DAFTAR PUSTAKA

Abdi, H., dan Williams, L. J. (2010). *Principal Component Analysis*. *Wiley Interdisciplinary Reviews: Computational Statistics*, *2*(4), 433–459. https://doi.org/10.1002/wics.101

Afriyanti, F., Rubiyanti, R., dan Aji, N. (2023). Studi Literatur Perbandingan Kadar Asam Klorogenat dan Aktivitas Antioksidan pada Kopi Arabika (*Coffea arabica*) dan Robusta (*Coffea canephora*) dari Berbagai Tempat Tumbuh. *Jurnal Ilmiah Nusantara*, *1*(6), 44–51.

Alam, I. N., Warkoyo, W., dan Siskawardani, D. (2022). Karakteristik Tingkat Kematangan Buah Kopi Robusta (*Coffea canephora*) dan Buah Kopi Arabika (*Coffea arabica Linnaelus*) terhadap Mutu Cita Rasa Seduhan Kopi. *Food Technology and Halal Science Journal*, *5*(2), 169–185.

Alamri, E., Rozan, M., and Bayomy, H. (2022). *A Study of Chemical Composition, Antioxidants, and Volatile Compounds in Roasted Arabic Coffee*. *Saudi Journal of Biological Sciences*, *29*(5), 3133–3139. https://doi.org/10.1016/j.sjbs.2022.03.025

Alfia, R., Sayuti, K., Nazir, N., Suliansyah, I., dan Fitri, H. (2022). *Bioactive Compounds Profile of Solok Arabica Coffee Analyzed by GC-MS Method*. *International Journal Advanced Science Engineeering Information Technology*, *12*(6), 2527–2531.

Aliah, N., Edzuan, F., dan Diana, N. (2015). *A Review of Quality Coffee Roasting Degree Evaluation*. *Journal of Applied Science And Agriculture*, *10*(7), 18–23.

Alnsour, L., Issa, R., Awwad, S., Albals, D., dan Al-Momani, I. (2022). *Quantification of Total Phenols and Antioxidants in Coffee Samples of Different Origins and Evaluation of the Effect of Degree of Roasting on Their Levels*. *Molecules*, *27*(5), 1–10. https://doi.org/10.3390/molecules27051591

Alwi, A. L., Nuraisyah, A., Ulma, Z., Mastutik, L., dan Nirmala, R. (2023). Perbandingan Kadar Air *Green Bean* dan *Roast Bean* Kopi Robusta Gumitir Jember Berdasarkan Metode Pengolahan dan Level Roasting. *Gontor Agrotech Journal Science*, *9*(1), 82–88. https://doi.org/10.21111/agrotech.v9i1.9900

Anggraini, A. P., Damat, D., dan Manshur, H. A. (2024). Studi Karakteristik Fisikokimia dan Organoleptik Bubuk Kopi dari Biji Cacat Hitam Kopi Robusta dengan Perbedaan Suhu Penyangraian. *Food Technology and Halal Science Journal*, *6*(2), 117–132. https://doi.org/10.22219/fths.v6i2.28307

Arlius, F., Tjandra, M. A., dan Yanti, D. (2017). Analisis Kesesuaian Lahan untuk Pengembangan Komoditas Kopi Arabika di Kabupaten Solok. *Jurnal Teknologi Pertanian Andalas*, *21*(1), 70. https://doi.org/10.25077/jtpa.21.1.70-78.2017

Arumsari, A. G., Surya, R., Irmasuryani, S., dan Sapitri, W. (2021). Analisis Proses *Roasting* pada Kopi. *Jurnal Beta Kimia*, *1*(2), 98–101.

Asadullah, M., Ikram, A., Sahni, O., Rasheed, M., Abdullah, Z., and Menon, S. V. (2025). *Coffee Beans Chemical Composition, Processing and Physiological Nature : a Comprehensive Review*. *European Food Research and Technology Coffee*, 1–14.

Aslani, E., Angraeni, L., Studi, P., Hasil, T., dan Umar, U. T. (2023). Pengaruh Lama Fermentasi terhadap Karakteristik Kimia dan Organoleptik Kopi Arabika (*Coffea arabica* L) di KBQ Baburrayan Aceh Tengah. *Pertanian Agrov*, *25*(1), 313–322.

Assidiqi, I. L., Nurfadhilah, L., Fadilah, N. A., dan Puspita, Syifa Dyah; Widyawati, L. (2025). Pengaruh Variasi Suhu dan Lama Penyangraian terhadap Sifat Fisik, Kimia, dan Organoleptik pada Biji Kopi Arabika. *Journal of Food Safety and Processing Technology (JFSPT)*, *2*(2), 135–143.

Astuti, Machmudah, S., Winardi, S., Manalu, L. P., Atmaji, G., Widodo, W. E., Hartono, L. K., Komariyah, K., Alfa, M. N., abd Kurniasari, I. (2023). *The Effect of Roasting Toraja Arabica Coffee with a Fluidized Roaster on the Antioxidant and Proximate Content*. *Science, Environmental*, *1181*(1), 1–6. https://doi.org/10.1088/1755-1315/1182/1/012076

Aswathi, K. N., Shirke, A., Praveen, A., Chaudhari, S. R., dan Murthy, P. S. (2023). *Pulped Natural/Honey Robusta Coffee Fermentation Metabolites, Physico-Chemical and Sensory Profiles*. *Food Chemistry*, *429*, 136897. https://doi.org/https://doi.org/10.1016/j.foodchem.2023.136897

Avallone, S., Guiraud, J., Guyot, B., Olguin, E., dan Brillouet, J. (2001). *Fate of Mucilage Cell Wall Polysaccharides during Coffee Fermentation*. *Journal of Agricultural and Food Chemistry*, *49*(11), 5556–5559.

