

DAFTAR PUSTAKA

- Abrosimova, K. V., Shulenina, O. V., & Paston, S. V., 2016, FTIR study of secondary structure of bovine serum albumin and ovalbumin, *Journal of Physics: Conference Series*, 769(1), 1-6.
- Aizawa, H., 2018, Allosteric effect by synchronized resonance of amide bonds through alpha-helix, *Trends in Research*, 1(2), 1-2.
- Akash, M.S.H., Rehman, K., Tariq, M. & Chen, S., 2015, Development of therapeutic proteins: Advances and challenges, *Turkish Journal of Biology*, 39(3), 343–358.
- Arakawa, T., Prestrelski, S. J., Kenney, W. C., & Carpenter, J. F., 2001, Factors affecting short-term and long-term stabilities of proteins, *Advanced Drug Delivery Reviews*, 46, 307–326.
- Arsiccio, A., & Pisano, R., 2018, Surfactants as stabilizers for biopharmaceuticals: An insight into the molecular mechanisms for inhibition of protein aggregation. *European Journal of Pharmaceutics and Biopharmaceutics*, 128(2018), 98–106.
- Badkar, A.V., 2006, Effects of Formulation and Processing Stress on The Physical Stability of Protein Solutions, *Disertasi*, Sekolah Pascasarjana, Mercer University, Atlanta.
- Bondos, S. E., & Bicknell, A., 2003, Detection and prevention of protein aggregation before, during, and after purification, *Analytical Biochemistry*, 316(2), 223–231.
- Borzova, V. A., Markossian, K. A., Kleymenov, S. Y., & Kurganov, B. I., 2017, A change in the aggregation pathway of bovine serum albumin in the presence of arginine and its derivatives, *Scientific Reports*, 7(1), 1–12.
- Chaudhuri, R., Cheng, Y., Middaugh, C. R., & Volkin, D. B., 2014, High-Throughput Biophysical Analysis of Protein Therapeutics to Examine Interrelationships Between Aggregate Formation and Conformational Stability, *The APPS Journal*, 16(1), 48–64.
- Chou, D.K., 2008, Mechanistic Insights Into Physical and Chemical Stability of Albumin Fusion Protein in Aqueous Solution, *Tesis*, Sekolah Pascasarjana University of Colorado, Denver.
- Deechongkit, S., Wen, J., Narhi, L.O., Jiang, Y., Park, S.S., Kim, J. & Kerwin, B.A., 2009, Physical and biophysical effects of polysorbate 20 and 80 on darbepoetin alfa, *Journal of Pharmaceutical Sciences*, 98(9), 3200–3217.
- Engelsman, J. Den, Garidel, P., Smulders, R., Koll, H., Smith, B., Bassarab, S., Seidl, A., Hainzl, O., dan Jiskoot, W., 2011, Strategies for the Assessment of Protein Aggregates in Pharmaceutical Biotech Product Development, *Pharmaceutical Research*, 28(4), 920–933.

- Gospodarczyk, W., Szutkowski, K., & Kozak, M., 2014, Interaction of bovine serum albumin (BSA) with novel gemini surfactants studied by synchrotron radiation scattering (SR-SAXS), circular dichroism (CD), and nuclear magnetic resonance (NMR), *Journal of Physical Chemistry B*, 118(29), 8652–8661.
- Graziano, G., 2012, How does sucrose stabilize the native state of globular proteins?, *International Journal of Biological Macromolecules*, 50(1), 230–235.
- Hauptmann, A., Podgoršek, K., Kuzman, D., Srčić, S., Hoelzl, G., & Loerting, T. 2018, Impact of Buffer, Protein Concentration and Sucrose Addition on the Aggregation and Particle Formation during Freezing and Thawing., *Pharmaceutical research*, 35(5), 101.
- Holm, N. K., Jespersen, S. K., Thomassen, L. V, Wolff, T. Y., Sehgal, P., Thomsen, L. A., Christiansen, G., Andersen, C. B., Knudsen, A. D., & Otzen, D. E., 2007, Aggregation and fibrillation of bovine serum albumin, *Biochimica et Biophysica Acta*, 1774, 1128–1138.
- Horton, H.R., Moran, L.A., Ochs, R.S., Rawn, J.D., Scrimgeour, K.G., 2002, *Principles of Biochemistry*, 3rd Edition, Printice-Hall, London, Halaman 83–84.
- Jones, L. S., Randolph, T. W., Kohnert, U., Papadimitriou, A., Winter, G., Hagmann, M. L., Manning, M. C., & Carpenter, J.F., 2001, The effects of Tween 20 and sucrose on the stability of anti-L-selectin during lyophilization and reconstitution, *Journal of Pharmaceutical Sciences*, 90(10), 1466–1477.
- Kamerzell, T.J., Esfandiary, R., Joshi, S.B., Middaugh, C.R. & Volkin, D.B., 2011, Protein–excipient interactions: Mechanisms and biophysical characterization applied to protein formulation development, *Advanced Drug Delivery Reviews*, 63(13), 1118–1159.
- Katdare, A., & Chaubal, M.V., 2006, *Excipient Development for Pharmaceutical, Biotechnology, and Drug Delivery Systems*, Informa Healthcare, New York.
- Kerwin, B. A. , Heller, M. C., Levin, S. H., & Randolph, T. W. R., 1998, Effects of Tween 80 and Sucrose on Acute Short-Term Stability and Long-Term Storage at –20 °C of a Recombinant Hemoglobin, *Journal of Pharmaceutical Sciences*, 87(9), 1062-1068.
- Khan, T.A., Mahler, H.C. & Kishore, R.S.K., 2015, Key interactions of surfactants in therapeutic protein formulations: A review, *European Journal of Pharmaceutics and Biopharmaceutics*, 97, 60–67.
- Kong, J., & Yu, S., 2007, Fourier Transform Infrared Spectroscopic Analysis of Protein Secondary Structures Protein, *Acta Biochimica et Biophysica Sinica*, 39(8), 549–559.

