

DAFTAR PUSTAKA

- Afoakwa, E. O., Paterson, A., Fowler, M., & Ryan, A. (2008). Flavor formation and character in cocoa and chocolate: a critical review. *Critical Reviews in Food Science and Nutrition*, 48(9), 840–857.
<https://doi.org/10.1080/10408390701719272>
- Afoakwa, E. O., Budu, A. S., Mensah-Brown, H., & Felix, J. (2014). Changes in biochemical and physico-chemical qualities during drying of pulp preconditioned and fermented cocoa (*Theobroma cacao*) beans. *Journal of Nutritional Health and Food Science*, 2(1), 1-8.
<http://dx.doi.org/10.15226/jnhfs.2014.00121>
- Almeida, S. D. F. O. De, Silva, L. R. C., Celso, G., Junior, A. C., Oliveira, G., Helena, S., Lopes, A. S. (2019). Diversity of yeasts during fermentation of cocoa from two sites in the brazilian amazon. *Acta Amazonica*, 49(1), 64–70.
<https://doi.org/10.1590/1809-4392201703712>
- Andrés-Bello, A., Barreto-Palacios, V. I. V. I. A. N., García-Segovia, P., Mir-Bel, J., & Martínez-Monzó, J. (2013). Effect of pH on color and texture of food products. *Food Engineering Reviews*, 5, 158-170.
<https://doi.org/10.1007/s12393-013-9067-2>
- Araujo, Q. R., Loureiro, G. A., Rohsius, C., & Baligar, V. C. (2018). Impact of soils and cropping systems on biochemical attributes of dry cacao beans. *Agrotrópica*, 30(3): 175 - 194
<https://doi.org/10.21757/0103-3816.2018v30n3p175-194>
- Ardhana, M. M., & Fleet, G. H. (2003). The microbial ecology of cocoa bean fermentations in Indonesia. *International Journal of Food Microbiology*, 86(1–2), 87–99. [https://doi.org/10.1016/S0168-1605\(03\)00081-3](https://doi.org/10.1016/S0168-1605(03)00081-3)
- Aryani, N. L. P. N. A., Yulianti, N. L., & Arda, G. (2018). Characteristics of cocoa beans on small capacity fermentation results based on different types of containers and different fermentation lengths. *Jurnal BETA (Biosistem dan Teknik Pertanian)*, 6(1), 17-24.
- Aprianto, Z. (2020). *Ranvang bangun sistem monitoring pH dan suhu pada larutan kopi berbasis fuzzy logic di PT HARUM ALAM SEGAR* (Disertasi doktoral, Universitas Muhammadiyah Gresik).
- Apriyanto, M. (2016). *Fermentasi Biji Kakao Kering Terkendali Menggunakan Inokulum Mikrobia*. (Disertasi, Universitas Gadjah Mada).
<https://doi.org/10.31219/osf.io/6xpz3>
- Apriyanto, M., Sutardi, S., Supriyanto, S., & Harmayani, E. (2017). Fermentasi biji kakao kering menggunakan *Saccharomyces cerevisiae*, *Lactobacillus lactis*, dan *Acetobacter aceti*. *Agritech*, 37(3), 302-311.
<https://doi.org/10.22146/agritech.17113>
- Balasimha, D. (2016). Cocoa and cashew. *Abiotic Stress Physiology of Horticultural Crops*, 307-319.https://doi.org/10.1007/978-81-322-2725-0_16