Azhara, I., Rais, M., Sukainah, A., dan Putra, R. P. (2022). Isolasi dan Identifikasi Bakteri Asam Laktat pada Fermentasi Spontan Biji Kopi Robusta Asal Bantaeng. *Jurnal Teknologi Pertanian*, *23*(1), 49.

Azizah, M., Sutamihardja, R. T. M., dan Wijaya, N. (2019). Karakteristik Kopi Bubuk Arabika (*Coffea arabica* L) Trerfermentasi *Saccharomyces cerevisiae*. *Sains Natural Universitas Nusa Bangs*, *9*(1), 37–46.

Badan Standar Nasional. (2008). Biji Kopi. *SNI 01-2907-2008*, 1–16.

Bekedam, E. K., Loots, M. J., Schols, H. A., Van Boekel, M. A. J. S., dan Smit, G. (2008). *Roasting Effects on Formation Mechanisms of Coffee Brew Melanoidins*. *Journal of Agricultural and Food Chemistry*, *56*(16), 7138–7145. https://doi.org/10.1021/jf800999a

Berg, R. A. V. D., Hoefsloot, H. C. J., Westerhuis, J. A., Smilde, A. K., and Werf, M. J. V. D. (2006). *Centering, Scaling , and Transformations : Improving the Biological Information*

Content of Metabolomics Data. *BMC Genomics*, *15*, 1–15. https://doi.org/10.1186/1471-2164-7-142

Bhattarai, R. R., Al-Ali, H., dan Johnson, S. K. (2022). *Extraction, Isolation and Nutritional Quality of Coffee Protein*. *Foods*, *11*(20), 1–14. https://doi.org/10.3390/foods11203244

Bobková, A., Hudáček, M., Jakabová, S., Belej, Ľ., Čurlej, J., Bobko, M., Árvay, J., Jakab, I., Čapla, J., Demianová, A., Bobková, A., Hudáček, M., Jakabová, S., and Belej, Ľ. (2020). *The Effect of Roasting on the Total Polyphenols and Antioxidant Activity of Coffee*. *Journal of Environmental Science and Health*, *55*(8), 1–6. https://doi.org/10.1080/03601234.2020.1724660

Böhm, W., Zinke, L., Rehle, A.-K., and Henle, T. (2023). *Role of Proteins in the Formation of Melanoidins during Coffee Roasting*. *Journal of Agricultural and Food Chemistry*, *71*(47), 18499–18509. https://doi.org/10.1021/acs.jafc.3c05425

BPS Sumbar. (2025). Provinsi Sumatera Barat dalam Angka 2025. *Badan Statistik Provinsi Sumatera Barat*, *54*, 282–283. https://sumbar.bps.go.id/publication/2020/04/27/0bde2141fda787c1f0e923bf/provinsi-sumatera-barat-dalam-angka-2020.html

Bruyn, F. D., Zhang, J., Pothakos, V., Torres, J., Lambot, C., Moroni, A. V., Callanan, M., Sybesma, W., Weckx, S., and Vuyst, L. D. (2017). *Exploring the Impacts of Postharvest Processing on the Microbiota and Metabolite Profiles during Green Coffee Bean Production*. *Applied and Environmental Microbiology*, *83*(1), 1–16.

Budiasih, R., Mustopa, A. S., dan Julianti, A. (2024). Identifikasi dan Karakterisasi Morfologi Tanaman Kopi (*Coffea* Sp.) Beserta Kekerabatannya di Kawasan Gunung Manglayang Timur Petak 9b Kab . Sumedang Jawa Barat. *Greenation Pertanian Dan Perkebunan*, *2*(2), 55–71.

Buffo, R. A., and Cardelli-Freire, C. (2004). *Coffee flavour: An overview*. *Flavour and Fragrance Journal*, *19*(2), 99–104. https://doi.org/10.1002/ffj.1325

Campos, G. A. F., Kruizenga, J. G. K. T., Sagu, S. T., Schwarz, S., Homann, T., Taubert, A., and Rawel, H. M. (2022). *Effect of the Post-Harvest Processing on Protein Modification in Green Coffee Beans by Phenolic Compounds*. *Foods*, *11*(159), 1–19.

Cao, X., Wu, H., Viejo, C. G., Dunshea, F. R., and Suleria, H. A. R. (2023). *Effects of Postharvest Processing on Aroma Formation in Roasted Coffee – a Review*. *International Journal of Food Science and Technology*, *58*(3), 1007–1027. https://doi.org/10.1111/ijfs.16261

Cwiková, O., Komprda, T., Šottníková, V., Svoboda, Z., Simonová, J., Slováček, J., and Jůzl, M. (2022). *Effects of Different Processing Methods of Coffee Arabica on Colour, Acrylamide, Caffeine, Chlorogenic Acid, and Polyphenol Content*. *Foods*, *11*, 1–13.

