiol4020065>
- Nakrani, M. N., Wineland, R. H., & Anjum, F. (2024). *Physiology, Glucose Metabolism*.
- Nowakowski, A. B., Wobig, W. J., & Petering, D. H. (2014). Native SDS-PAGE: high resolution electrophoretic separation of proteins with retention of native properties including bound metal ions. *Metallomics : Integrated Biometal Science*, 6(5), 1068–1078. <https://doi.org/10.1039/c4mt00033a>
- Olfat, N., Ashoori, M., & Saedisomeolia, A. (2022). Riboflavin is an antioxidant: a review update. *British Journal of Nutrition*, 128(10), 1887–1895. <https://doi.org/10.1017/S0007114521005031>
- Pacheco, T. F., & Almeida, J. R. M. de. (2025). Targeted Redesign and Optimization of Culture Media for Ethylene Glycol Biosynthesis in *Komagataella phaffii*. *Fermentation*, 11(8), 424. <https://doi.org/10.3390/fermentation11080424>
- Pan, Y., Yang, J., Wu, J., Yang, L., & Fang, H. (2022). Current advances of *Pichia pastoris* as cell factories for production of recombinant proteins. *Frontiers in Microbiology*, 13. <https://doi.org/10.3389/fmicb.2022.1059777>
- Pawlak, A., Stefanek, S., & Janusz, G. (2022). Properties, Physiological Functions and Involvement of Basidiomycetous Alcohol Oxidase in Wood Degradation. *International Journal of Molecular Sciences*, 23(22), 13808. <https://doi.org/10.3390/ijms232213808>
- Pereira, W. V. C., Vancea, D. M. M., de Andrade Oliveira, R., de Freitas, Y. G. P. C., Lamounier, R. N., Silva Júnior, W. S., Fioretti, A. M. B., Macedo, C. L. D., Bertoluci, M. C., & Zagury, R. L. (2023). 2022: Position of Brazilian Diabetes Society on exercise recommendations for people with type 1 and type 2 diabetes. *Diabetology & Metabolic Syndrome*, 15(1), 2. <https://doi.org/10.1186/s13098-022-00945-3>

- Perez-Frances, M., Bru-Tari, E., Cohrs, C., Abate, M. V., van Gurp, L., Furuyama, K., Speier, S., Thorel, F., & Herrera, P. L. (2024). Regulated and adaptive in vivo insulin secretion from islets only containing β -cells. *Nature Metabolism*, 6(9), 1791–1806. <https://doi.org/10.1038/s42255-024-01114-8>
- Pham, P. V. (2018). Medical Biotechnology. In *Oomics Technologies and Bio-Engineering* (pp. 449–469). Elsevier. <https://doi.org/10.1016/B978-0-12-804659-3.00019-1>
- Pikkemaat, M., Andersson, T., Melander, O., Chalmers, J., Rådholm, K., & Bengtsson Boström, K. (2019). C-peptide predicts all-cause and cardiovascular death in a cohort of individuals with newly diagnosed type 2 diabetes. The Skaraborg diabetes register. *Diabetes Research and Clinical Practice*, 150, 174–183. <https://doi.org/10.1016/j.diabres.2019.03.014>
- Poznyak, A., Grechko, A. V., Poggio, P., Myasoedova, V. A., Alfieri, V., & Orekhov, A. N. (2020). The Diabetes Mellitus–Atherosclerosis Connection: The Role of Lipid and Glucose Metabolism and Chronic Inflammation. *International Journal of Molecular Sciences*, 21(5), 1835. <https://doi.org/10.3390/ijms21051835>
- Rahman, M. S., Hossain, K. S., Das, S., Kundu, S., Adegoke, E. O., Rahman, Md. A., Hannan, Md. A., Uddin, M. J., & Pang, M.-G. (2021). Role of Insulin in Health and Disease: An Update. *International Journal of Molecular Sciences*, 22(12), 6403. <https://doi.org/10.3390/ijms22126403>
- Rajas, F., Gautier-Stein, A., & Mithieux, G. (2019). Glucose-6 Phosphate, a Central Hub for Liver Carbohydrate Metabolism. *Metabolites*, 9(12), 282. <https://doi.org/10.3390/metabo9120282>
- Ramachandran, A. (2014). Diabetes symptoms. *Indian Journal of Medical Research*, 140, 579–581.
- Rani, A. K., Katiyar, R., & Rathore, A. S. (2024). Bioprocessing of inclusion bodies from *E. coli* to produce bioactive recombinant proteins. *Biochemical Engineering Journal*, 203, 109188. <https://doi.org/10.1016/j.bej.2023.109188>
- Redmile-Gordon, M. A., Armenise, E., White, R. P., Hirsch, P. R., & Goulding, K. W. T. (2013). A comparison of two colorimetric assays, based upon Lowry and Bradford techniques, to estimate total protein in soil extracts. *Soil Biology and Biochemistry*, 67, 166–173. <https://doi.org/10.1016/j.soilbio.2013.08.017>