- Bariah, K. (2014). Impact of fermentation duration on the quality of Malaysian cocoa beans using shallow box. *Asia-Pacific Journal of Science and Technology*, 19, 74-80.
- Barbosa, A. M., Giese, E. C., Dekker, R. F., Borsato, D., Pérez, A. I. B., & Iranzo, J. F. Ú. (2010). Extracellular β -glucosidase production by the yeast *Debaryomyces pseudopolymorphus UCLM-NS7A*: optimization using response surface methodology. *New Biotechnology*, 27(4), 374-381.
<https://doi.org/10.1016/j.nbt.2010.05.013>
- Batista, N. N., Ramos, C. L., Ribeiro, D. D., Pinheiro, A. C. M., & Schwan, R. F. (2015). Dynamic behavior of *Saccharomyces cerevisiae*, *Pichia kluveri*, and *Hanseniaspora uvarum* during spontaneous and inoculated cocoa fermentations and their effect on sensory characteristics of chocolate. *LWT-Food Science and Technology*, 63(1), 221-227.
<https://doi.org/10.1016/j.lwt.2015.03.051>
- Britannica, T. Editors of Encyclopaedia (2022). *Yeast*. Encyclopedia Britannica. diakses pada 15 September 2022, dari <https://www.britannica.com/science/yeast-fungus>
- Bergman, L.W. (2001). Growth and maintenance of yeast. In: MacDonald, P.N. (eds) two-hybrid systems. *Methods in Molecular Biology*, vol 177.
<https://doi.org/10.1385/1-59259-210-4:009>
- Caligiani, A., Marseglia, A., & Palla, G. (2016). Cocoa: production, chemistry, and use. <https://doi.org/10.1016/B978-0-12-384947-2.00177-X>
- Calvo, A. M., Botina, B. L., García, M. C., Cardona, W. A., Montenegro, A. C., & Criollo, J. (2021). Dynamics of cocoa fermentation and its effect on quality. *Scientific reports*, 11(1), 16746.
<https://doi.org/10.1038/s41598-021-95703-2>
- Camu, N., De Winter, T., Verbrugghe, K., Cleenwerck, I., Vandamme, P., Takrama, J. S., ... & De Vuyst, L. (2007). Dynamics and biodiversity of populations of lactic acid bacteria and acetic acid bacteria involved in spontaneous heap fermentation of cocoa beans in Ghana. *Applied and environmental microbiology*, 73(6), 1809-1824.
<https://doi.org/10.1128/AEM.02189-06>
- Chagas Junior, G. C. A., Ferreira, N. R., Andrade, E. H. D. A., Nascimento, L. D. D., Siqueira, F. C. D., & Lopes, A. S. (2021). Profile of volatile compounds of on-farm fermented and dried cocoa beans inoculated with *Saccharomyces cerevisiae* KY794742 and *Pichia kudriavzevii* KY794725. *Molecules*, 26(2), 344. <https://doi.org/10.3390/molecules26020344>
- Chan, G. F., Gan, H. M., Ling, H. L., & Rashid, N. A. A. (2012). Genome sequence of *Pichia kudriavzevii* M12, a potential producer of bioethanol and phytase. <https://doi.org/10.1128/EC.00229-12>
- Chelliah, R., Ramakrishnan, S. R., Prabhu, P. R., & Antony, U. (2016). Evaluation of antimicrobial activity and probiotic properties of wild-strain

Pichia kudriavzevii isolated from frozen idli batter. *Yeast*, 33(8), 385-401.
<https://doi.org/10.1002/yea.3181>

Costa, A., Entzinger, C., Fredericq, A., Gilmour, M., Matissek, R., & Quintana, S. (2016). Cocoa beans: chocolate & cocoa industry quality requirements.

Daniel, H. M., Vrancken, G., Takrama, J. F., Camu, N., De Vos, P., & De Vuyst, L. (2009). Yeast diversity of Ghanaian cocoa bean heap fermentations. *FEMS Yeast Research*, 9(5), 774–783. <https://doi.org/10.1111/j.1567-1364.2009.00520.x>

Delgado-Ospina, J., Triboletti, S., Alessandria, V., Serio, A., Sergi, M., Paparella, A., ... & Chaves-López, C. (2020). Functional biodiversity of yeasts isolated from Colombian fermented and dry cocoa beans. *Microorganisms*, 8(7), 1086. <https://doi.org/10.3390/microorganisms8071086>

De Mesmaeker, V. (2019). *Cadmium distribution in Ecuadorian cacao beans during post-harvest processes*. [Disertasi doktoral, Katholieke Universiteit Leuven].