- Krielgaard, L., Jones, L.S., Randolph, T.W., Frokjaer, S., Flink, J.M., Manning, M.C. & Carpenter, J.F., 1998, Effect of tween 20 on freeze-thawing- and agitation-induced aggregation of recombinant human factor XIII, *Journal of Pharmaceutical Sciences*, 87(12), 1597–1603.
- Krishnan, S., Chi, E. Y., Webb, J. N., Chang, B. S., Shan, D., Goldenberg, M., Manning, M. C., Randolph, T.W., & Carpenter, J. F., 2002, Aggregation of Granulocyte Colony Stimulating Factor under Physiological Conditions: Characterization and Thermodynamic Inhibition, *Biochemistry*, 41, 6422–6431.
- Kueltzo, L. A., Wang, W. E. I., Randolph, T. W., & Carpenter, J. F., 2008, Effects of Solution Conditions, Processing Parameters, and Container Materials on Aggregation of a Monoclonal Antibody during Freeze–Thawing, *Wiley InterScience*, 97(5), 1801–1812.
- Lagassé, H.A.D., Alexaki, A., Simhadri, V.L., Katagiri, N.H., Jankowski, W., Sauna, Z.E. & Kimchi-Sarfaty, C., 2017, Recent advances in (therapeutic protein) drug development, *F1000Research*, 6, 113.
- Leader, B., Baca, Q.J. & Golan, D.E., 2008, Protein therapeutics: a summary and pharmacological classification, 7(1), 21–39.
- Lee, H.J., McAuley, A., Schilke, K.F. & McGuire, J., 2011, Molecular origins of surfactant-mediated stabilization of protein drugs, *Advanced Drug Delivery Reviews*, 63(13), 1160–1171.
- Lee, J. C., & Timasheff, S. N., The Stabilization of Proteins by Sucrose*, *The Journal of Biological Chemistry*, 256, 7193-7201.
- Liu, W., 2000, The Impact Of Formulation Composition On The Stability Of Freezed-Dried Proteins, *Tesis*, Sekolah Pascasarjana, Purdue University, Indiana.
- Ludwig, D.B., 2010, Therapeutic Protein Formulation Stability : Homogeneous & Heterogeneous Nucleated Protein Aggregation, *Disertasi*, Sekolah Pascasarjana, University of Colorado, Denver.
- Mach, H., Sanyal, G., Volkin, D. B., & Middaugh, C. R., 1997, Applications of Ultraviolet Absorption Spectroscopy to the Analysis of Biopharmaceuticals, *American Chemical Society*, 186-205.
- Manning, M. C., Chou, D. K., Murphy, B. M., Payne, R. W., & Katayama, D. S., 2010, Stability of protein pharmaceuticals: An update, *Pharmaceutical Research*, 27(4), 544–575.
- Mensink, M.A., Frijlink, H.W., Voort Maarschalk, K. van der & Hinrichs, W.L.J., 2017, How sugars protect proteins in the solid state and during drying (review): Mechanisms of stabilization in relation to stress conditions, *European Journal of Pharmaceutics and Biopharmaceutics*, 114, 288–295.
- Moussa, E. M., Panchal, J. P., Moorthy, B. S., Blum, J. S., Joubert, M. K., Narhi, L. O., & Topp, E. M., 2016, Immunogenicity of Therapeutic Protein Aggregates, *Journal of Pharmaceutical Sciences*, 105(2), 417–430.

