

## DAFTAR PUSTAKA

1. Wróbel A, Maliszewski D, Baradyn M, Drozdowska D. Trimethoprim: An old antibacterial drug as a template to search for new targets. Synthesis, biological activity and molecular modeling study of novel trimethoprim analogs. *Molecules*. 2020;25(1).
2. Elshaer A, Hanson P, Worthington T, Lambert P, Mohammed AR. Preparation and characterization of amino acids-based trimethoprim salts. *Pharmaceutics*. 2012;4(1):179–96.
3. Mendes C, Valentini G, Chamorro Rengifo AF, Pinto JMO, Silva MAS, Parize AL. Supersaturating drug delivery system of fixed drug combination: sulfamethoxazole and trimethoprim. *Expert. Rev. Anti Infect. Ther*. 2019;17(10):841–50.
4. Setyawan D, Paramita DP. *Strategi Peningkatan Kelarutan Bahan Aktif Farmasi*. Malang: Airlangga University Press; 2019.
5. Huang Y, Li JM, Lai ZH, Wu J, Lu TB, Chen JM. Phenazopyridine-phthalimide nano-cocrystal: Release rate and oral bioavailability enhancement. *Eur. J. Pharm. Sci*. 2017;109:581–6.
6. Bhattacharya B, Das S, Lal G, Soni SR, Ghosh A, Reddy CM, et al. Screening, crystal structures and solubility studies of a series of multidrug salt hydrates and cocrystals of fenamic acids with trimethoprim and sulfamethazine. *J. Mol. Struct*. 2020;1199:127028.
7. Li N, Zhang YH, Xiong XL, Li ZG, Jin XH, Wu YN. Study of the physicochemical properties of trimethoprim with  $\beta$ -cyclodextrin in solution. *J. Pharm. Biomed. Anal*. 2005;38(2):370–4.
8. Batisai E. Multicomponent crystals of anti-tuberculosis drugs: a mini-review. *RSC Adv*. 2020;10(61):37134–41.
9. Ainurofiq A, Mauludin R, Mudhakhir D, Soewandhi S. Synthesis, characterization, and stability study of desloratadine multicomponent crystal formation. *Res. Pharm. Sci*. 2018;13(2):93–102.
10. Umar S, Farnandi R, Salsabila H, Zaini E. Multicomponent Crystal of Trimethoprim and Citric Acid: Solid State Characterization and Dissolution Rate Studies. *J. Med. Sci*. 2022;10:141–5.
11. Yuliandra Y, Hutabarat LJ, Ardila R, Octavia MD, Zaini E. Enhancing solubility and antibacterial activity using multi-component crystals of trimethoprim and malic acid. *Pharm. Educ*. 2021;21(2):296–304.
12. Zaini E, Sumirtapura YC, Halim A, Fitriani L, Soewandhi SN. Formation and characterization of sulfamethoxazole-trimethoprim cocrystal by milling

- process. *J. Appl. Pharm. Sci.* 2017;7(12):169–73.
13. Guo M, Sun X, Chen J, Cai T. Pharmaceutical cocrystals: A review of preparations, physicochemical properties and applications. *Acta. Pharm. Sin. B.* 2021;11(8):2537–64.
  14. Rodrigues M, Baptista B, Lopes JA, Sarraguça MC. Pharmaceutical cocrystallization techniques. Advances and challenges. *Int. J. Pharm.* 2018;547(1–2):404–20.
  15. Alhalaweh A, Velaga SP. Formation of cocrystals from stoichiometric solutions of incongruently saturating systems by spray drying. *Cryst. Growth. Des.* 2010;10(8):3302–5.
  16. Liu N, Duan B, Lu X, Mo H, Xu M, Zhang Q, et al. Preparation of CL-20/DNDAP cocrystals by a rapid and continuous spray drying method: An alternative to cocrystal formation. *Cryst. Eng. Comm.* 2018;20(14):2060–7.
  17. Kesharwani P, Jain N. *Hybrid Nanomaterials for Drug Delivery*. Kidlington: Woodhead Publishing; 2022.
  18. Álvarez-Vidaurre R, Castiñeiras A, Frontera A, García-Santos I, Gil DM, González-Pérez JM, et al. Weak interactions in cocrystals of isoniazid with glycolic and mandelic acids. *Crystals.* 2021;11(4).
  19. Wang L, Tan B, Zhang H, Deng Z. Pharmaceutical cocrystals of diflunisal with nicotinamide or isonicotinamide. *Org. Process. Res. Dev.* 2013;17(11):1413–8.
  20. Dayal S, Kalra KD, Sahu P. Comparative study of efficacy and safety of 45% mandelic acid versus 30% salicylic acid peels in mild-to-moderate acne vulgaris. *J. Cosmet. Dermatol.* 2020;19(2):393–9.
  21. Corcoran JW, Hahn FE, Snell JF, Arora KL. *Antibiotics III: Mechanism of Action of Antimicrobial and Antitumor Agents*. Heidelberg: Springer ; 1975.
  22. Pubchem. Trimethoprim. National Library of Medicine [disitasi pada 23 Desember 2021]. Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/Trimethoprim#section=2D-Structure>
  23. Kemenkes RI. *Farmakope Indonesia edisi VI*. Departemen Kesehatan Republik Indonesia. 2020.
  24. Garnero C, Zoppi A, Genovese D, Longhi M. Studies on trimethoprim: Hydroxypropyl- $\beta$ -cyclodextrin: Aggregate and complex formation. *Carbohydr. Res.* 2010;345(17):2550–6.
  25. Siswando. *Kimia Medisinal 2 Edisi 2*. Surabaya: Airlangga University Press; 2016.
  26. Tjaj DTH, Rahardja DK. *Obat-Obat Penting : khasiat, penggunaan dan*