De Souza, P. A., Moreira, L. F., Sarmento, D. H. A., & da Costa, F. B. (2018). Cacao—*Theobroma cacao*. *Exotic Fruits*, 3(2001), 69–76. <https://doi.org/10.1016/B978-0-12-803138-4.00010-1>

Dewandari, K. T., Rahmawati, R., & Munarso, S. J. (2021). The effect of techniques and fermentation time on cocoa beans quality (*Theobroma cacao* L.). In *IOP Conference Series: Earth and Environmental Science* (Vol. 653, No. 1, p. 012046). IOP Publishing.

Díaz-Muñoz, C., Van de Voorde, D., Comasio, A., Verce, M., Hernandez, C. E., Weckx, S., & De Vuyst, L. (2021). Curing of cocoa beans: fine-scale monitoring of the starter cultures applied and metabolomics of the fermentation and drying steps. *Frontiers in Microbiology*, 11, 616875. <https://doi.org/10.3389/fmicb.2020.616875>

Douglass, A. P., Offei, B., Braun-Galleani, S., Coughlan, A. Y., Martos, A. A., Ortiz-Merino, R. A., ... & Wolfe, K. H. (2018). Population genomics shows no distinction between pathogenic *Candida krusei* and environmental *Pichia kudriavzevii*: one species, four names. *PLoS pathogens*, 14(7), e1007138. <https://doi.org/10.1371/journal.ppat.1007138>

Elisabeth, D. A. A., & Setijorini, L. E. (2009). Keragaan mutu biji kakao kering dan produk setengah jadi cokelat pada berbagai tingkatan fermentasi. *Jurnal Matematika Sains dan Teknologi*, 10(1), 36-46.

Fonseca, A., & Inácio, J. (2006). Phylloplane yeasts. In *Biodiversity and ecophysiology of yeasts* (pp. 263-301). Springer, Berlin, Heidelberg. https://doi.org/10.1007/3-540-30985-3_13

Fox, P. F., Guinee, T. P., Cogan, T. M., & McSweeney, P. L. (2017). Pathogens in cheese and foodborne illnesses. In *Fundamentals of Cheese Science* (pp. 681-713). Springer, Boston, MA. https://doi.org/10.1007/978-1-4899-7681-9_19

- Ganeswari, I., Khairul Bariah, S., Amizi, M. A., & Sim, K. Y. (2015). Effects of different fermentation approaches on the microbiological and physicochemical changes during cocoa bean fermentation. *International Food Research Journal*, 22(1), 70–76. 10.3923/jas.2010.1.7
- Gálvez, S. L., Loiseau, G., Paredes, J. L., Barel, M., & Guiraud, J. P. (2007). Study on the microflora and biochemistry of cocoa fermentation in the Dominican Republic. *International Journal of Food Microbiology*, 114(1), 124–130. <https://doi.org/10.1016/j.ijfoodmicro.2006.10.041>
- Greppi, A., Saubade, F., Botta, C., Humblot, C., Guyot, J. P., & Cocolin, L. (2017). Potential probiotic *Pichia kudriavzevii* strains and their ability to enhance folate content of traditional cereal-based African fermented food. *Food Microbiology*, 62, 169-177. <https://doi.org/10.1016/j.fm.2016.09.016>
- Guzmán-Alvarez, R. E., & Márquez-Ramos, J. G. (2021). Fermentation of cocoa beans. *Fermentation-Processes, Benefits and Risks*, 127. <https://dx.doi.org/10.5772/intechopen.98756>
- Haile, M., & Kang, W. H. (2019). Isolation, identification, and characterization of pectinolytic yeasts for starter culture in coffee fermentation. *Microorganisms*, 7(10), 401. <https://doi.org/10.3390/microorganisms7100401>
- Hamdouche, Y., Guehi, T., Durand, N., Kedjebo, K. B. D., Montet, D., & Meile, J. C. (2015). Dynamics of microbial ecology during cocoa fermentation and drying: towards the identification of molecular markers. *Food Control*, 48, 117-122. <https://doi.org/10.1016/j.foodcont.2014.05.031>
- Hernández-Hernández, C., López-Andrade, P. A., Ramírez-Guillermo, M. A., Guerra Ramirez, D., & Caballero Perez, J. F. (2016). Evaluation of different fermentation processes for use by small cocoa growers in Mexico. *Food science & nutrition*, 4(5), 690-695. <https://doi.org/10.1002/fsn3.333>
- Ho, V. T. T., Zhao, J., & Fleet, G. (2014). Yeasts are essential for cocoa bean fermentation. *International Journal of Food Microbiology*, 174, 72–87. <https://doi.org/10.1016/j.ijfoodmicro.2013.12.014>
- Ho, V. T. T., Zhao, J., & Fleet, G. (2018). Unravelling the contribution of lactic acid bacteria and acetic acid bacteria to cocoa fermentation using inoculated organisms. *International Journal of Food Microbiology*, 279, 43-56. <https://doi.org/10.1016/j.ijfoodmicro.2018.04.040>
- ICCO. (2020). Diakses pada 16 Desember 2022, dari https://www.icco.org/wp-content/uploads/2019/07/Annual-Report-2014-2015-English-French-Spanish-Russian_FULL-1.pdf.
- Indarti, E., Widayat, H. P., & Zuhri, N. (2011). Effect of fermentation container and thickness of bean mass during fermentation process of cocoa bean