Destirana, S., Rahma, R. N., Sena, M. I., Khotimah, F. H., dan Primasari, A. (2025). Kopi sebagai Pangan Fungsional: Aktivitas Biologis, Manfaat Kesehatan dan Risiko Toksisitas. *Jurnal Al-AZhar Indonesia Seri Sains Dan Teknologi*, *10*(3), 279–294.

Duan, S., Yu, L., Dong, J., Du, Z., Liu, S., Yin, H., Li, Y., Shen, Y., and Fang, C. (2026). *Biomimetic Fermentation Reshapes Precursor Pools to Drive Synergistic Roasting Reactions and Enhance Coffee Flavor Complexity*. *Foods*, *15*(849), 1–29.

Dudareva, N., Klempien, A., Muhlemann, K., and Kaplan, I. (2013). *Tansley Review Biosynthesis, Function and Metabolic Engineering of Plant Volatile Organic Compounds*. *New Phytologist*, *198*(1), 16–32.

Dwijatmoko, M. I., Fadri, R. A., Syahrul, S., Harni, M., and Muchrida, Y. D. (2024). *The Effects of Different Roasting Degrees on Antioxidant of Coffee From West Sumatra*. *Food*

ScienTech Journal, *6*(2), 135–142. https://doi.org/10.33512/fsj.v6i2.25143

Fakih, M., Nuri, K., Wulandari, N., and Rafi, M. (2017). *Metabolomic Approach for Understanding Phenolic Compounds and Melanoidin Roles on Antioxidant Activity of Indonesia Robusta and Arabica Coffee Extracts*. *Food Science and Biotechnology*, *26*(6), 1475–1480. https://doi.org/10.1007/s10068-017-0228-6

Farah, A. (2019). *Caffeine Consumption through Coffee : Content in the Beverage, Metabolisme, Health Benefits and Risks*. *Beverages*, *5*(37), 1–51. https://doi.org/10.3390/beverages5020037

Farah, A., and Donangelo, C. M. (2006). *Phenolic Compounds in Coffee*. *Brazilian Journal of Plant Physiology*, *18*(1), 23–36.

Farida, A., Ristanti, E., and Kumoro, A. C. (2013). Penurunan Kadar Kafein dan Asam Total pada Biji Robusta menggunakan Teknologi Fermentasi Anaerob Fakultatif dengan Mikroba Nopkor MZ-15. *Jurnal Teknologi Kimia Dan Industri*, *2*(3), 70–75.

Febrianti, K. D., dan Setyaningtyas, S. W. (2021). Asam Klorogenat pada Kopi dan Obesitas: *A Systematic Review Chlorogenic Acid in Coffee and Obesity: A Systematic Review*. *Media Gizi Indonesia*, *16*(3), 256. https://doi.org/10.20473/mgi.v16i3.256-266

Fildzah, M., Muhammad, A., Ummu, F., dan Yahya, S. (2024). Pengaruh Variasi Waktu Ekstraksi terhadap Aktivitas Perendaman Radikal Bebas DPPH Ekstrak Biji Kopi Robusta Lampung Barat. *Journal of Pharmaceutical*, *2*(2), 59–69.

Fiqhry, A. T., Nugraha, T., Santosa, B., dan Ardiani, F. (2024). Kajian Produksi Kopi Arabika (*Coffea arabica*) pada Berbagai Ketinggian Tempat di Kabupaten Temanggung. *Jurnal Agro Industri Perkebunan*, *12*(2), 81–90.

Gobbi, L., Maddaloni, L., and Prencipe, S. A. (2023). *Bioactive Compounds in Different Coffee Beverages for Quality and*

Sustainability Assessment. *Beverage*, *9*(3), 1–18.

Hanif, M. I., dan Maligan, J. M. (2023). Perbandingan Metode Fermentasi Semi Karbonik Maserasi dan Karbonik Maserasi terhadap Karakteristik Fisik, Kimia, dan Sensoris Kopi Arabica. *Prosiding Seminar Nasional Teknologi Pangan*, *1*(1), 162–167.

Hasbullah, U. H. A., Hikmahyuliana;, Maharani, Z., dan Nur, L. R. (2018). Perubahan Karakteristik Fisik Biji Kopi yang ditambahkan Sorbitol Selama Penyangraian. *Jurnal Ilmu Pangan Dan Hasil Pertanian*, *2*(2), 173–182.

Herawati, D., Giriwono, P. E., Dewi, F. N. A., Kashiwagi, T., and Andarwulan, N. (2019). *Critical Roasting Level Determines Bioactive Content and Antioxidant Activity of Robusta Coffee Beans*. *Food Science and Biotechnology*, *28*(1), 7–14. https://doi.org/10.1007/s10068-018-0442-x

Hidayatullah, A. N. (2021). *Pola Kerusakan Asam Klorogenat pada Proses Penyangraian Kopi Arabika*. Institusi Pertanian Bogor.

Humaira, A., Widayat, H. P., dan Abubakar, Y. (2024). Analisis Kualitas Organoleptik Kopi Arabika Gayo dan Arabika Lintong yang diperoleh dari Pasar Komersial. *Jurnal Ilmiah Mahasiswa Pertanian*, *9*(1), 409–415. https://doi.org/10.17969/jimfp.v9i1.28542

Husna, P. A. U., Kairupan, C. F., dan Lintong, P. M. (2022). Tinjauan Mengenai Manfaat Flavonoid pada Tumbuhan Obat sebagai Antioksidan dan Antiinflamasi. *EBiomedik*, *10*(1), 76–83.