- Murayama, K., & Tomida, M., 2004, Heat-Induced Secondary Structure and Conformation Change of Bovine Serum Albumin Investigated by Fourier Transform Infrared Spectroscopy, *Biochemistry*, 43, 11526–11532.
- Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A., 2014, *Biokimia Harper*, Edisi 29, Penerbit Buku Kedokteran EGC, Jakarta, Halaman 29.
- Murray, R.K., Granner, D.K., Mayes, P.A., dan Rodwell, V.W., 2003, *Biokimia, Harper*, Edisi 25, Penerbit Buku Kedokteran EGC, Jakarta, Halaman 46-47.
- Nikolaidis, A., & Moschakis, T., 2017, Studying the denaturation of bovine serum albumin by a novel approach of difference-UV analysis, *Food Chemistry*, 215, 235–244.
- Ngarize, S., Herman, H., Adams, A., dan Howel, N., 2004, Comparison of Changes in the Secondary Structure of Unheated , Heated , and High-Pressure-Treated β -Lactoglobulin and Ovalbumin Proteins Using Fourier Transform Raman Spectroscopy and Self-Deconvolution, *Journal of Agricultural and Food Chemistry*, 52, 6470–6477.
- Ohtake, S., Kita, Y. & Arakawa, T., 2011, Interactions of formulation excipients with proteins in solution and in the dried state, *Advanced Drug Delivery Reviews*, 63(13), 1053–1073.
- Oshima, H. & Kinoshita, M., 2013, Effects of sugars on the thermal stability of a protein, *Journal of Chemical Physics*, 138(24).
- Ratanji, K.D., Derrick, J.P., Dearman, R.J. & Kimber, I., 2014, Immunogenicity of therapeutic proteins: Influence of aggregation, *Journal of Immunotoxicology*, 11(2), 99–109.
- Roberts, C.J., 2014, Therapeutic protein aggregation: Mechanisms, design, and control, *Trends in Biotechnology*, 32(7), 372–380.
- Shirwaikar, A., Srinivasan, K., Alex, J., Prabu, S., Mahalaxmi, R., Kumar, R. & Jacob, S., 2006, Stability of proteins in aqueous solution and solid state, *Indian Journal of Pharmaceutical Sciences*, 68(2), 154.
- Stryer, Lubert, 2000, *Biokimia Vol.2*, Edisi 4, Penerbit Buku Kedokteran EGC, Jakarta, Halaman 47.
- Tabak, M., Sousa Neto, D. De & Salmon, C.E.G., 2006, On the interaction of Bovine Serum Albumin (BSA) with cetyltrimethyl ammonium chloride surfactant: Electron Paramagnetic Resonance (EPR) study, *Brazilian Journal of Physics*, 36(1a).
- Taha, M., Quental, M. V., Correia, I., Freire, M.G. & João, A.P., 2015, Extraction and stability of bovine serum albumin (BSA) using cholinium-based Good ' s buffers ionic liquids, *Process Biochem*, 50(7), 1158–1166.

- Vlasova, I. M., Vlasov, A. A., Grapendaal, G. R., & Saletskii, A. M., 2018, Association Constants in the Bovine Serum Albumin/Human Serum Albumin–Tween 20 System in Aqueous Solutions, *Russian Journal of Physical Chemistry A*, 92(4), 714–718.
- Wang, W., 2005, Protein aggregation and its inhibition in biopharmaceutics, *International Journal of Pharmaceutics*, 289(1–2), 1–30.
- Wang, W., Wang, Y. J., & Wang, D. Q., 2008, Dual effects of Tween 80 on protein stability, *International Journal of Pharmaceutics*, 347(1–2), 31–38.
- Wang, W., & Roberts, C. J., 2018, Protein Aggregation - Mechanisms, Detection, and Control. *International Journal of Pharmaceutics*, 550(1-2), 251-268.
- Webb, S. D., Cleland, J. L., Carpenter, J. F., & Randolph, T. W., 2002, A New Mechanism for Decreasing Aggregation of Recombinant Human Interferon- γ by a Surfactant: Slowed Dissolution of Lyophilized Formulations in a Solution Containing 0.03% Polysorbate 20, *Journal of Pharmaceutical Sciences*, 91(2), 543–558.
- Yohannes, G., Wiedmer, S.K., Elomaa, M., Jussila, M., Aseyev, V. & Riekkola, M.L., 2010, Thermal aggregation of bovine serum albumin studied by asymmetrical flow field-flow fractionation, *Analytica Chimica Acta*, 675(2), 191–198.
- Zhou, X., He, Z., & Huang, H., 2017, Secondary Structure Transitions of Bovine Serum Albumin Induced by Temperature Variation. *Vibrational Spectroscopy*, 1-23.