- (*Theobroma cocoa* L.). In *Proceedings of The Annual International Conference, Syiah Kuala University-Life Sciences & Engineering Chapter* (Vol. 1, No. 1). 10.1016/j.profoo.2013.03.032
- Jespersen, L., Nielsen, D. S., Hønholt, S., & Jakobsen, M. (2005). Occurrence and diversity of Yeasts involved in fermentation of West African cocoa beans. *FEMS Yeast Research*, 5(4–5), 441–453.
<https://doi.org/10.1016/j.femsyr.2004.11.002>
- Kadhim, R. A., Al-Saadoon, A. H., & Al-Mahmoud, W. A. (2019). Morphological and phylogenetic identification of *Pichia* species associated with foods in Basrah, Iraq. *Basrah Journal of Science*, 37(2), 223-236.
10.29072/basjs.20190206
- Kadow, D. (2020). The biochemistry of cocoa flavor— a holistic analysis of its development along the processing chain. *Journal of Applied Botany and Food Quality*. <https://doi.org/10.5073/JABFQ.2020.093.037>
- Karmawati, E., Z. Mahmud, M. Syakir, S.J. Munarso, K. Ardana, dan Rubiyo. (2010). *Budidaya dan pascapanen kakao*. Pusat Penelitian dan Pengembangan Perkebunan. Bogor. 92 hlm.
- Khoiriyah, H., & Ardiningsih, P. (2014). Penentuan waktu inkubasi optimum terhadap aktivitas bakteriosin *Lactobacillus* sp. RED4. *Jurnal Kimia Khatulistiwa*, 3(4).
- Komisi Kakao Indonesia. (2006). Direktori dan revitalisasi agribisnis kakao Indonesia. *Departemen Pertanian*, 248.
- Kongor, J. E., Hinneh, M., Walle, D. Van De, Afoakwa, E., Boeckx, P., & Dewettinck, K. (2016). Factors influencing quality Variation In Cocoa (*Theobroma cacao*) bean flavour profile — A review. *Food Research International*, 82, 44–52. <https://doi.org/10.1016/j.foodres.2016.01.012>
- Kowalski, R., Rosochacki, M., Wyrostek, J., & Islam, M. T. (2023). Evaluating the quality of raw chocolate as an alternative to commercial Products. *Applied Sciences*, 13(3), 1274.
<https://doi.org/10.3390/app13031274>
- Kresnowati, M. T. A. P., Suryani, L., & Affifah, M. (2013). Improvement of cocoa beans fermentation by LAB starter addition. *Journal of Medical and Bioengineering*, 2(4). <https://doi.org/10.12720/jomb.2.4.274-278>
- Kurtzman, C. P. (2011). *Pichia* EC Hansen (1904). In *The yeasts* (pp. 685-707). Elsevier.
- Kurtzman, C. P., Fell, J. W., Boekhout, T., & Robert, V. (2011). Methods for isolation, phenotypic characterization and maintenance of yeasts. In *The yeasts* (pp. 87-110). Elsevier. <https://doi.org/10.1016/B978-0-444-52149-1.00007-0>
- Gálvez, S. L., Loiseau, G., Paredes, J. L., Barel, M., & Guiraud, J. P. (2007). Study on the microflora and biochemistry of cocoa fermentation in the

