



REFERENCES

- A. Ferreira, J., Lennartsson, P., & Taherzadeh, M. (2014). Production of Ethanol and Biomass from Thin Stillage Using Food-Grade Zygomycetes and Ascomycetes Filamentous Fungi. *Energies*, 7, 3872–3885. <https://doi.org/10.3390/en7063872>
- Asadollahzadeh, M., Ghasemian, A., Saraeian, A., Resalati, H., & Taherzadeh, M. (2018). Production of Fungal Biomass Protein by Filamentous Fungi Cultivation on Liquid Waste Streams from Pulping Process. *Bioresources*, 13, 5013–5031.
- Atasoy, M., Eyice, Ö., & Cetecioglu, Z. (2020). Volatile fatty acid production from semi-synthetic milk processing wastewater under alkali pH: The pearls and pitfalls of microbial culture. *Bioresource Technology*, 297, 122415. <https://doi.org/https://doi.org/10.1016/j.biortech.2019.122415>
- Atasoy, M., Owusu-Agyeman, I., Plaza, E., & Cetecioglu, Z. (2018). Bio-based volatile fatty acid production and recovery from waste streams: Current status and future challenges. *Bioresource Technology*, 268, 773–786. <https://doi.org/https://doi.org/10.1016/j.biortech.2018.07.042>
- Bedaso, B. (2019). *Volatile fatty acid production from co-fermentation of primary sludge and food waste without pH control* (Issue 19691). KTH, Sustainable development, Environmental science and Engineering.
- Ben-Gera, I., & Kramer, A. (1969). *The Utilization of Food Industries Wastes* (C. O. Chichester, E. M. Mrak, & G. F. B. T.-A. in F. R. Stewart (eds.); Vol. 17, pp. 77–152). Academic Press. [https://doi.org/https://doi.org/10.1016/S0065-2628\(08\)60309-2](https://doi.org/https://doi.org/10.1016/S0065-2628(08)60309-2)
- Beolchini, F., Del Re, G., Di Giacomo, G., Spera, L., & Veglio, F. (2006). Biological Treatment of Agro-Industrial Wastewater for the Production of Glucoamylase and



<https://doi.org/10.1080/01496390500524818>

Blumenthal, C. Z. (2004). Production of toxic metabolites in *Aspergillus niger*, *Aspergillus oryzae*, and *Trichoderma reesei*: justification of mycotoxin testing in food grade enzyme preparations derived from the three fungi. *Regulatory Toxicology and Pharmacology : RTP*, 39(2), 214–228. <https://doi.org/10.1016/j.yrtph.2003.09.002>

Brown, D. W., Adams, T. H., & Keller, N. P. (1996). Aspergillus has distinct fatty acid synthases for primary and secondary metabolism. *Proceedings of the National Academy of Sciences*, 93(25), 14873 LP – 14877.

<https://doi.org/10.1073/pnas.93.25.14873>

Cairns, T. C., Zheng, X., Zheng, P., Sun, J., & Meyer, V. (2019). Moulding the mould: understanding and reprogramming filamentous fungal growth and morphogenesis for next generation cell factories. *Biotechnology for Biofuels*, 12(1), 77.

<https://doi.org/10.1186/s13068-019-1400-4>

Caplice, E., & Fitzgerald, G. F. (1999). Food fermentations: role of microorganisms in food production and preservation. *International Journal of Food Microbiology*, 50(1), 131–149. [https://doi.org/https://doi.org/10.1016/S0168-1605\(99\)00082-3](https://doi.org/https://doi.org/10.1016/S0168-1605(99)00082-3)

Cavka, A., & Jo`nsson, L. J. (2014). Comparison of the growth of filamentous fungi and yeasts in lignocellulose-derived media. *Biocatalysis and Agricultural Biotechnology*, 3(4), 197–204. <https://doi.org/https://doi.org/10.1016/j.bcab.2014.04.003>

Chalima, A., Oliver, L., Fernandez de Castro, L., Karnaouri, A., Dietrich, T., & Topakas, E. (2017). Utilization of Volatile Fatty Acids from Microalgae for the Production of High Added Value Compounds. *Fermentation*, 3, 54.

