

DAFTAR PUSTAKA

1. Al-Kassas R, Bansal M, Shaw J. Nanosizing techniques for improving bioavailability of drugs. *J Control Release* [Internet]. 2017;260:202–12.
2. Wang Y, Pi C, Feng X, Hou Y, Zhao L, Wei Y. The influence of nanoparticle properties on oral bioavailability of drugs. *Int J Nanomedicine*. 2020;15:6295–310.
3. Malamatari M, Taylor KMG, Malamataris S, Douroumis D, Kachrimanis K. Pharmaceutical nanocrystals: production by wet milling and applications. *Drug Discov Today* [Internet]. 2018;23(3):534–47.
4. Dizaj SM, Vazifehasl Z, Salatin S, Adibkia K, Javadzadeh Y. Nanosizing of drugs: Effect on dissolution rate. *Res Pharm Sci*. 2015;10(2):95–108.
5. Vasavirama K, Upender M. Piperine : A Valuable Alkaloid From Piper Species. *Int J Pharm Pharm Sci*. 2014;6(4):34–8.
6. Sari YN, Zaini E, Ismed F. Peningkatan Laju Disolusi Piperine dengan Pembentukan Multikomponen Kristal Menggunakan Asam Nikotinat. *J Sains Farm Klin*. 2019;6(2):180–5.
7. Ezawa T, Inoue Y, Murata I, Takao K, Sugita Y, Kanamoto I. Characterization of the Dissolution Behavior of Piperine/Cyclodextrins Inclusion Complexes. *AAPS PharmSciTech*. 2018;19(2):923–33.
8. Thenmozhi K, Yoo YJ. Enhanced solubility of piperine using hydrophilic carrier-based potent solid dispersion systems. *Drug Dev Ind Pharm* [Internet]. 2017;43(9):1501–9.
9. Ren T, Hu M, Cheng Y, Shek TL, Xiao M, Ho NJ, et al. Piperine-loaded nanoparticles with enhanced dissolution and oral bioavailability for epilepsy control. *Eur J Pharm Sci* [Internet]. 2019;137(May):104988.
10. Jessica A, Naura R, Hasanah U, Zaini E, Fitriani L. Pembentukan Multikomponen Kristal Piperin Dan Kuersetin. *JOPS (Journal Pharm Sci)*. 2021;4(2):1–11.
11. Zaini E, Afriyani, Fitriani L, Ismed F, Horikawa A, Uekusa H. Improved solubility and dissolution rates in novel multicomponent crystals of piperine with succinic acid. *Sci Pharm*. 2020;88(2).
12. Auria IMA. Pembentukan dan Karakterisasi Multikomponen Kristal Piperin dan Nikotinamida Dengan Metode Solvent Drop Grinding. Universitas Andalas; 2021.
13. Hairunnisa, Sopyan I, Gozali D. Cocrystal : nocotimide as the cofomer. *J Ilm Farm Bahari*. 2019;10(2):113–22.