*efek-efek sampingnya. 6th ed.* Jakarta: PT Elex Media Komputindo; 2007.

27. Sharon M, Durve A, Pandey A, Pathak M. *Mandelic Acid: Aha*. Gurgaon: Partridge Publishing; 2018.
28. Pubchem. Mandelic acid. National Library of Medicine. [disitasi pada 23 Desember 2021]. Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/Mandelic-acid#section=3D-Conformer>
29. Brittain HG. Mandelic Acid. *Anal. Profiles Drug Subst. Excipients*. 2002;29(C):179–211.
30. Gomes DJC, Caires FJ, Lima LS, Gigante AC, Ionashiro M. Thermal behaviour of mandelic acid, sodium mandelate and its compounds with some bivalent transition metal ions. *Thermochim. Acta*. 2012;533:16–21.
31. Motamedifar M, Bazargani A, Namazi MR, Sarai HSE. Antimicrobial activity of mandelic acid against methicillin-resistant *Staphylococcus aureus*: A novel finding with important practical implications. *World. Appl. Sci. J*. 2014;31(5):925–9.
32. Varala R, Kotra V, Alam MM, Kumar NR, Ganapaty S, Adapa SR. Synthesis of mandelic acid derived phthalimides as a new class of antiinflammatory and antimicrobial agents. *Indian. J. Chem. - Sect B Org. Med. Chem*. 2008;47(8):1243–8.
33. Viertelhaus M, Hilfiker R, Blatter F, Neuburger M. Piracetam Co-Crystals with OH-Group Functionalized Carboxylic Acids. *Cryst. Growth. Des*. 2009;9(5):2220–8.
34. Sládková V, Dammer O, Sedmak G, Skořepová E, Kratochvíl B. Ivabradine hydrochloride (S)-mandelic acid co-crystal: In situ preparation during formulation. *Crystals*. 2017;7(1).
35. Kojima T, Tsutsumi S, Yamamoto K, Ikeda Y, Moriwaki T. High-throughput cocrystal slurry screening by use of in situ Raman microscopy and multi-well plate. *Int. J. Pharm*. 2010;399(1–2):52–9.
36. Setyawan D, Paramita DP. *Strategi Peningkatan Kelarutan Bahan Aktif Farmasi*. Surabaya: Airlangga University Press; 2019.
37. Sopyan I. *Kokristalisasi*. Yogyakarta: Deepublish; 2020.
38. Couillaud BM, Espeau P, Mignet N, Corvis Y. State of the Art of Pharmaceutical Solid Forms: from Crystal Property Issues to Nanocrystals Formulation. *Chem. Med. Chem*. 2019;14(1):8–23.
39. Setyawan D, Zaini E. *Polimorf Bahan Aktif Farmasi*. Surabaya: Airlangga University Press; 2018.
40. Sakamoto M, Uekusa H. *Advances in Organic Crystal Chemistry; Comprehensive Reviews 2020*. Singapore: Springer; 2020.