<https://doi.org/10.3390/fermentation3040054>



- Chang, H. N., Kim, N.-J., Kang, J., & Jeong, C. M. (2010). Biomass-derived volatile fatty acid platform for fuels and chemicals. *Biotechnology and Bioprocess Engineering*, 15(1), 1–10. <https://doi.org/10.1007/s12257-009-3070-8>
- Chang, P.-K., Horn, B. W., Abe, K., & Gomi, K. (2014). *ASPERGILLUS / Introduction* (C. A. Batt & M. L. B. T.-E. of F. M. (Second E. Tortorello (eds.); pp. 77–82). Academic Press. [https://doi.org/https://doi.org/10.1016/B978-0-12-384730-0.00010-0](https://doi.org/10.1016/B978-0-12-384730-0.00010-0)
- Dahiya, S., Sarkar, O., Swamy, Y. V., & Venkata Mohan, S. (2015). Acidogenic fermentation of food waste for volatile fatty acid production with co-generation of biohydrogen. *Bioresource Technology*, 182, 103–113. <https://doi.org/10.1016/j.biortech.2015.01.007>
- Dodge, B. O. (1932). Crossing Hermaphroditic Races of Neurospora. *Mycologia*, 24(1), 7–13. <https://doi.org/10.2307/3753727>
- Dynesen, J., & Nielsen, J. (2003). Surface Hydrophobicity of *Aspergillus nidulans* Conidiospores and Its Role in Pellet Formation. *Biotechnology Progress*, 19(3), 1049–1052. <https://doi.org/10.1021/bp0340032>
- El-Enshasy, H. A. (2007). *Chapter 9 - Filamentous Fungal Cultures – Process Characteristics, Products, and Applications* (S.-T. B. T.-B. for V.-A. P. from R. R. Yang (ed.); pp. 225–261). Elsevier. [https://doi.org/https://doi.org/10.1016/B978-044452114-9/50010-4](https://doi.org/10.1016/B978-044452114-9/50010-4)
- FAO. (2011). *Global food losses and food waste – Extent, causes and prevention*. <http://www.fao.org/3/a-i2697e.pdf>
- FAO. (2013). *Food wastage footprint: Impacts on natural resources - Summary report*.
- Ferreira, J. A., Agnihotri, S., & Taherzadeh, M. J. (2019). *Chapter 3 - Waste Biorefinery* (M. J. Taherzadeh, K. Bolton, J. Wong, & A. B. T.-S. R. R. and Z. W. A. Pandey (eds.); pp.



- 35–52). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-0-444-64200-4.00003-7>
- Ferreira, J. A., Lennartsson, P. R., Edebo, L., & Taherzadeh, M. J. (2013). Zygomycetes-based biorefinery: Present status and future prospects. *Bioresource Technology*, *135*, 523–532. <https://doi.org/https://doi.org/10.1016/j.biortech.2012.09.064>
- Gad, S. C. (2014). *Propionic Acid* (P. B. T.-E. of T. (Third E. Wexler (ed.); pp. 1105–1107). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-386454-3.00914-3>
- García, M., Beltrán-Hernández, R. I., Vázquez-Rodríguez, G., Coronel-Olivares, C., Medina, S., Juárez-Santillán, L., & Lucho-Constantino, C. (2017). Formation, morphology and biotechnological applications of filamentous fungal pellets: A review. *Revista Mexicana de Ingeniería Química*, *16*, 703–720.
- Gautier, M. (2014). *Propionibacterium* (C. A. Batt & M. L. B. T.-E. of F. M. (Second E. Tortorello (eds.); pp. 232–237). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-384730-0.00280-9>
- Goldberg, I., & Rokem, J. S. (2009). *Organic and Fatty Acid Production, Microbial* (M. B. T.-E. of M. (Third E. Schaechter (ed.); pp. 421–442). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-012373944-5.00156-5>
- Gomi, K. (2014). *ASPERGILLUS / Aspergillus oryzae* (C. A. Batt & M. L. B. T.-E. of F. M. (Second E. Tortorello (eds.); pp. 92–96). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-384730-0.00011-2>
- Gopal, P. M., Sivaram, N. M., & Barik, D. (2019). Chapter 7 - Paper Industry Wastes and Energy Generation From Wastes. In D. B. T.-E. from T. O. W. for H. and P. G. Barik (Ed.), *Woodhead Publishing Series in Energy* (pp. 83–97). Woodhead Publishing. <https://doi.org/https://doi.org/10.1016/B978-0-08-102528-4.00007-9>



Gurr, M. I., & Harwood, J. L. (1990). *Lipid Biochemistry*. Springer.