Husniati, H. (2021). Kajian : Karakterisasi Senyawa Aktif dalam Kopi Robusta sebagai Antioksidan. *Majalah TEGI*, *12*(2), 34. https://doi.org/10.46559/tegi.v12i2.6750

Hwang, C., Chen, C., and Ho, C. (2012). *Contribution of Coffee Proteins to Roasted Coffee Volatiles in a Model System. International Journal of Food Science and Technology*, *47*(10), 2117–2126. https://doi.org/10.1111/j.1365-

2621.2012.03078.x

International Coffee Organization. (2004). *Coffee Quality-Improvement Programme – Modifications* (Issue 420).

Isleib, T. G., Pattee, H. E., and Rice, P. W. (1997). *A Laboratory Colorimeter Method to Measure Pod Brightness in Virginia-Type Peanuts*. *Peanut Science*, *24*(2), 81–84. https://doi.org/10.3146/i0095-3679-24-2-4

Ivanisova, E., Dlugos, M., and Grigorieva, O. (2024). *Exploring the Phytochemical Profil and Sensory Properties of Green and Roasted Coffea Arabica Beans from Diverse Geographic Regions*. *Biotechnologies*, *19*(7), 396–406.

Jeszka, M., Aleksandra, S., and Krystyna, S. (2016). *Chlorogenic Acids, Caffeine Content and Antioxidant Properties of Green Coffee Extracts : Influence of Green Coffee Bean Preparation*. *Eur Food Res Technol*, *242*(8), 1403–1409. https://doi.org/10.1007/s00217-016-2643-y

Joët, T., Laffargue, A., Descroix, F., Doulbeau, S., Bertrand, B., De, A., and Dussert, S. (2010). *Influence of Environmental Factor, Wet Processing and their Interactions on the Biochemical Composition of Green Arabica Coffee Beans*. *Food Chemistry*, *118*(3), 693–701. https://doi.org/10.1016/j.foodchem.2009.05.048

Johnantan, C., Vaz, T., Soares, L., Ricardo, D. M., and Santana, C. De. (2023). *Effect of Fermentation on the Physicochemical Characteristics and Sensory Quality of Arabica Coffee*. *Biotech*, *13*(12), 1–12. https://doi.org/10.1007/s13205-023-03768-9

Juniaty, T., dan Rubiyo. (2016). Mutu Fisik Biji dan Cita Rasa Kopi Arabika Hasil Fermentasi Mikrob Probiotik Asal Pencernaan Luwak. *TIDP*, *3*(2), 61–70.

Kassaye, T., Desalegn, A., Derbew, B., and Pascal, B. (2019). *Biochemical Composition of Ethiopian Coffees* (*Coffea arabica* L.) *as Influenced by Variety and Postharvest Processing Methods*. *African Journal of Food Science*, *13*(2),

48–56. https://doi.org/10.5897/ajfs2018.1770

Kim, I., Jung, S., Lee, E. K. J., Ha, C. K. J., and Jeong, Y. (2021). *Physicochemical Characteristics of Ethiopian Coffea arabica cv. Heirloom Coffee Extracts with Various Roasting Conditions*. *Food Science and Biotechnology*, *30*(2), 235–244. https://doi.org/10.1007/s10068-020-00865-w

Knoop, S., Bytof, G., and Selmar, D. (2006). *Influence of Processing on the Content of Sugars in Green Arabica Coffee Beans*. *European Food Research and Technology*, *223*(2), 195–201. https://doi.org/10.1007/s00217-005-0172-1

Krajangsang, S., Seephin, P., Tantayotai, P., Mahingsapun, R., Meeampun, Y., Panyachanakul, T., Samosorn, S., Dolsophon, K., Jiamjariyatam, R., Lorliam, W., and Srisuk, N. (2022). *New Approach for Screening of Microorganisms from Arabica Coffee Processing for their Ability to Improve Arabica Coffee Flavor*. *3 Biotech*, *12*(7), 1–11. https://doi.org/10.1007/s13205-022-03203-5

Król, K., Gantner, M., Tatarak, A., and Hallmann, E. (2020). *The Content of Polyphenols in Coffee Beans as Roasting , Origin and Storage Effect*. *European Food Research and Technology*, *246*(1), 33–39. https://doi.org/10.1007/s00217-019-03388-9

Kuncoro, S., Sutiarso, L., Nugroho, J., dan Evi, R. M. (2018). Kinetika Reaksi Penurunan Kafein dan Asam Klorogenat Biji Kopi Robusta melalui Pengukusan Sistem Tertutup. *Agritech*, *38*(1), 105–111.

Latunra, A. I., Johannes, E., Mulihardianti, B., dan Sumule, O. (2021). Analisis Kandungan Kafein Kopi (*Coffea arabica*) pada Tingkat Kematangan Berbeda menggunakan Spektrofotometer UV-VIS. *Jurnal Ilmu Alam Dan Lingkungan*, *12*(1), 45–50.