41. Karagianni A, Malamatari M, Kachrimanis K. Pharmaceutical cocrystals: New solid phase modification approaches for the formulation of APIs. *Pharmaceutics*. 2018;10(1):1–30.
42. Salama AH. Spray drying as an advantageous strategy for enhancing pharmaceuticals bioavailability. *Drug. Deliv. Transl. Res.* 2020;10(1).
43. Malamatari M, Charisi A, Malamataris S, Kachrimanis K, Nikolakakis I. Spray drying for the preparation of nanoparticle-based drug formulations as dry powders for inhalation. *Processes*. 2020;8(7).
44. Czyz S, Wewers M, Finke JH, Kwade A, van Eerdenbrugh B, Juhnke M, et al. Spray drying of API nanosuspensions: Importance of drying temperature, type and content of matrix former and particle size for successful formulation and process development. *Eur. J. Pharm. Biopharm.* 2020;152(April):63–71.
45. Sosnik A, Seremeta KP. Advantages and challenges of the spray-drying technology for the production of pure drug particles and drug-loaded polymeric carriers. *Adv. Colloid. Interface. Sci.* 2015;223:40–54.
46. Sopyan I. *Kokristalisasi; Modifikasi Padatan Farmasi Sebagai Strategi Perbaikan Sifat Fisikokimia Obat*. Yogyakarta: Deepublish; 2020.
47. Qiu Y, Chen Y, Zhang GGZ. *Developing Solid Oral Dosage Forms*. Netherland; 2009.
48. Healy AM, Worku ZA, Kumar D, Madi AM. Pharmaceutical solvates, hydrates and amorphous forms: A special emphasis on cocrystals. *Adv. Drug. Deliv. Rev.* 2017;117:25–46.
49. Gong W, Mondal PK, Ahmadi S, Wu Y, Rohani S. Cocrystals, Salts, and Salt-Solvates of olanzapine; selection of cofomers and improved solubility. *Int. J. Pharm.* 2021;608:121063.
50. Ma Y, Yang Y, Xie J, Xu J, Yue P, Yang M. Novel nanocrystal-based solid dispersion with high drug loading, enhanced dissolution, and bioavailability of andrographolide. *Int. J. Nanomedicine*. 2018;13:3763–79.
51. Yuliandra Y, Izadihari R, Rosaini H, Zaini E. Multicomponent crystals of mefenamic acid–tromethamine with improved dissolution rate. *J. Res. Pharm.* 2019;23(6):988–96.
52. Mattei A, Lim Tonglei. *Pharmaceutical Crystals*. Hoboken: Wiley; 2018. 1–46 p.
53. Shah N. *Nanocarriers : drug delivery system : an evidence based approach*. Singapore: Springer singapore; 2021.
54. Byrn SR, Zografis G, Chen X. *Solid state properties of pharmaceutical materials*. Hoboken: John Wiley & Sons Inc; 2017.

55. Storey RA, Ymen I. *Solid state characterization of pharmaceuticals*. Chichester: John Wiley & Sons; 2011.
56. Fatmawati A, Nisa M, Rezki R. *Teknologi Sediaan Farmasi*. Yogyakarta: Deepublish; 2015.
57. Nair A, Saal C. *Solubility in Pharmaceutical Chemistry*. Germany: De Gruyter; 2020.
58. Webster GK, Jackson JD, Bell RG. *Poorly soluble drugs : dissolution and drug release*. Singapore: Jenny Stanford Publishing; 2017.
59. Susanti M, Dachriyanus. *Kromatografi Cair Kinerja Tinggi*. Padang: LPTIK Universitas Andalas; 2017.
60. Rochman A. *Analisis Farmasi dengan Kromatografi Cair*. Yogyakarta: UGM Press; 2020.
61. Rohman A. *Validasi Penjaminan Mutu Metode Analisis Kimia*. Yogyakarta: Gadjah Mada University Press; 2014.
62. Fadhila M, Umar S, Zaini E. Pembentukan Kokristal Asam Usnat – N-Methyl-DGlucamine dengan Metode Penguapan Pelarut dan Pengaruhnya terhadap Penurunan Interleukin-8 pada Tikus Inflamasi. *J. Sains. Farm. Klin.* 2020;7(1):23.
63. Noviza D, Fitriani L, Fauzi RZ. Dispersi Padat Asam Usnat dengan Teknik Freeze Drying menggunakan Poloxamer 188 sebagai Polimer. *J. Sains. Farm. Klin.* 2018;5(1):41.
64. Farnandi R. *Multikomponen Kristal Trimethoprim dan Asam Sitrat : Karakterisasi dan Efektivitas Anti Bakteri*. Padang: Universitas Andalas; 2021.
65. Mufarida NA. *Perpindahan Panas dan Massa pada Spray Dryer*. CV Pustaka Abadi. Jember: Pustaka Abadi; 2016. 1–65 p.
66. Almansour K, Ali R, Alheibshy F, Almutairi TJ, Alshammari RF, Alhaji N, et al. Particle Engineering by Nano Spray Drying: Optimization of Process Parameters with Hydroethanolic versus Aqueous Solutions. *Pharmaceutics*. 2022;14(4):1–20.
67. Lee K-C, Seok Yoon Y, Li F-Z, Eun J-B. Effects of inlet air temperature and concentration of carrier agents on physicochemical properties, sensory evaluation of spray-dried mandarin (Citrus unshiu) beverage powder. *Appl. Biol. Chem.* 2017;60(1):33–40.
68. Weng J, Wong SN, Xu X, Xuan B, Wang C, Chen R, et al. Cocrystal Engineering of Itraconazole with Suberic Acid via Rotary Evaporation and Spray Drying. *Cryst. Growth. Des.* 2019 May 1;19(5):2736–45.
69. Zaini E, Fitriani L, Sari RY, Rosaini H, Horikawa A, Uekusa H.