Gustavsson, J., Cederberg, C., & Sonesson, U. (2011). Global Food Losses and Food Waste.

Save Food at Interpack Düsseldorf, Germany.

Hatton, P. V, & Kinderlerer, J. (2008). Toxicity of medium chain fatty acids to *Penicillium crustosum* Thom and their detoxification to methyl ketones. *Journal of Applied Microbiology*, 70, 401–407. <https://doi.org/10.1111/j.1365-2672.1991.tb02956.x>

Helena Nevalainen, K. M., & Te'o, V. S. J. (2003). 11 - Enzyme Production in Industrial Fungi-Molecular Genetic Strategies for Integrated Strain Improvement. In D. K. Arora & G. G. B. T.-A. M. and B. Khachatourians (Eds.), *Fungal Genomics* (Vol. 3, pp. 241–259). Elsevier. [https://doi.org/https://doi.org/10.1016/S1874-5334\(03\)80014-X](https://doi.org/https://doi.org/10.1016/S1874-5334(03)80014-X)

Helmenstine, A. M. (2020). *pKa Definition in Chemistry*. <https://www.thoughtco.com/what-is-pka-in-chemistry-605521>

Ho, C. C. (1986). Identity and characteristics of *Neurospora intermedia* responsible for oncom fermentation in Indonesia. *Food Microbiology*, 3(2), 115–132. [https://doi.org/https://doi.org/10.1016/S0740-0020\(86\)80035-1](https://doi.org/https://doi.org/10.1016/S0740-0020(86)80035-1)

Hwang, D. H., Lee, Y. J., & Kinsella, J. E. (1976). β -Ketoacyl decarboxylase activity in spores and mycelium of *Penicillium roqueforti*. *International Journal of Biochemistry*, 7(3), 165–171. [https://doi.org/https://doi.org/10.1016/0020-711X\(76\)90015-X](https://doi.org/https://doi.org/10.1016/0020-711X(76)90015-X)

Hynes, M. J. (2003). The *Neurospora crassa* genome opens up the world of filamentous fungi. *Genome Biology*, 4(6), 217. <https://doi.org/10.1186/gb-2003-4-6-217>

Jennessen, J., Nielsen, K. F., Houbraken, J., Lyhne, E. K., Schnürer, J., Frisvad, J. C., & Samson, R. A. (2005). Secondary Metabolite and Mycotoxin Production by the *Rhizopus microsporus* Group. *Journal of Agricultural and Food Chemistry*, 53(5),



Jennessen, J., Schnürer, J., Olsson, J., Samson, R. A., & Dijksterhuis, J. (2008).

Morphological characteristics of sporangiospores of the tempe fungus *Rhizopus oligosporus* differentiate it from other taxa of the *R. microsporus* group. *Mycological Research*, *112*(5), 547–563. <https://doi.org/https://doi.org/10.1016/j.mycres.2007.11.006>

Jha, ajay kumar, Li, J., Yuan, Y., Baral, N., & Ai, B. (2014). A Review on Bio-butyric Acid Production and its Optimization. *International Journal of Agriculture and Biology*, *16*, 1019–1024.