Lee, J. E., Recker, M., Bowers, A. J., and Yuan, M. (2016). *Hierarchical Cluster Analysis Heatmaps and Pattern Analysis : An Approach for Visualizing Learning*

Management System Interaction Data. *Proceedings of the 9th International Conference on Educational Data Mining*, 603–604.

Lee, L. W., Cheong, M. W., Curran, P., Yu, B., and Liu, S. Q. (2015). *Coffee Fermentation and Flavor--an Intricate and Delicate Relationship*. *Food Chemistry*, *185*, 182–191. https://doi.org/10.1016/j.foodchem.2015.03.124

Lee, L. W., Yu, G., Wai, M., Curran, P., and Yu, B. (2017). *Modulation of the Volatile and Non-Volatile Profiles of Coffee Fermented with Yarrowia Lipolytica : II . Roasted Coffee*. *Food Science and Technology*, *80*, 32–42. https://doi.org/10.1016/j.lwt.2017.01.070

Liang, N., and Kitts, D. (2014). *Antioxidant Property of Coffee Components: Assessment of Methods that Define Mechanisms of Action*. *Molecules*, *19*, 19180–19208. https://doi.org/10.3390/molecules191119180

LIczbi´nski, P. , and Bukowska, B. (2020). *Tea and Coffee Polyphenols and their Biological Properties Based on the Latest in Vitro Investigations*. *Industrial Crops and Products*, *175*(11), 2–8.

Liguori, C., Giriwono, P. E., dan Herawati, D. (2024). Kadar Bioaktif dan Aktivitas Antioksidan Seduhan Kopi Arabika dengan Variasi Metode Penyeduhan. *Jurnal Mutu Pangan : Indonesian Journal of Food Quality*, *11*(1), 11–18. https://doi.org/10.29244/jmpi.2024.11.1.11

Liu, X., Fei, Y., Wang, W., Lei, S., Cheng, C., and Xing, Z. (2022). *Physicochemical Difference of Coffee Beans with Different Species, Production Areas and Roasting Degrees*. *Beverage Plant Research*, *2*(7), 1–8.

Lobo, V., Patil, A., Phatak, A., and Chandra, N. (2010). *Free Radicals, Antioxidants and Functional Foods : Impact on Human Health*. *Pharmacognosy Reviews*, *4*(8), 118–126. https://doi.org/10.4103/0973-7847.70902

Maciej, G., and Hallmann, E. (2020). *Antioxidants the Antioxidant*

Content of Co ff ee and Its In Vitro Activity as an Effect of its Production Method and Roasting and Brewing Time. *Antioxidants*, *9*(4), 1–10.

Mahardhika, D. A., Antonius, A. H., dan Dwiloka, B. (2022). Perbedaan Sifat Fisikokimia dan Organoleptik Produk Kopi Rempah dari Kopi Arabika (*Coffea arabica*) dan Kopi Robusta (*Coffea robusta*). *Jurnal Aplikasi Teknologi Pangan*, *11*(4), 179–184. https://doi.org/10.17728/jatp.13827

Mangiwa, S., Happyana, N., and Rusli, H. (2025). *Metabolic Profiling and Antioxidant Activity of Papua Arabica Green Coffee Beans*. *Food Chemistry Advances*, *9*(10), 1–11. https://doi.org/https://doi.org/10.1016/j.focha.2025.101131

Mcguire, R. G. (1992). *Reporting of Objective Color Measurements*. *Hort Science*, *27*(12), 1254–1255.

Mehaya, F. M., and Mohammad, A. A. (2020). *Thermostability of Bioactive Compounds During Roasting Process of Coffee Beans*. *Heliyon*, *6*(11), 1–7. https://doi.org/10.1016/j.heliyon.2020.e05508

Melliyanti, S. N., Afandi, F. A., Giriwono, P. E., and Herawati, D. (2023). *The Effects of Types , Roasting Degrees and Origins on Antioxidant Properties of Coffee*. *International Journal of Food Science and Technology 2023*, *58*(1), 2857–2865. https://doi.org/10.1111/ijfs.16431

Mestanza, M., and Mori-culqui, P. L. (2023). *Changes of Polyphenols and Antioxidants of Arabica Coffee Varieties During Roasting*. *Frontiers in Nutrition*, *10*, 1–9. https://doi.org/10.3389/fnut.2023.1078701

Miao, H., Zhang, L., Chen, D. Q., and Chen, H. (2017). *Urinary Biomarker and Treatment Mechanism of Rhizoma Alismatis on Hyperlipidemia*. *Biomedical Chromatography*, *31*(3), 1–12. https://doi.org/10.1002/bmc.3829

Montavon, P., Mauron, A.-F., and Duruz, E. (2003). *Changes in Green Coffee Protein Profiles During Roasting*. *Journal of Agricultural and Food Chemistry*, *51*(8), 2335–2343.

https://doi.org/10.1021/jf020832b

Moon, J.-K., and Shibamoto, T. (2009). *Role of Roasting Conditions in the Profile of Volatile Flavor Chemicals Formed from Coffee Beans*. *Journal of Agricultural and Food Chemistry*, *57*(13), 5823–5831. https://doi.org/10.1021/jf901136e

Moon, J.-K., Yoo, H. S., and Shibamoto, T. (2009). *Role of Roasting Conditions in the Level of Chlorogenic Acid Content in Coffee Beans: Correlation with Coffee Acidity*. *Journal of Agricultural and Food Chemistry*, *57*(12), 5365–5369. https://doi.org/10.1021/jf900012b

Moon, S. A., Wongsakul, S., and Kitazawa, H. (2024). *Influence of Post-Harvest Processing and Drying Techniques on Physicochemical Properties of Thai Arabica Coffee*. *AgriEngineering Article*, *6*(2), 2198–2213.