- Dominican Republic. *International journal of food microbiology*, 114(1), 124-130. <https://doi.org/10.1016/j.ijfoodmicro.2006.10.041>
- Kostinek, M., Ban-Koffi, L., Ottah-Atikpo, M., Teniola, D., Schillinger, U., Holzapfel, W. H., & Franz, C. M. (2008). Diversity of predominant lactic acid bacteria associated with cocoa fermentation in Nigeria. *Current microbiology*, 56, 306-314.
<https://doi.org/10.1007/s00284-008-9097-9>
- Laranjo, M., Potes, M. E., & Elias, M. (2019). Role of starter cultures on the safety of fermented meat products. *Frontiers in Microbiology*, 10, 853. <https://doi.org/10.3389/fmicb.2019.00853>
- Lefeber, T., Janssens, M., Moens, F., Gobert, W., De Vuyst, L., (2011). Interesting Starter Culture Strains For Controlled Cocoa Bean Fermentation Revealed By Simulated Cocoa Pulp Fermentations Of Cocoa-Specific Lactic Acid Bacteria. *Appl. Environ. Microbiol.* 77, 6694–6698.
<https://doi.org/10.1128/AEM.00594-11>
- Lefeber, T., Papalexandratou, Z., Gobert, W., Camu, N., & De Vuyst, L. (2012). On-farm implementation of a starter culture for improved cocoa bean fermentation and its influence on the flavour of chocolates produced thereof. *Food Microbiology*, 30(2), 379-392.
<https://doi.org/10.1016/j.fm.2011.12.021>
- Li, P., Li, S., Cheng, L., & Luo, L. (2014). Analyzing the relation between the microbial diversity of DaQu and the turbidity spoilage of traditional Chinese vinegar. *Applied microbiology and biotechnology*, 98(13), 6073-6084. <https://doi.org/10.1007/s00253-014-5697-4>
- Liu, H., Bao, M. L., Chen, H. L., & Li, Q. (2017). Impact of sucrose addition on the physiochemical properties and volatile compounds of “Shuangyou” red wines. *Journal of Food Quality*. <https://doi.org/10.1155/2017/2926041>
- Lieberei, R., & Reisdorff, C. (2012). Agricultural crops. ; Nutzpflanzen. Thieme, Stuttgart, Germany.
- Loppies, J. E., & Yumas, M. (2008). Mempelajari Proses Fermentasi Biji Kakao Dengan Penambahan Aktivator. *Jurnal Industri Hasil Perkebunan*, 3(25-32)
- Martono, B. (2014). Karakteristik morfologi dan kegiatan plasma nutfaf tanaman kakao. IAARD Press.
- Maura, Y. F., Balzarini, T., Borges, P. C., Evrard, P., De Vuyst, L., & Daniel, H. M. (2016). The environmental and intrinsic yeast diversity of Cuban cocoa bean heap fermentations. *International Journal of Food Microbiology*, 233, 34-43. <https://doi.org/10.1016/j.ijfoodmicro.2016.06.012>
- Meersman, E., Steensels, J., Mathawan, M., Wittocx, P. J., Saels, V., Struyf, N., ... & Verstrepen, K. J. (2013). Detailed analysis of the microbial population in