14. Adeyinka Aina, Andrew Morris, Manish Gupta, Nashiru Billa, Neesha Madhvani, Ritika Sharma, et al. Dissolution behavior of poly vinyl alcohol in water and its effect on the physical morphologies of PLGA scaffolds. *Pharm Biosci J.* 2014;(February):01–6.
15. Shityakov S, Bigdelian E, Hussein AA, Hussain MB, Tripathi YC, Khan MU, et al. Phytochemical and pharmacological attributes of piperine: A bioactive ingredient of black pepper. *Eur J Med Chem [Internet].* 2019;176:149–61.
16. Haq IU, Imran M, Nadeem M, Tufail T, Gondal TA, Mubarak MS. Piperine: A review of its biological effects. *Phyther Res.* 2021;35(2):680–700.
17. Shah SS, Shah GB, Singh SD, Gohil P V., Chauhan K, Shah KA, et al. Effect of piperine in the regulation of obesity-induced dyslipidemia in high-fat diet rats. *Indian J Pharmacol.* 2011;43(3):296–9.
18. Maneesai P, Scholfield NC, Chootip K. Piperine is Anti-hyperlipidemic and Improves Endothelium-Dependent Vasorelaxation in Rats on a High Cholesterol Diet. *J Physiol Biomed Sci.* 2012;25(1):27–30.
19. Tunsophon S, Chootip K. Comparative effects of piperine and simvastatin in fat accumulation and antioxidative status in high fat-induced hyperlipidemic rats. *Can J Physiol Pharmacol.* 2016;94(12):1344–8.
20. PERKENI. Pedoman Pengelolaan Dislipidemi di Indonesia 2019. PB Perkeni. 2019;9.
21. WHO. Years of healthy life can be increased 5-10 years, WHO says. 2020;
22. Riskesdas T. Laporan Nasional Riskesdas 2018. 2018.
23. Purba DH, Marzuki I, Dailami M, Saputra HA, Mawarti H, Gurning K, et al. *Biokimia.* Medan: Yayasan Kita Menulis; 2021.
24. Mamuaja CF. *Lipida.* Unsrat Press. 2017;1(1):1–119.
25. Purbayanti D. Pengaruh Waktu Pada Penyimpanan Serum Untuk Pemeriksaan Kolesterol Total. *J Surya Med.* 2015;1(1).
26. Pachauri M, Gupta ED, Ghosh PC. Piperine loaded PEG-PLGA nanoparticles: Preparation, characterization and targeted delivery for adjuvant breast cancer chemotherapy. *J Drug Deliv Sci Technol [Internet].* 2015;29:269–82.
27. Gorgani L, Mohammadi M, Najafpour GD, Nikzad M. Piperine—The Bioactive Compound of Black Pepper: From Isolation to Medicinal Formulations. *Compr Rev Food Sci Food Saf.* 2017;16(1):124–40.
28. Itharat A, Kanokkangsadal P, Khemawoot P, Wanichsetakul P, Davies N. Pharmacokinetics of piperine after oral administration of Sahastara remedy capsules in healthy volunteers. *Res Pharm Sci.* 2020;15(5):410–7.
29. Kemenkes RI. *Farmakope Indonesia edisi VI.* Departemen Kesehatan

Republik Indonesia. 2020. 2371 p.

30. Maiese K. Nicotinamide as a Foundation for Treating Neurodegenerative Disease and Metabolic Disorders. *Curr Neurovasc Res.* 2021;18(1):134–49.
31. Pubchem. Nikotinamida [Internet]. 2020. Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/936>
32. Ying H, Zhang J, Jiang C. Preparation of Carbamazepine-Nicotinamide Cocrystal. *OALib.* 2021;08(07):1–8.
33. Yuliandra Y, Zaini E, Syofyan S, Pratiwi W, Putri LN, Pratiwi YS, et al. Cocrystal of ibuprofen–nicotinamide: Solid-state characterization and in vivo analgesic activity evaluation. *Sci Pharm.* 2018;86(2).
34. 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.
35. Ennis OP. Potential Role of Nicotinamide Supplementation in Prevention of Global Covid-19 Transmission Mukul Arvind Gharote. 2021;1(1).
36. Linnik I V., Rayner PJ, Stow RA, Duckett SB, Cheetham GMT. Pharmacokinetics of the SABRE agent 4,6-d 2 -nicotinamide and also nicotinamide in rats following oral and intravenous administration. *Eur J Pharm Sci [Internet].* 2019;135(March):32–7.
37. Fania L, Mazzanti C, Campione E, Candi E, Abeni D, Dellambra E. Role of nicotinamide in genomic stability and skin cancer chemoprevention. *Int J Mol Sci.* 2019;20(23).
38. Hwang ES, Song SB. Possible adverse effects of high-dose nicotinamide: Mechanisms and safety assessment. *Biomolecules.* 2020;10(5):1–21.
39. Grothe E, Meekes H, Vlieg E, Ter Horst JH, De Gelder R. Solvates, Salts, and Cocrystals: A Proposal for a Feasible Classification System. *Cryst Growth Des.* 2016;16(6):3237–43.
40. Umar S, Putri Bandaro N, Anggraini D, Zaini E. Multicomponent Crystal of Fenofibric Acid-Saccharin: Characterization and Antihyperlipidemic Effectiveness. 2021;40(Iccscp):104–9.
41. Surov AO, Vasilev NA, Vener M V., Parashchuk OD, Churakov A V., Magdysyuk O V., et al. Pharmaceutical Salts of Fenbendazole with Organic Counterions: Structural Analysis and Solubility Performance. *Cryst Growth Des.* 2021;21(8):4516–30.
42. Berry DJ, Steed JW. Pharmaceutical cocrystals, salts and multicomponent systems; intermolecular interactions and property based design. *Adv Drug Deliv Rev [Internet].* 2017;117:3–24.
43. Sakamoto M, Uekusa H. Advances in Organic Crystal Chemistry. *Advances in Organic Crystal Chemistry.* 2020.