Jun, H., Kieselbach, T., & Jönsson, L. J. (2011). Enzyme production by filamentous fungi: analysis of the secretome of *Trichoderma reesei* grown on unconventional carbon source. *Microbial Cell Factories*, *10*(1), 68. <https://doi.org/10.1186/1475-2859-10-68>

Karimi, S., Soofiani, N., Lundh, T., Mahboubi Soufiani, A., Kiessling, A., Taherzadeh, M., Taherzadeh@hb, M., & Se. (2019). Evaluation of Filamentous Fungal Biomass Cultivated on Vinasse as an Alternative Nutrient Source of Fish Feed: Protein, Lipid, and Mineral Composition. *Fermentation*, *2019*, 99. <https://doi.org/10.3390/fermentation5040099>

Kim, H., Chang, Y.-C., Lynch, R., & Escobar, B. (2016). *Rhizopus microsporus* var. *Oligosporus*. https://microbewiki.kenyon.edu/index.php/Rhizopus_microsporus_var._Oligosporus

Kinderlerer, J. L. (1993). Fungal strategies for detoxification of medium chain fatty acids. *International Biodeterioration & Biodegradation*, *32*(1), 213–224. [https://doi.org/https://doi.org/10.1016/0964-8305\(93\)90053-5](https://doi.org/https://doi.org/10.1016/0964-8305(93)90053-5)

Kleerebezem, R., Joosse, B., Rozendal, R., & van Loosdrecht, M. (2015). Anaerobic



digestion without biogas? *Reviews in Environmental Science and Bio/Technology*, 14.

<https://doi.org/10.1007/s11157-015-9374-6>

Lewis, H. L. (1970). Caproic Acid Metabolism and the Production of 2-Pentanone and Gluconic Acid by *Aspergillus niger*. *Microbiology*, 63(2), 203–210.

<https://doi.org/https://doi.org/10.1099/00221287-63-2-203>

Liaud, N., Giniés, C., Navarro, D., Fabre, N., Crapart, S., Gimbert, I. H., Levasseur, A., Raouche, S., & Sigoillot, J.-C. (2014). Exploring fungal biodiversity: organic acid production by 66 strains of filamentous fungi. *Fungal Biology and Biotechnology*, 1(1), 1. <https://doi.org/10.1186/s40694-014-0001-z>

Machida, M. (2002). Progress of *Aspergillus oryzae* Genomics. In A. I. Laskin, J. W. Bennett, & G. M. B. T.-A. in A. M. Gadd (Eds.), *Advances in Applied Microbiology* (Vol. 51, pp. 81-107e). Academic Press. [https://doi.org/https://doi.org/10.1016/S0065-2164\(02\)51002-9](https://doi.org/https://doi.org/10.1016/S0065-2164(02)51002-9)

Mitchell, D. A., Doelle, H. W., & Greenfield, P. F. (1988). Agar plate growth studies of *Rhizopus oligosporus* and *Aspergillus oryzae* to determine their suitability for solid-state fermentation. *Applied Microbiology and Biotechnology*, 28(6), 598–602. <https://doi.org/10.1007/BF00250419>

Moo-Young, M. (2019). *Comprehensive Biotechnology*. Elsevier Science. <https://books.google.se/books?id=uyWqDwAAQBAJ>

Nair, R. B., Lennartsson, P. R., & Taherzadeh, M. J. (2016). Mycelial pellet formation by edible ascomycete filamentous fungi, *Neurospora intermedia*. *AMB Express*, 6(1), 31. <https://doi.org/10.1186/s13568-016-0203-2>

Nanavaty, H., & Ogledzinski, M. (2020). *Aspergillus oryzae*.



NCBI. (2020a). *Acetic Acid*. PubChem Database.

<https://pubchem.ncbi.nlm.nih.gov/compound/Acetic-acid>

NCBI. (2020b). *Caproic Acid*. PubChem Database.

<https://pubchem.ncbi.nlm.nih.gov/compound/Hexanoic-acid>

Nitayavardhana, S., & Khanal, S. K. (2010). Innovative biorefinery concept for sugar-based ethanol industries: Production of protein-rich fungal biomass on vinasse as an aquaculture feed ingredient. *Bioresource Technology*, *101*(23), 9078–9085.

<https://doi.org/https://doi.org/10.1016/j.biortech.2010.07.048>

Nout, M. J., & Aidoo, K. (2010). *Asian Fungal Fermented Food* (pp. 29–58).

https://doi.org/10.1007/978-3-642-11458-8_2

Okonko, I., Adeola, T., Enobong, F., Damilola, O., & Ogunjobi, A. (2009). Utilization of food wastes for sustainable development. *Electronic Journal of Environmental, Agricultural and Food Chemistry*, *8*.