Mulyara, B., Rangkuti;, I. U. P., dan Siregar;, A. K. (2025). Karakteristik Sensoris dan Sifat Fisiko Kimia Kopi Arabika Sidikalang dari Variasi Proses Pascapanen Berbeda. *Jurnal Teknologi Dan Industri Pertanian Indonesia*, *17*(01).

Nappu, M. B., Pengkajian, B., Pertanian, T., Selatan, S., Besar, B., Pertanian, P., Toraja, T., dan Selatan, S. (2016). Karakteristik Agronomis dan Hasil Tanaman Kopi Arabika di Wilayah Sentra Pengembangan di Sulawesi Selatan. *Agrisistem Desember*, *12*(2), 117–127.

Natalia, G., Joaquim, D. D., Hastuti, S., Studi, P., Hasil, T., dan Pertanian, F. T. (2023). Pengaruh Metode Roasting dari Berbagai Perbandingan Biji Kopi (*Coffee* sp) Arabika dan Robusta terhadap Karakteristik Organoleptik Seduhan. *Agroforetech*, *1*(01), 548–561.

Olechno, E., Pu´scion-Jakubik, A., Zujko, M. E., and Socha, K. (2021). *Influence of Various Factors on Caffeine Content in Coffee Brews*. *Foods*, *10*(12), 1–29.

Paloma, C., Hakimi, R., dan Indah Mutiara, V. (2023). Kajian Keragaan Petani Kopi Solok Radjo di Kecamatan Lembah

Gumanti Kabupaten Solok. *Jurnal Pertanian Agros*, *25*(2), 1279–1290.

Pamungkas, M. T., Masrukan, M., dan Sar, K. (2021). Pengaruh Suhu dan Lama Penyangraian (*Roasting*) terhadap Sifat Fisik dan Kimia pada Seduh Kopi Arabika (*Coffea arabica* L.) dari Kabupaten Gayo, Provinsi Aceh. *Agrotech : Jurnal Ilmiah Teknologi Pertanian*, *3*(2), 1–10. https://doi.org/10.37631/agrotech.v3i2.278

Pebriati, I. W., and Diana, A. N. (2023). Uji Antioksidan Ekstrak Etanol Biji Kopi Arabika (*Coffea arabica* L.) Lereng Gunung Argopura Kabupaten Jember pada Berbagai Kondisi Penyangraian. *Jurnal Riset Kefarmasian Indonesia*, *5*(2), 284–298.

Putri, R. E., dan Andasuryani. (2017). Studi Mutu Briket Arang dengan Bahan Baku Limbah Biomassa. *Jurnal Teknologi Pertanian Andalas*, *21*(2), 146. https://doi.org/10.25077/jtpa.21.2.143-151.2017

Rahmah, N. A. (2023). Budidaya Kopi Arabika hingga Proses Pemasarannya. Pak Tani Digital. Diakses pada 9 Oktober 2025,pukul 16.07 https://paktanidigital.com/artikel/budidaya-kopi-arabika hingga-proses-pemasarannya/

Rahmawati, I., dan Gustiani, L. T. (2023). Analisis Kafein pada Kopi Arabika *(Coffea arabica* L .) Gununghalu Teknik *Light Roasting, Medium Roasting, dan Dark Roasting*. *Jurnal Kimia Padjajaran*, *1*(2), 66–73.

Ramanda, M. R., Prameswari, A. F., and Ulfa, M. N. (2024). *Effect of Variations of Roasting Temperature on the Physicochemical Properties of Robusta Coffee* (*Coffea canephora* L.). *Journal of Agricultural Engineering*, *13*(2), 405. https://doi.org/10.23960/jtep-l.v13i2.405-417

Randriani, E., dan Dani. (2018). *Pengenalan Varietas Unggul Kopi* (Edisi II). IAARD Press.

Rangga, Kordiyana K, dan Nanda Pardani. 2024. Analisis Proses Pascapanen Kopi di Pusat Pelatihan Pertanian dan Pedesaan

Swadaya (P4S) Kopi Gunung Ikamaja Kecamatan Sumberjaya Kabupaten Lampung Barat. *Jurnal Agro Industri Perkebunan* .12(2), 117–28

Rehman, R., and S.Ashraf. (2017). *Analysis of Caffeine Contents in Commercial Beverages and Tea Samples of Pakistan using UV/Visible Spectrometry*. *Bulgarian Chemical Communications*, *49*(4), 823 – 828).