44. Werner JE, Swift JA. Organic solvates in the Cambridge Structural Database. *CrystEngComm*. 2021;23(7):1555–65.
45. Chaudhari S, Nikam SA, Khatri N, Wakde S. Co-Crystals: a Review. *J Drug Deliv Ther*. 2018;8(6-s):350–8.
46. Johan, Wouters QL. Pharmaceutical Salts and Co-crystals [Internet]. *Pharmaceutical salts and co-crystals*. 2011. 406 p.
47. Bazzo GC, Pezzini BR, Stulzer HK. Eutectic mixtures as an approach to enhance solubility, dissolution rate and oral bioavailability of poorly water-soluble drugs. *Int J Pharm* [Internet]. 2020;588(August):119741.
48. Joshi K, Chandra A, Jain K, Talegaonkar S. Nanocrystallization: An Emerging Technology to Enhance the Bioavailability of Poorly Soluble Drugs. *Pharm Nanotechnol*. 2019;7(4):259–78.
49. Fontana F, Figueiredo P, Zhang P, Hirvonen JT, Liu D, Santos HA. Production of pure drug nanocrystals and nano co-crystals by confinement methods. *Adv Drug Deliv Rev* [Internet]. 2018;131:3–21.
50. Li M, Azad M, Davé R, Bilgili E. Nanomilling of drugs for bioavailability enhancement: A holistic formulation-process perspective. *Pharmaceutics*. 2016;8(2).
51. Knopp MM, Löbmann K, Elder DP, Rades T, Holm R. Recent advances and potential applications of modulated differential scanning calorimetry (mDSC) in drug development. *Eur J Pharm Sci* [Internet]. 2016;87:164–73.
52. Jahangir MA, Imam SS, Muheem A, Chettupalli A, Al-Abbasi FA, Nadeem MS, et al. Nanocrystals: Characterization Overview, Applications in Drug Delivery, and Their Toxicity Concerns. *J Pharm Innov*. 2020;
53. Bunaciu AA, Udriștioiu E gabriela, Aboul-Enein HY. X-Ray Diffraction: Instrumentation and Applications. *Crit Rev Anal Chem*. 2015;45(4):289–99.
54. Epp J. X-Ray Diffraction (XRD) Techniques for Materials Characterization [Internet]. *Materials Characterization Using Nondestructive Evaluation (NDE) Methods*. Elsevier Ltd; 2016. 81–124 p.
55. Xicoy H, Wieringa B, Martens GJM. The Role of Lipids in Parkinson's Disease. *Cells*. 2019;8(1):27.
56. Sumbono A. *Biokimia Pangan Dasar*. Vol. 10, Deepublish. Yogyakarta: Deepublish; 2016. 176–184 p.
57. Tjokoprawiro A. *Buku Ajar Ilmu Penyakit Dalam*. 2nd ed. Surabaya: Airlangga University Press; 2015.
58. Feingold K, Grunfeld C. *Introduction to Lipids and Lipoproteins*. South Dartmouth, USA: MD Text.com; 2021.
59. Bintang M, Rahmawati F, Safira UM, Andrianto D. *Biokimia Fisik*. Bogor: PT Penerbit IPB Press; 2020.