Malaysian spontaneous cocoa pulp fermentations reveals a core and variable microbiota. *PLoS One*, 8(12), e81559.
<https://doi.org/10.1371/journal.pone.0081559>

Melo, T. S., Pires, T. C., Engelmann, J. V. P., Monteiro, A. L. O., Maciel, L. F., & Bispo, E. D. S. (2021). Evaluation of the content of bioactive compounds in cocoa beans during the fermentation process. *Journal of food science and technology*, 58, 1947-1957. <https://doi.org/10.1007/s13197-020-04706-w>

Monteiro, L. M. O., Pereira, M. G., Vici, A. C., Heinen, P. R., Buckeridge, M. S., & de Moraes, M. D. L. T. (2019). Efficient hydrolysis of wine and grape juice anthocyanins by *Malbranchea pulchella* β -glucosidase immobilized on MANAE-agarose and ConA-Sepharose supports. *International journal of biological macromolecules*, 136, 1133-1141.
<https://doi.org/10.1016/j.ijbiomac.2019.06.106>

Motamayor, J. C., Risterucci, A. M., Lopez, P. A., Ortiz, C. F., Moreno, A., & Lanaud, C. (2002). Cacao domestication I: the origin of the cacao cultivated by the Mayas. *Heredity*, 89(5), 380-386.
<https://doi.org/10.1038/sj.hdy.6800156>

Mukherjee, V., Radecka, D., Aerts, G., Verstrepen, K. J., Lievens, B., & Thevelein, J. M. (2017). Phenotypic landscape of non-conventional yeast species for different stress tolerance traits desirable in bioethanol fermentation. *Biotechnology for biofuels*, 10(1), 1-19.
<https://doi.org/10.1186/s13068-017-0899-5>

Nielsen, D. S., Hønholt, S., Tano-Debrah, K., & Jespersen, L. (2005). Yeast Populations Associated With Ghanaian Cocoa Fermentations Analysed Using Denaturing Gradient Gel Electrophoresis (DGGE). *Yeast*, 22(4), 271-284. <https://doi.org/10.1002/yea.1207>

Nielsen, D. S., Snitkjaer, P., & van den Berg, F. (2008). Investigating the fermentation of cocoa by correlating denaturing gradient gel electrophoresis profiles and near infrared spectra. *International Journal of Food Microbiology*, 125(2), 133-140.
<https://doi.org/10.1016/j.ijfoodmicro.2008.03.040>

O'Connor, C. M. (2013). Investigations in Molecular Cell Biology.

Ooi, T. S. (2020). *Effect of selected yeast starter in cocoa fermentation: a study on antioxidant content, volatile organic compounds and sensory profile of Malaysian cocoa beans and chocolates produced* (Disertasi, Monash University). <https://doi.org/10.1016/j.lwt.2019.108977>.

Papalexandratou, Z., Falony, G., Romanens, E., Jimenez, J. C., Amores, F., Daniel, H. M., & De Vuyst, L. (2011a). Species diversity, community dynamics, and metabolite kinetics of the microbiota associated with traditional Ecuadorian spontaneous cocoa bean fermentations. *Applied and environmental microbiology*, 77(21), 7698-7714.
<https://doi.org/10.1128/AEM.05523-11>.