Reza, M., Herawati, D., dan Kusnandar, F. (2023). Perbandingan Asam Fenolat dan Total Fenolik Kopi Arabika Bogor dari Pengolahan Pascapanen dan Tingkat Sangrai Berbeda. *Jurnal Mutu Pangan*, *10*(2), 93–99. https://doi.org/10.29244/jmpi.2023.10.2.93

Riong, S. P., Risty, S. A., and Yuni, C. (2022). *Caffein Levels in Green Tea Bags* (% Kadar Kafein pada Teh Hijau Celup Kemasan). *Indonesian Journal of Pharmaceutical Research*, *2*(1), 26–31. www.jurnal.umsb.ac.id/index.php/IJPR

S. schenker, S., Hansschin, B. F., R., P., and Escher, F. (2000). *Pore Structure of Coffee Beans Affected by Roasting Conditions*. *Food Engineering and Physical Properties Pore*, *65*(3), 452–457.

Salam, U., Ullah, S., Tang, Z.-H., Elateeq, A. A., Khan, Y., Khan, J., Khan, A., and Ali, S. (2023). *Plant Metabolomics: An Overview of the Role of Primary and Secondary Metabolites against Different Environmental Stress Factors*. *Life*, *13*(3), 1–25. https://doi.org/10.3390/life13030706

Setianingsih, S. A., Sari, E. K., dan Putri, M. K. (2023). Pengaruh Derajat Penyangraian terhadap Kadar Asam Klorogenat Kopi Robusta Temanggung dengan Metode Spektrofotometri UV-VIS. *Jurnal Jamu Kusuma*, *3*(1), 7–14. https://jurnaljamukusuma.com/index.php/jurnaljamukusuma/article/view/44

Shen, X., Wang, Q., Zheng, T., Yuan, B., Yin, Z., and Liu, K. (2024). *Effect of Fermentation Duration on the Chemical Compounds of Coffea arabica from Ultra Performance*

Liquid Chromatography – Triple Quadrupole Mass Spectrometry and Gas Chromatography – Mass Spectrometry Analysis During the Washed Processing. *Fermentation*, *10*(11), 1–13.

Sigma, F., Zukhrufuz, M., and Purwanto, E. (2023). *Food Bioscience Coffee Authentication Via Targeted Metabolomics and Machine Learning : Unveiling Origins and their Discriminating Biochemicals*. *Food Bioscience*, *56*, 1–11. https://doi.org/10.1016/j.fbio.2023.103122

Silva, L., Egídio, D., Reis, S., Gabriela, M., Miguel, P., Carla, A., and Pinheiro, M. (2017). *LWT - Food Science and Technology Controlled Fermentation of Semi-Dry Coffee* (*Coffea arabica*) u*sing Starter Cultures : A Sensory Perspective*. *Food Science and Technology*, *82*, 32–38. https://doi.org/10.1016/j.lwt.2017.04.008

Siregar, Z. A., Suthamihardja, R. T. M., Susanty, D., Kimia, P. S., Mipa, F., Bangsa, U. N., Kh, J., Iskandar, S., Sareal, T., dan Indische, W. (2020). Karakterisasi Kopi Arabika (*Coffea arabica* L .) Hasil Fermentasi dengan Bakteri Asam Laktat (*Lactobacillus* sp). *Jurnal Sains Natural Universitas Nusa Bangsa*, *10*(2), 87–94.

Srikandi, S., Kristanti, A. W., dan Sutamihardja, R. (2019). Tingkat Kematangan Biji Kopi Arabika (*Coffea arabica* L.) dalam Menghasilkan Kadar Kafein. *Sains Natural: Journal of Biology and Chemistry*, *9*(1), 22–28. https://doi.org/10.31938/jsn.v9i1.189

Sunarharum, W. B., Williams, D. J., and Smyth, H. E. (2014). *Complexity of Coffee Flavor: A Vompositional and Sensory Perspective*. *Food Research International*, *62*, 315–325. https://doi.org/10.1016/j.foodres.2014.02.030

Supriadi, H. (2015). Prospek Pengembangan Agroforestri Berbasis Kopi di Indonesia. *Perspektif*, *14*(2), 135–150.

Syahputra, H., Arnia, F., dan Munadi, K. (2019). Karakterisasi Kematangan Buah Kopi Berdasarkan Warna Kulit Kopi

menggunakan Histogram dan Momen Warna. *Jurnal Nasional Teknik Elektro*, *8*(1), 42. https://doi.org/10.25077/jnte.v8n1.615.2019

Szczupak, R. K., Przybylska-balcerek, A., Bu, M., Szablewski, T., and Stuper-szablewska, K. (2025). *Roasting Temperature as a Factor Modifying the Caffeine and Phenolic Content of Ethiopian Coffee*. *Processes*, *13*, 1–16.

Tan, Y., Wu, H., Shi, L., Barrow, C., Dunshea, F. R., and Suleria, H. A. R. (2023). *Impacts of Fermentation on the Phenolic Composition, Antioxidant Potential and Volatile Compounds Profile of Commercially Roasted Coffee Beans*. *Fermentation*, *9* (918), 1–19.

Todhanakasem, T., Van Tai, N., Kunyanee, K., and Pitinidhipat, N. (2025). *Physicochemical Characteristics and Metabolite Content of Roasted Arabica Coffee in Relation to Consumer Preference*. *LWT*, *217*(7), 1–9. https://doi.org/https://doi.org/10.1016/j.lwt.2025.117438

Trinafianita, E., dan Widyaningsih, T. D. (2018). Kajian Perlakuan Awal Bahan dan Proporsi Penyeduhan Kopi Bubuk : AIair pada Proses Pembautan Kopi dari Kulit Buah Kopi Arabika (*Coffea arabica* L.) Lereng Bromo. *Jurnal Pangan dan Agroindustri Vol.6*, *6*(4), 59–69.

