



DAFTAR PUSTAKA

- Agathian, G., Semwal, A. D., & Sharma, G. K. (2015). Optimization of barrel temperature and kidney bean flour percentage based on various physical properties of extruded snacks. *Journal of Food Science and Technology*, 52(7), 4113–4123. <https://doi.org/10.1007/s13197-014-1483-7>
- Alam, M. S., Kaur, J., Khaira, H., & Gupta, K. (2016). Extrusion and Extruded Products: Changes in Quality Attributes as Affected by Extrusion Process Parameters: A Review. *Critical Reviews in Food Science and Nutrition*, 56(3), 445–473. <https://doi.org/10.1080/10408398.2013.779568>
- Alam, M. S., Pathania, S., & Sharma, A. (2016). Optimization of the extrusion process for development of high fibre soybean-rice ready-to-eat snacks using carrot pomace and cauliflower trimmings. *LWT*, 74, 135–144. <https://doi.org/10.1016/j.lwt.2016.07.031>
- Altaf, U., Hussain, S. Z., Qadri, T., Iftikhar, F., Naseer, B., & Rather, A. H. (2021). Investigation on mild extrusion cooking for development of snacks using rice and chickpea flour blends. *Journal of Food Science and Technology*, 58(3), 1143–1155. <https://doi.org/10.1007/s13197-020-04628-7>
- Altan, A., & Maskan, M. (2012). Development of Extruded Foods by Utilizing Food Industry By-Products. Dalam A. Altan & M. Maskan (Ed.), *Advances in Food Extrusion Technology* (hlm. 121–168). CRC Press.
- Altan, A., McCarthy, K. L., & Maskan, M. (2008). Evaluation of snack foods from barley-tomato pomace blends by extrusion processing. *Journal of Food Engineering*, 84(2), 231–242. <https://doi.org/10.1016/j.jfoodeng.2007.05.014>
- Anton, A. A., Gary Fulcher, R., & Arntfield, S. D. (2009). Physical and nutritional impact of fortification of corn starch-based extruded snacks with common bean (*Phaseolus vulgaris* L.) flour: Effects of bean addition and extrusion cooking. *Food Chemistry*, 113(4), 989–996. <https://doi.org/10.1016/J.FOODCHEM.2008.08.050>
- Arora, B., Yoon, A., Sriram, M., Singha, P., & Rizvi, S. S. H. (2020). Reactive extrusion: A review of the physicochemical changes in food systems. Dalam *Innovative Food Science and Emerging Technologies* (Vol. 64). Elsevier Ltd. <https://doi.org/10.1016/j.ifset.2020.102429>
- ASABE. (2006). *Method of Determining and Expressing Fineness of Feed Materials by Sieving*. ASABE.
- Barbosa-Canovas, G. V., Ortega-Rivas, E., Juliano, P., & Yan, H. (2005). *Food Powders: Physical Properties, Processing, and Functionality*. Kluwer Academic/Plenum Publishers.
- Berk, Z. (2018). Extrusion. Dalam Z. Berk (Ed.), *Food Process Engineering and Technology* (Third, hlm. 373–394). Academic Press.
- Bhattacharya, S. (2012). Raw Materials for Extrusion of Foods. Dalam M. Maskan & A. Altan (Ed.), *Advances in Food Extrusion Technology* (hlm. 69–86). CRC Press.



- Boakye, P. G., Okyere, A. Y., Kougblenou, I., Kowalski, R., Ismail, B. P., & Annor, G. A. (2022). Optimizing the extrusion conditions for the production of expanded intermediate wheatgrass (*Thinopyrum intermedium*) products. *Journal of Food Science*, 87(8), 3496–3512. <https://doi.org/10.1111/1750-3841.16238>
- Brennan, M. A., Derbyshire, E., Tiwari, B. K., & Brennan, C. S. (2013). Ready-to-eat snack products: The role of extrusion technology in developing consumer acceptable and nutritious snacks. Dalam *International Journal of Food Science and Technology* (Vol. 48, Nomor 5, hlm. 893–902). <https://doi.org/10.1111/ijfs.12055>
- Brnčić, M., Bosiljkov, T., Ukrainczyk, M., Tripalo, B., Brnčić, S. R., Karlović, S., Karlović, D., Ježek, D., & Topić, D. V. (2011). Influence of Whey Protein Addition and Feed Moisture Content on Chosen Physicochemical Properties of Directly Expanded Corn Extrudates. *Food and Bioprocess Technology*, 4(7), 1296–1306. <https://doi.org/10.1007/s11947-009-0273-0>
- Buzera, A., Gikundi, E., Orina, I., & Sila, D. (2022). Effect of Pretreatments and Drying Methods on Physical and Microstructural Properties of Potato Flour. *Foods*, 11(4). <https://doi.org/10.3390/foods11040507>
- Chang, Q., Zheng, B., Zhang, Y., & Zeng, H. (2021). A comprehensive review of the factors influencing the formation of retrograded starch. Dalam *International Journal of Biological Macromolecules* (Vol. 186, hlm. 163–173). Elsevier B.V. <https://doi.org/10.1016/j.ijbiomac.2021.07.050>
- Chessari, C. J., & Sellahewa, J. N. (2001). Effective Process Control. Dalam R. Guy (Ed.), *Extrusion cooking: Technologies and Applications* (hlm. 83–107). Woodhead Publishing Limited.
- Chiu, H. W., Peng, J. C., Tsai, S. J., Tsay, J. R., & Lui, W. B. (2013). Process Optimization by Response Surface Methodology and Characteristics Investigation of Corn Extrudate Fortified with Yam (*Dioscorea alata* L.). *Food and Bioprocess Technology*, 6(6), 1494–1504. <https://doi.org/10.1007/s11947-012-0894-6>
- Choton, S., Gupta, N., Bandral, J. D., Anjum, N., & Choudary, A. (2020). Extrusion technology and its application in food processing: A review. *The Pharma Innovation*, 9(2), 162–168. <https://doi.org/10.22271/tpi.2020.v9.i2d.4367>
- Cotacallapa-Sucapuca, M., Vega, E. N., Maieves, H. A., Berrios, J. D. J., Morales, P., Fernández-Ruiz, V., & Cámaras, M. (2021). Extrusion process as an alternative to improve pulses products consumption. A review. *Foods*, 10(5). <https://doi.org/10.3390/foods10051096>
- Dalbhagat, C. G., Mahato, D. K., & Mishra, H. N. (2019). Effect of extrusion processing on physicochemical, functional and nutritional characteristics of rice and rice-based products: A review. Dalam *Trends in Food Science and Technology* (Vol. 85, hlm. 226–240). Elsevier Ltd. <https://doi.org/10.1016/j.tifs.2019.01.001>
- de Onis, M., Borghi, E., Arimond, M., Webb, P., Croft, T., Saha, K., De-Regil, L. M., Thuita, F., Heidkamp, R., Krasevec, J., Hayashi, C., & Flores-