- Multicomponent Crystal of Mefenamic Acid and N-Methyl-D-Glucamine: Crystal Structures and Dissolution Study. *J. Pharm. Sci.* 2019;108(7):2341–8.
70. Solares-Briones M, Coyote-Dotor G, Páez-Franco JC, Zermeño-Ortega MR, Contreras CM de la O, Canseco-González D, et al. Mechanochemistry: A green approach in the preparation of pharmaceutical cocrystals. *Pharmaceutics*. 2021;13(6):1–49.
71. Lombard J, Loots L, Le Roex T, Haynes DA. Formation of multi-component crystals with a series of pyridinium-carboxyacrylate zwitterions. *Cryst. Eng. Comm.* 2017 Dec 18;20(1):25–34.
72. Bettinetti GP, Caramella C, Giordano F, La Manna A, Margheritis C, Sinistri C. Thermal analysis of binary systems of the pharmaceuticals trimethoprim and benzoic acid. *J. Therm. Anal.* 1983;28(2):285–93.
73. Brown WH, Poon T. *Introduction to organic chemistry*. Hoboken: John and Wiley Sons Inc; 2016.
74. Dachriyanus. *Analisis Struktur Senyawa Organik Secara Spektroskopi*. Padang: LPTIK Universitas Andalas; 2004.
75. Nandiyanto ABD, Oktiani R, Ragadhita R. How to read and interpret ftir spectroscopy of organic material. *Indones. J. Sci. Technol.* 2019;4(1):97–118.
76. Yadav LDS. *Organic spectroscopy*. Heidelberg: Springer; 2013.
77. Arzi RS, Sosnik A. Electrohydrodynamic atomization and spray-drying for the production of pure drug nanocrystals and co-crystals. *Adv. Drug. Deliv.* 2018;131:79–100.
78. Ahuja S, Dong MW. *Handbook of pharmaceutical analysis by HPLC*. San Diego: Elsevier Academic Press; 2005.
79. Rosydiati, Saleh EK. Karakterisasi puncak kromatogram dalam High Performance Liquid Chromatography (HPLC) terhadap perbedaan fase gerak, laju alir, dan penambahan asam dalam analisis Indole Acetic Acid (IAA). *Kandaga*. 2019;1(2):65–73.
80. Dong MW. *Modern HPLC for Practicing Scientists*. Hoboken: Wiley; 2016.
81. Dong MW. *HPLC and UHPLC for practicing scientists*. Hoboken: Wiley; 2019.
82. Umar S, Putri Bandaro N, Anggraini D, Zaini E. Multicomponent Crystal of Fenofibric Acid-Saccharin: Characterization and Antihyperlipidemic Effectiveness. *Adv. Heal. Sci. Res.* 2021;40(Iccscp):104–9.
83. Savjani KT, Gajjar AK, Savjani JK. Drug Solubility: Importance and

Enhancement Techniques. *ISRN Pharm.* 2012;2012(100 mL):1–10.

84. Fathnur SK. *Metodologi Penelitian Farmasi Komunitas dan Eksperimental*. Yogyakarta: Deepublish; 2018.