- Sacks, D. B., Arnold, M., Bakris, G. L., Bruns, D. E., Horvath, A. R., Lernmark, Å., Metzger, B. E., Nathan, D. M., & Kirkman, M. S. (2023). Guidelines and Recommendations for Laboratory Analysis in the Diagnosis and Management of Diabetes Mellitus. *Diabetes Care*, 46(10), e151–e199. <https://doi.org/10.2337/dci23-0036>
- Saeidi, D., Saeidi, S., Moazen, F., & Akbari, V. (2024). Cloning and Optimization of Intracellular Expression of Human Interferon β -1a in *Pichia pastoris* GS115. *Advanced Biomedical Research*, 13. https://doi.org/10.4103/abr.abr_376_23
- Sakurai, T., Kubota, S., Kato, T., & Yabe, D. (2023). Advances in insulin therapy from discovery to β -cell replacement. *Journal of Diabetes Investigation*, 14(1), 15–18. <https://doi.org/10.1111/jdi.13902>
- Sambrook, J., & Russell, D. W. (2006). SDS-Polyacrylamide Gel Electrophoresis of Proteins. *Cold Spring Harbor Protocols*, 2006(4), pdb.prot4540. <https://doi.org/10.1101/pdb.prot4540>
- Sampath Kumar, A., Maiya, A. G., Shastry, B. A., Vaishali, K., Ravishankar, N., Hazari, A., Gundmi, S., & Jadhav, R. (2019). Exercise and insulin resistance in type 2 diabetes mellitus: A systematic review and meta-analysis. *Annals of Physical and Rehabilitation Medicine*, 62(2), 98–103. <https://doi.org/10.1016/j.rehab.2018.11.001>
- Santoso, A., Herawati, N., & Rubiana, Y. (2012). Effect of Methanol Induction and Incubation Time on Expression of Human Erythropoietin in Methylotropic Yeast *Pichia pastoris*. *Makara of Technology Series*, 16(1). <https://doi.org/10.7454/mst.v16i1.1041>
- Shapira, S. N., Naji, A., Atkinson, M. A., Powers, A. C., & Kaestner, K. H. (2022). Understanding islet dysfunction in type 2 diabetes through multidimensional pancreatic phenotyping: The Human Pancreas Analysis Program. *Cell Metabolism*, 34(12), 1906–1913. <https://doi.org/10.1016/j.cmet.2022.09.013>
- Shemesh, P., & Fishman, A. (2024). Optimal fermentation conditions for growth and recombinant protein production in *Pichia pastoris*: Strain selection, ploidy level and carbon source. *Current Research in Food Science*, 9, 100840. <https://doi.org/10.1016/j.crfs.2024.100840>
- Shen, W., Xue, Y., Liu, Y., Kong, C., Wang, X., Huang, M., Cai, M., Zhou, X., Zhang, Y., & Zhou, M. (2016). A novel methanol-free *Pichia pastoris* system for recombinant protein expression. *Microbial Cell Factories*, 15(1), 178. <https://doi.org/10.1186/s12934-016-0578-4>