60. Singh P, Saxena R, Srinivas G, Pande G, Chattopadhyay A. Cholesterol Biosynthesis and Homeostasis in Regulation of the Cell Cycle. PLoS One. 2013;8(3).
61. Schade DS, Shey L, Eaton RP. Cholesterol review: A metabolically important molecule. Endocr Pract. 2020;26(12):1514–23.
62. Hill MF, Bordoni B. Hyperlipidemia. Treasure Island (FL): StatPearls Publishing; 2021.
63. Naser IH, Alkareem ZA, Mosa AU. Hyperlipidemia : pathophysiology , causes , complications , and treatment . A review. Kerbala J Pharm Pharm Sci. 2021;118–32.
64. Onwe P, Folawiyo M, Ogah A, Umahi G, Okorochoa A, Afoke A. Hyperlipidemia: Etiology and Possible Control. IOSR J Dent Med Sci [Internet]. 2015;14(10):2279–861.
65. Tjodi A, Killay A, Unitly AJA. Efek Antikolesterol Sirup Sirih Cina pada Tikus *Rattus norvegicus* Model Hiperkolesterolemia. J Kalwedo Sains. 2021;2(2):61–7.
66. Mende R, Simbala H, Mansauda KLR. Effectiveness Test Cider and Lime Peel Etanol Extract (*Citrus aurantifolia*) Againsts Hypercholesterolemia in Male White Rats Galur Wistar (*Rattus norvegicus*). Pharmacon. 2021;10:676–83.
67. Jialal MAIEAI. Hypercholesterolemia. Treasure Island (FL): StatPearls Publishing; 2021.
68. Dron JS, Hegele RA. Genetics of Hypertriglyceridemia. Front Endocrinol (Lausanne). 2020;11(July).
69. Parhofer KG, Laufs U. The diagnosis and treatment of hypertriglyceridemia. Dtsch Arztebl Int. 2019;116(49):825–32.
70. Erwiannto, Santoso A, Putranto JNE, Tedjasukmana P, Sukmawan R, Suryawan R, et al. Panduan Tatalaksana Dislipidemia [Internet]. Vol. 5, BMC Public Health. Indonesia: Perhimpunan Dokter Spesialis Kardiovaskular Indonesia; 2017. 1–8 p.
71. Sahriawati S & WS. Validasi Metode dan Penetapan Kadar Kolesterol Ayam Broiler dengan Metode Liebermann-Burchard. Lutjanus. 2019;9(1):31–40.
72. Saraswati SY, Puspitasari E, Yuswatiningsih E. Kadar kolesterol total pada perokok aktif dan perokok pasif: Studi literatur. J Borneo Cendekia. 2019;3:40–6.
73. Liu P. Nanocrystal formulation for poorly soluble drugs. 2013.
74. Alaydrus S, Pagal FRP., T D, Ervianingsih. Uji Efektivitas Ekstrak Etanol Biji Alpukat (*Persea americana Mill.*) terhadap Penurunan Kadar Kolesterol total Tikus Putih Jantan (*Rattus norvegicus*) Model Hiperkolesterolemia Diabetes. J Sains dan Kesehat. 2020;2(4):405–12.

75. Artha C, Mustika A, Sulistyawati SW. Pengaruh Ekstrak Daun Singawalang Terhadap Kadar LDL Tikus Putih Jantan Hiperkolesterolemia. *eJournal Kedokt Indones*. 2017;5(2):105–9.
76. Vogel HG. *Drug Discovery and Evaluation Pharmacological Assays*. 2nd ed. Germany: Springer; 2002.
77. Wahyuningrum MR, Probosari E. Pengaruh Pemberian Buah Pepaya (*Carica Papaya L.*) Terhadap Kadar Trigliserida Pada Tikus Sprague Dawley Dengan Hiperkolesterolemia. *J Nutr Coll*. 2012;1(1):192–8.
78. Afda Zakiya Annisa. Pengaruh Pemberian Ekstrak Etanol Daun Sungkai (*Peronema Canescens Jack.*) Terhadap Penurunan Kadar Kolesterol Total Dan Hdl Tikus Putih Jantan Hiperkolesterolemia. 2021;10–1.
79. Arpagaus C, Schafroth N. Laboratory scale spray drying of biodegradable polymers. *Respir Drug Deliv Eur*. 2009;(January 2009):269–74.
80. 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 [Internet]*. 2015;223:40–54.
81. Haggag YA, Faheem AM. Evaluation of nano spray drying as a method for drying and formulation of therapeutic peptides and proteins. *Front Pharmacol*. 2015;6(JUL):1–5.
82. Zaini E, Halim A, Soewandhi SN, Dwi Setyawan. Peningkatan Laju Pelarutan Trimetoprim Melalui Metode Ko-Kristalisasi Dengan Nikotinamida. *J Farm Indones*. 2011;5(July):206–12.
83. Gozali D, Tandela R, Wardhana W. Karakterisasi dan Peningkatan Disolusi Kalsium Atorvastatin melalui Proses Mikrokristalisasi. *J Ilmu-Ilmu Hayati dan Fis*. 2014;16(1):16–20.
84. Yunida Y, Kamaluddin MT, Theodorus T, Mangunsong S. Formulasi dan Karakterisasi Nanopartikel Kafein Hasil Isolasi dari Biji Kopi Robusta. *J Mandala Pharmacon Indones*. 2021;7(1):47–59.
85. Dipahayu D, Kusumo GG. Formulasi dan Evaluasi Nano Partikel Ekstrak Etanol Daun Ubi Jalar Ungu (*Ipomoea batatas L.*) Varietas Antin-3. *J Sains dan Kesehat*. 2021;3(6):781–5.
86. Susanti M, Dachriyanus. *Kromatografi Cair Kinerja Tinggi*. Padang: Lembaga Pengembangan Teknologi Informasi dan Komunikasi (LPTIK) Universitas Andalas;
87. Nugraheni B, Nafi'ah N, Anggoro B. Validasi Metode Analisis Dan Penurunan Kadar Infus Ciprofloksasin Yang Dipengaruhi Reaksi Oksidasi Menggunakan Hplc. *J Ilm Manuntung*. 2017;2(2):218.
88. Rejeki PS, Putri EAC, Prasetya RE. *Ovariectomi Pada Tikus dan Mencit*. Surabaya: Airlangga University Press; 2018.
89. Niza RS, Asni E, FW WA, Ismawati. Hubungan lama pemberian diet