Parachin, N. S., Hahn-Hägerdal, B., & Bettiga, M. (2011). *6.46 - A Microbial Perspective on Ethanolic Lignocellulose Fermentation* (M. B. T.-C. B. (Second E. Moo-Young (ed.); pp. 605–614). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-08-088504-9.00390-1>

Perez-Garcia, O., Escalante, F., de-Bashan, L., & Bashan, Y. (2010). Heterotrophic cultures of microalgae: Metabolism and potential products. *Water Research*, *45*, 11–36.

<https://doi.org/10.1016/j.watres.2010.08.037>

Perez-Garcia, O., Escalante, F. M. E., de-Bashan, L. E., & Bashan, Y. (2011). Heterotrophic cultures of microalgae: Metabolism and potential products. *Water Research*, *45*(1), 11–



36. <https://doi.org/https://doi.org/10.1016/j.watres.2010.08.037>

Perkins, D. D. (1992). Neurospora: the organism behind the molecular revolution. *Genetics*, 130(4), 687–701. <https://pubmed.ncbi.nlm.nih.gov/1582553>

Perkins, D. D., & Davis, R. H. (2000). Evidence for safety of Neurospora species for academic and commercial uses. *Applied and Environmental Microbiology*, 66(12), 5107–5109. <https://doi.org/10.1128/aem.66.12.5107-5109.2000>

Phillips, G. O., & Williams, P. A. (2011). *Handbook of Food Proteins*. Elsevier Science. <https://books.google.se/books?id=43pwAgAAQBAJ>

Pirt, S. J. (1966). A theory of the mode of growth of fungi in the form of pellets in submerged culture. *Proceedings of the Royal Society of London. Series B, Biological Sciences*, 166(1004), 369–373. <https://doi.org/10.1098/rspb.1966.0105>

Polanowska, K., Grygier, A., Kuligowski, M., Rudzińska, M., & Nowak, J. (2020). Effect of tempe fermentation by three different strains of *Rhizopus oligosporus* on nutritional characteristics of faba beans. *LWT*, 122, 109024. <https://doi.org/https://doi.org/10.1016/j.lwt.2020.109024>

Roddy, D. J. (2012). *5.01 - Biomass and Biofuels – Introduction* (A. B. T.-C. R. E. Sayigh (ed.); pp. 1–9). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-0-08-087872-0.00501-1>

Rodríguez Porcel, E. M., Casas López, J. L., Sánchez Pérez, J. A., Fernández Sevilla, J. M., & Chisti, Y. (2005). Effects of pellet morphology on broth rheology in fermentations of *Aspergillus terreus*. *Biochemical Engineering Journal*, 26(2), 139–144. <https://doi.org/https://doi.org/10.1016/j.bej.2005.04.011>

Sajbidor, J., Certík, M., & Dobroňová, S. (1988). Influence of different carbon sources on



growth, lipid content and fatty acid composition in four strains belonging to mucorales.

Biotechnology Letters, 10(5), 347–350. <https://doi.org/10.1007/BF01026163>

Skory, C. D., Freer, S. N., & Bothast, R. J. (1997). Screening for ethanol-producing filamentous fungi. *Biotechnology Letters*, 19(3), 203–206.
<https://doi.org/10.1023/A:1018337003433>

Solomon, G. L. (1996). *Materials and Methods in Fermentation*. Academic Press.

Sorenson, W. G., & Hesseltine, C. W. (1966). Carbon and nitrogen utilization by *Rhizopus oligosporus*. *Mycologia*, 58(5), 681–689.