- Shi, L., Wang, J., Wang, X., Zhang, Y., Song, Z., Cai, M., & Zhou, X. (2020). Transcriptional regulatory networks of methanol-independent protein expression in *Pichia pastoris* under the AOX1 promoter with trans-acting elements engineering. *Bioresources and Bioprocessing*, 7(1), 18. <https://doi.org/10.1186/s40643-020-00306-w>
- Singh, A., & Narang, A. (2023). PAOX1 expression in mixed-substrate continuous cultures of *Komagataella phaffii* (*Pichia pastoris*) is completely determined by methanol consumption regardless of the secondary carbon source. *Frontiers in Bioengineering and Biotechnology*, 11. <https://doi.org/10.3389/fbioe.2023.1123703>
- Tao, Z., Yuan, H., Liu, M., Liu, Q., Zhang, S., Liu, H., Jiang, Y., Huang, D., & Wang, T. (2023). Yeast Extract: Characteristics, Production, Applications and Future Perspectives. *Journal of Microbiology and Biotechnology*, 33(2), 151–166. <https://doi.org/10.4014/jmb.2207.07057>
- Tuluc, P., Theiner, T., Jacobo-Piqueras, N., & Geisler, S. M. (2021). Role of High Voltage-Gated Ca²⁺ Channel Subunits in Pancreatic β-Cell Insulin Release. From Structure to Function. *Cells*, 10(8), 2004. <https://doi.org/10.3390/cells10082004>
- van Gerwen, J., Shun-Shion, A. S., & Fazakerley, D. J. (2023). Insulin signalling and GLUT4 trafficking in insulin resistance. *Biochemical Society Transactions*, 51(3), 1057–1069. <https://doi.org/10.1042/BST20221066>
- Vojinović, V., Cabral, J. M. S., & Fonseca, L. P. (2006). Real-time bioprocess monitoring. *Sensors and Actuators B: Chemical*, 114(2), 1083–1091. <https://doi.org/10.1016/j.snb.2005.07.059>
- Wang, J., Wang, X., Shi, L., Qi, F., Zhang, P., Zhang, Y., Zhou, X., Song, Z., & Cai, M. (2017). Methanol-Independent Protein Expression by AOX1 Promoter with trans-Acting Elements Engineering and Glucose-Glycerol-Shift Induction in *Pichia pastoris*. *Scientific Reports*, 7(1), 41850. <https://doi.org/10.1038/srep41850>
- WHO. (2021, November 10). *Diabetes*. World Health Organization.
- Yunn, N.-O., Kim, J., Ryu, S. H., & Cho, Y. (2023). A stepwise activation model for the insulin receptor. *Experimental & Molecular Medicine*, 55(10), 2147–2161. <https://doi.org/10.1038/s12276-023-01101-1>
- Zepeda, A. B., Pessoa, A., & Farías, J. G. (2018). Carbon metabolism influenced for promoters and temperature used in the heterologous protein production using *Pichia pastoris* yeast. *Brazilian Journal of Microbiology*, 49, 119–127. <https://doi.org/10.1016/j.bjm.2018.03.010>

Zha, J., Liu, D., Ren, J., Liu, Z., & Wu, X. (2023a). Advances in Metabolic Engineering of *Pichia pastoris* Strains as Powerful Cell Factories. *Journal of Fungi*, 9(10), 1027. <https://doi.org/10.3390/jof9101027>

Zha, J., Liu, D., Ren, J., Liu, Z., & Wu, X. (2023b). Advances in Metabolic Engineering of *Pichia pastoris* Strains as Powerful Cell Factories. *Journal of Fungi*, 9(10), 1027. <https://doi.org/10.3390/jof9101027>

Zheng, N., Karra, P., VandenBerg, M. A., Kim, J. H., Webber, M. J., Holland, W. L., & Chou, D. H.-C. (2019). Synthesis and Characterization of an A6-A11 Methylene Thioacetal Human Insulin Analogue with Enhanced Stability. *Journal of Medicinal Chemistry*, 62(24), 11437–11443. <https://doi.org/10.1021/acs.jmedchem.9b01589>