aterogenik terhadap kadar trigliserida. jom FK Vol 2 no2 Oktober 2015. 2015;2(2):1–12.

90. Witosari N, Widyastuti N. Pengaruh Pemberian Jus Ubi Jalar (*Ipomoea batatas (L.) Lam*) terhadap Kadar Kolesterol Total Tikus Wistar Jantan (*Rattus norvegicus*) yang Diberi Pakan Tinggi Lemak. J Nutr Coll. 2014;3(4):638–46.
91. Faadlilah N, Ardiaria M. Efek Pemberian Seduhan Kulit Buah Naga Merah (*Hylocereus polyrhizus*) terhadap Kadar HDL Tikus Sprague Dawley Dislipidemia. J Nutr Coll. 2016;5(4):280–8.
92. Nuralifah N, Wahyuni W, Parawansah P, Dwi Shintia U. Uji Aktivitas Antihiperlipidemia Ekstrak Etanol Daun Notika (*Arcboldiodendron calosericeum Kobuski*) Terhadap Kadar Kolesterol Total Tikus (*Rattus norvegicus*) Jantan Galur Wistar. J Syifa Sci Clin Res. 2019;2(1):1–10.
93. Sentosa M, Saraswati TR, Tana S. Kadar Low Density Lipoprotein (LDL) Kuning Telur Puyuh Jepang (*Coturnix coturnix japonica L.*) setelah Pemberian Tepung Kunyit (*Curcuma longa L.*) pada Pakan. Bul Anat dan Fisiol. 2017;2(1):94.
94. Widada ST, Martsiningsik MA, Carolina SC. Gambaran Perbedaan Kadar Kolesterol Total Metode CHOD-PAP (Cholesterol Oxidase –Peroxidase Aminoantypirin) Sampel Serum dan Sampel Plasma EDTA. J Teknol Lab. 2016;5(1):41–4.
95. Hardisari R, Koiriyah B. Gambaran Kadar Trigliserida (Metode Gpo-Pap) Pada Sampel Serum dan Plasma EDTA. J Teknol Lab. 2016;5:27–31.
96. Rezeki PS, Argarini R, Purwanto B, Soetjipto H. Peningkatan Kolesterol pada Tikus Putih (*Rattus norvegicus*) Akibat Diet Tinggi Lemak Jenuh. Maj Ilmu Faal Indones. 2010;9(3):156–60.
97. Rahmat D, Wiradimadja R. Pendugaan Kadar Kolesterol Daging dan Telur Berdasarkan Kadar Kolesterol Darah pada Puyuh Jepang (Estimated Cholesterol Levels Meat and Egg Based on Blood Cholesterol on the Japanese Quail). 2011;11(1):35–8.