- Papalexandratou, Z., Vrancken, G., De Bruyne, K., Vandamme, P., & De Vuyst, L. (2011b). Spontaneous organic cocoa bean box fermentations in Brazil are characterized by a restricted species diversity of lactic acid bacteria and acetic acid bacteria. *Food Microbiology*, 28(7), 1326-1338.
<https://doi.org/10.1016/j.fm.2011.06.003>
- Papalexandratou, Z., Lefeber, T., Bahrim, B., Lee, O. S., Daniel, H. M., & De Vuyst, L. (2013). *Hanseniaspora opuntiae*, *Saccharomyces cerevisiae*, *Lactobacillus fermentum*, and *Acetobacter pasteurianus* predominate during well-performed Malaysian cocoa bean box fermentations, underlining the importance of these microbial species for a successful cocoa bean fermentation process. *Food Microbiology*, 35(2), 73-85.
<https://doi.org/10.1016/j.fm.2013.02.015>
- Pereira, G. V., Soccol, V. T., & Soccol, C. R. (2016). Current state of research on cocoa and coffee fermentations. *Current Opinion in Food Science*, 7, 50-57.
<https://doi.org/10.1016/j.cofs.2015.11.001>
- Pereira, G. V., Alvarez, J. P., Neto, D. P. D. C., Soccol, V. T., Tanobe, V. O., Rogez, H., ... & Soccol, C. R. (2017). Great intraspecies diversity of *Pichia kudriavzevii* in cocoa fermentation highlights the importance of yeast strain selection for flavor modulation of cocoa beans. *Lwt*, 84, 290-297.
<https://doi.org/10.1016/j.lwt.2017.05.073>
- Phale, S. (2018). Yeast: characteristics and economic significance. *Journal of bioprocessing and biotechniques*, 8(5), 2155-9821.
<https://doi.org/10.4172/2155-9821.1000337>
- Phong, H. X., Klanrit, P., Dung, N. T. P., Yamada, M., & Thanonkeo, P. (2019). Isolation and characterization of thermotolerant yeasts for the production of second-generation bioethanol. *Annals of Microbiology*, 69(7), 765-776.
<https://doi.org/10.1007/s13213-019-01468-5>
- Pusat Penelitian Kopi dan Kakao. (2010). Buku pintar budidaya kakao. Jakarta: Agro Media Pustaka.
- Radecka, D., Mukherjee, V., Mateo, R. Q., Stojiljkovic, M., Foulquie-Moreno, M. R., & Thevelein, J. M. (2015). Looking beyond *Saccharomyces*: the potential of non-conventional yeast species for desirable traits in bioethanol fermentation. *FEMS yeast research*, 15(6), fo53. <https://doi.org/10.1093/femsyr/fo53>
- Sabahannur, St. & Nirwana. (2017). Kajian pengaruh berat biji kakao perkotak dan waktu pengadukan terhadap keberhasilan proses fermentasi. *Jurnal Pendidikan Matematika dan IPA*. 8(2). 18-30.
<http://dx.doi.org/10.26418/jpmipa.v8i2.21172>
- Sandhya, M. V. S., Yallappa, B. S., Varadaraj, M. C., Puranaik, J., Rao, L. J., Janardhan, P., & Murthy, P. S. (2016). Inoculum of the starter consortia and interactive metabolic process in enhancing quality of cocoa bean (*Theobroma cacao*) fermentation. *LWT-Food Science and Technology*, 65,

731-738.