Sparringa, R. A., Kendall, M., Westby, A., & Owens, J. D. (2002). Effects of temperature, pH, water activity and CO₂ concentration on growth of *Rhizopus oligosporus* NRRL 2710. *Journal of Applied Microbiology*, 92(2), 329–337. <https://doi.org/10.1046/j.1365-2672.2002.01534.x>

Strazzer, G., Battista, F., Garcia, N. H., Frison, N., & Bolzonella, D. (2018). Volatile fatty acids production from food wastes for biorefinery platforms: A review. *Journal of Environmental Management*, 226, 278–288.
<https://doi.org/https://doi.org/10.1016/j.jenvman.2018.08.039>

Su, X., Schmitz, G., Zhang, M., Mackie, R. I., & Cann, I. K. O. (2012). Chapter One - Heterologous Gene Expression in Filamentous Fungi. In G. M. Gadd & S. B. T.-A. in A. M. Sariaslani (Eds.), *Advances in Applied Microbiology* (Vol. 81, pp. 1–61). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-394382-8.00001-0>

Taherzadeh, M. J., Niklasson, C., & Lidén, G. (1997). Acetic acid—friend or foe in anaerobic batch conversion of glucose to ethanol by *Saccharomyces cerevisiae*? *Chemical Engineering Science*, 52(15), 2653–2659. <https://doi.org/https://doi.org/10.1016/S0009->



- Veiter, L., Rajamanickam, V., & Herwig, C. (2018). The filamentous fungal pellet-relationship between morphology and productivity. *Applied Microbiology and Biotechnology*, *102*(7), 2997–3006. <https://doi.org/10.1007/s00253-018-8818-7>
- Wainaina, S., Kisworini, A. D., Fanani, M., Wikandari, R., Millati, R., Niklasson, C., & Taherzadeh, M. J. (2020). Utilization of food waste-derived volatile fatty acids for production of edible *Rhizopus oligosporus* fungal biomass. *Bioresource Technology*, *310*, 123444. <https://doi.org/https://doi.org/10.1016/j.biortech.2020.123444>
- Wainaina, S., Parchami, M., Mahboubi, A., Horváth, I. S., & Taherzadeh, M. J. (2019). Food waste-derived volatile fatty acids platform using an immersed membrane bioreactor. *Bioresource Technology*, *274*, 329–334. <https://doi.org/https://doi.org/10.1016/j.biortech.2018.11.104>
- Walker, V., & Mills, G. A. (2014). 2-Pentanone production from hexanoic acid by *Penicillium roqueforti* from blue cheese: is this the pathway used in humans? *TheScientificWorldJournal*, *2014*, 215783. <https://doi.org/10.1155/2014/215783>
- WANG, H. W. A. L., SWAIN, E. W., & TINE, C. W. H. (1975). MASS PRODUCTION OF *Rhizopus oligosporus* SPORES AND THEIR APPLICATION IN TEMPEH FERMENTATION. *Journal of Food Science*, *40*(1), 168–170. <https://doi.org/10.1111/j.1365-2621.1975.tb03762.x>
- Wijekoon, K. C., Visvanathan, C., & Abeynayaka, A. (2011). Effect of organic loading rate on VFA production, organic matter removal and microbial activity of a two-stage thermophilic anaerobic membrane bioreactor. *Bioresource Technology*, *102*(9), 5353–5360. <https://doi.org/10.1016/j.biortech.2010.12.081>



Xu, F., Li, Y., Ge, X., Yang, L., & Li, Y. (2018). Anaerobic digestion of food waste –

Challenges and opportunities. *Bioresource Technology*, 247, 1047–1058.

<https://doi.org/https://doi.org/10.1016/j.biortech.2017.09.020>

Yuan, H., & Zhu, N. (2016). Progress in inhibition mechanisms and process control of

intermediates and by-products in sewage sludge anaerobic digestion. *Renewable and Sustainable Energy Reviews*, 58, 429–438.

<https://doi.org/https://doi.org/10.1016/j.rser.2015.12.261>

Zhang, J., & Zhang, J. (2016). The filamentous fungal pellet and forces driving its formation.

Critical Reviews in Biotechnology, 36(6), 1066–1077.

<https://doi.org/10.3109/07388551.2015.1084262>

Zigová, J., & Šturdík, E. (2000). Advances in biotechnological production of butyric acid.

Journal of Industrial Microbiology and Biotechnology, 24(3), 153–160.

<https://doi.org/10.1038/sj.jim.2900795>