Vale, S., Lindner, J. D. D., Roberto, L., Rodrigues, S., Kadri, E., Giovana, M., Pagnoncelli, B., Brar, S. K., Soccol, C. R., Vin, G., and Pereira, D. M. (2024). *Exploring Microbial Influence on Flavor Development during Coffee Processing in Humid Subtropical Climate through Metagenetic–Metabolomics Analysis*. *Foods*, *13*(12), 1–15.

Wang, X., and Lim, L. (2015). *Physicochemical Characteristics of Roasted Coffee*. *Coffee in Health and Disease Prevention* (247–254). https://doi.org/10.1016/B978-0-12-409517-5.00027-9

Wardhana, M. G., dan Irwan, M. S. (2020). Analisis Karakteristik Kandungan Kopi Bening (*Clear coffea*) Kabupaten

Banyuwangi. *Agrotek Ummat*, *7*(2), 65–72.

Wibowo, A. (2021). Karakter Perakaran Sejumlah Varietas Kopi Arabika pada Fase Bibit di Pesemaian. *Agrotechnology Research Journal*, *5*(1), 18. https://doi.org/10.20961/agrotechresj.v5i1.44868

Wigati, E. I., Pratiwi, E., Nissa, T. F., dan Utami, N. F. (2018). Uji Karakteristik Fitokimia dan Aktivitas Antioksidan Biji Kopi Robusta (*Coffea canephora*) dari Bogor, Bandung dan Garut dengan Metode DPPH. *Fitofarmaka Jurnal Ilmiah Farmasi*, *8*(1), 59–66.Wijaya, T., & Budiman, S. (2016). *Analisis Multivariat Untuk Penelitian Manajemen*. 116.

Wijaya, T., dan Budiman, S. (2016). *Analisis Multivariat untuk Penelitian Manajemen*. Edisi 1. Yogyakarta : Pohon Cahaya.

Winanti, A. A., dan Handoko, Y. A. (2024). Pengaruh Penambahan Kultur *Lactobacillus plantarum* dan *Saccharomyces cerevisiae* terhadap Kualitas Biji Kopi Arabika (*Coffea arabica* L.). *Agroteknika*, *7*(2), 124–137.

Worley, B., and Powers, R. (2015). *Multivariate Analysis in Metabolomics Bradley*. *Current Metabolomics*. *1*(1), 92–107). https://doi.org/10.2174/2213235X11301010092.

Wu, H., Lu, P., , Z., Sharifi-Rad, J., and Suleria, H. A. R. (2022). *Impact of Roasting on the Phenolic and Volatile Compounds in Coffee Beans*. *Food Science and Nutrition*, *10*(7), 2408–2425. https://doi.org/10.1002/fsn3.2849

Wulandari, D., Prahasto, T., dan Gunawan, V. (2016). Penerapan *Principal Component Analysis* untuk Mereduksi Dimensi Data Penerapan Teknologi Informasi dan Komunikasi untuk Pendidikan di Sekolah. *Jurnal Sistem Informasi Bisnis*, *6*(2), 91. https://doi.org/10.21456/vol6iss2pp91-96

Yanti, R. P. (2023). *Pengaruh Metode Roasting terhadap Senyawa Kafein, Antioksidan, dan Analisis Sensori pada Kopi Natural Anaerob Arabika (Coffea arabica)*. Universitas Andalas.

Yusibani, E., Ikramullah, Yufita, E., Jalil, Z., and Suhendi, E.

(2023). *The Effect of Temperature and Roasting Time on the Physical Properties of Arabica and Robusta Gayo Coffee Bean*. *Journal of Applied Agricultural Science and Technology*, *7*(2), 100–108.

Zakidou, P., Plati, F., Matsakidou, A., Varka, E. M., Blekas, G., and Paraskevopoulou, A. (2021). *Single Origin Coffee Aroma: from Optimized Flavor Protocols and Coffee Customization to Instrumental Volatile Characterization and Chemometrics*. *Molecules*, *26*(15), 1–7. https://doi.org/10.3390/molecules26154609

Zhang, S. J., Bruyn, F. D., Pothakos, V., Torres, J., Falconi, C., Moccand, C., Weckx, S., and Vuyst, L. D. (2019). *Following Coffee Production from Cherries to Cup : Microbiological and Metabolomic Analysis of Wet Processing*. *Applied and Environmental Microbiology*, *85*(6), 1–22.

Zhao, H., Wang, Z., Cheng, C., Yao, L., Wang, L., Lu, W., Yang, X., and Ma, F. (2012). *In-Vitro Free Radical Scavenging Activities of Anthocyanins from Three Berries*. *Journal of Medicinal Plants Research*, *6*(1), 7036–7042. https://doi.org/10.5897/jmpr11.1171

Zuniyanto, R. (2018). Analisis Proses Pasca Panen Kopi di Kabupaten Batang terhadap Uji Rasa dan Kwalitas Kopi Standar *Speciality Coffee Association America* (SCAA). *Ristek: Jurnal Riset, Inovai Dan Teknologi*, *3*(2), 27–41.