<https://doi.org/10.1016/j.lwt.2015.09.002>

- Setiarto, R. H. B., Widhyastuti, N., & Saskiawan, I. (2016). Pengaruh fermentasi fungi, bakteri asam laktat dan khamir terhadap kualitas nutrisi tepung sorgum. *Agritech*, 36(4), 440-449. <https://doi.org/10.22146/agritech.16769>
- Schwan, R.F. & Wheals, A.E. (2004). The microbiology of cocoa fermentation and its role in chocolate quality. *Critical Reviews in Food Science and Nutrition*. 44 (4), 205–221. <https://doi.org/10.1080/10408690490464104>
- Scollo, E., Neville, D. C., Oruna-Concha, M. J., Trotin, M., Umaharan, P., Sukha, D., ... & Cramer, R. (2020). Proteomic and peptidomic UHPLC-ESI MS/MS analysis of cocoa beans fermented using the styrofoam-box method. *Food chemistry*, 316, 126350. <https://doi.org/10.1016/j.foodchem.2020.126350>
- Semuel. F.K., (2013). *Pengaruh fermentasi biji kakao kering non fermentasi terhadap Indeks fermentasi*. (Tesis, Universitas Gadjah Mada). Diakses dari http://etd.repository.ugm.ac.id/home/detail_pencarian/63709
- Shahbandeh, M. (2022). Global cocoa bean production from 2019/20 to 2021/22, by country.
- Shankar, S. R., Sneha, H. P., Prakash, I., Khan, M., HN, P. K., Om, H., ... & Murthy, P. S. (2022). Microbial ecology and functional coffee fermentation dynamics with *Pichia kudriavzevii*. *Food Microbiology*, 105, 104012. <https://doi.org/10.1016/j.fm.2022.104012>
- Silva Neto, P. J. D. (2001). Sistema de produção de cacau para a Amazônia brasileira (No. 633.74 S623). Comissão Executiva do Plano da Lavoura Cacaueira, Belém, PA (Brasil).
- Soares, T. F., & Oliveira, M. B. P. (2022). Cocoa By-Products: Characterization of Bioactive Compounds and Beneficial Health Effects. *Molecules*, 27(5), 1625. <https://doi.org/10.3390/molecules27051625>
- Toyotome, T., Yamamoto, M., & Horie, M. (2019). Draft genome sequence of the yeast *Pichia manshurica* YM63, a participant in secondary fermentation of Ishizuchi-kurocha, a Japanese fermented tea. *Microbiology Resource Announcements*, 8(27), e00528-19. <https://doi.org/10.1128/mra.00528-19>
- Vervuurt, W. (2019). *Modelling GHG Emissions of Cacao Production at Plot Level in the Republic of Côte D'Ivoire*. Thesis <https://doi.org/10.1007/s10457-022-00729-8>
- Vicente, J., Calderón, F., Santos, A., Marquina, D., & Benito, S. (2021). High potential of *Pichia kluyveri* and other *Pichia* species in wine technology. *International Journal of Molecular Sciences*, 22(3), 1196.
- Vinicio De Melo Pereira, G., De Carvalho Neto, D. P., Junqueira, A. C. D. O., Karp, S. G., Letti, L. A., Magalhães Júnior, A. I., & Soccoll, C. R. (2020). A review of selection criteria for starter culture development in the food fermentation industry. *Food Reviews International*, 36(2), 135-167.

<https://doi.org/10.1080/87559129.2019.1630636>

- Visintin, S., Alessandria, V., Valente, A., Dolci, P., & Cocolin, L. (2016). Molecular identification and physiological characterization of yeasts, lactic acid bacteria and acetic acid bacteria isolated from heap and box cocoa bean fermentations in West Africa. *International Journal of Food Microbiology*, 216, 69-78. <https://doi.org/10.1080/87559129.2019.1630636>
- Wahyuni, M. F., Yunita, D., Yusriana, Y., Aisyah, Y., Lahmer, R. A., & Mugampoza, D. (2018). Chemical and microbiological characteristics of cocoa beans from Pidie district, Aceh province, Indonesia. *Proceeding of AIC: Health and Life Sciences*, 8(1).
- Wilson, P. K., & Hurst, W. J. (2012). Chocolate as medicine: a quest over the centuries. Royal Society of Chemistry.
- Walker, G. M. (2009). Yeasts. University of Abertay Dundee, Dundee, Scotland.
- Walker, G. M., & White, N. A. (2017). Introduction to fungal physiology. *Fungi: biology and applications*, 1-35. <https://doi.org/10.1002/9781119374312.ch1>
- Widianto, D., Pramita, A. D., & Wedhastris, S. (2013). Perbaikan proses fermentasi biji kakao kering dengan penambahan tetes tebu, khamir, dan bakteri asam asetat. *Jurnal teknosains*, 3(1).
<https://doi.org/10.22146/teknosains.6126>
- Yuwono, S. S., & Waziiroh, E. (2017). *Teknologi pengolahan pangan hasil perkebunan*. Universitas Brawijaya Press.