- Ayala, R. (2019). Prevalence thresholds for wasting, overweight and stunting in children under 5 years. *Public Health Nutrition*, 22(1), 175–179. <https://doi.org/10.1017/S1368980018002434>
- Devi, G. (2021). Red Kidney Bean: Nutritious Pulse Crop. *The Pharma Innovation Journal*, 10(8), 1048–1050.
- Ding, Q. B., Ainsworth, P., Plunkett, A., Tucker, G., & Marson, H. (2006). The effect of extrusion conditions on the functional and physical properties of wheat-based expanded snacks. *Journal of Food Engineering*, 73(2), 142–148. <https://doi.org/10.1016/j.jfoodeng.2005.01.013>
- Ding, Q. B., Ainsworth, P., Tucker, G., & Marson, H. (2005). The effect of extrusion conditions on the physicochemical properties and sensory characteristics of rice-based expanded snacks. *Journal of Food Engineering*, 66(3), 283–289. <https://doi.org/10.1016/j.jfoodeng.2004.03.019>
- Dobraszczyk, B. J., Ainsworth, P., Ibanoglu, S., & Bouchon, P. (2006). Baking, Extrusion and Frying. Dalam J. G. Brennan (Ed.), *Food Processing Handbook* (hlm. 237–290). Wiley-VCH.
- Fiorda, F. A., Soares, M. S., da Silva, F. A., de Moura, C. M. A., & Grossmann, M. V. E. (2015). Physical quality of snacks and technological properties of pre-gelatinized flours formulated with cassava starch and dehydrated cassava bagasse as a function of extrusion variables. *LWT*, 62(2), 1112–1119. <https://doi.org/10.1016/j.lwt.2015.02.030>
- Gopirajah, R., & Muthukumarappan, K. (2018). Effect of extrusion process conditions on the physical properties of tef-oat healthy snack extrudates. *Journal of Food Processing and Preservation*, 42(3). <https://doi.org/10.1111/jfpp.13559>
- Green, M., Hadihardjono, D. N., Pries, A. M., Izwardy, D., Zehner, E., & Huffman, S. L. (2019). High proportions of children under 3 years of age consume commercially produced snack foods and sugar-sweetened beverages in Bandung City, Indonesia. *Maternal and Child Nutrition*, 15(S4). <https://doi.org/10.1111/mcn.12764>
- Guy, R. (2001). Raw Materials for Extrusion Cooking. Dalam R. Guy (Ed.), *Extrusion Cooking: Technologies and Applications* (hlm. 5–28). Woodhead Publishing Limited.
- Guzmán-Ortiz, F. A., Hernández-Sánchez, H., Yee-Madeira, H., Martín-Martínez, E. S., Robles-Ramírez, M. del C., Rojas-López, M., Berrios, J. D. J., & Mora-Escobedo, R. (2015). Physico-chemical, nutritional and infrared spectroscopy evaluation of an optimized soybean/corn flour extrudate. *Journal of Food Science and Technology*, 52(7), 4066–4077. <https://doi.org/10.1007/s13197-014-1485-5>
- Huang, X., Liu, H., Ma, Y., Mai, S., & Li, C. (2022). Effects of Extrusion on Starch Molecular Degradation, Order–Disorder Structural Transition and Digestibility—A Review. Dalam *Foods* (Vol. 11, Nomor 16). MDPI. <https://doi.org/10.3390/foods11162538>



- Jain, R., Goomer, S., & Singh, S. N. (2022). Mung-Oat snack of high protein content by twin screw extrusion using response surface methodology. *Applied Food Research*, 2(1). <https://doi.org/10.1016/j.afres.2022.100099>
- Kalman, H. (2021). Effect of moisture content on flowability: Angle of repose, tilting angle, and Hausner ratio. *Powder Technology*, 393, 582–596. <https://doi.org/10.1016/j.powtec.2021.08.010>
- Kamran, A., & Afshan. (2011). Evaluating risk factors for protein-energy malnutrition in children under the age of six years: a case-control study from Iran. *International Journal of General Medicine*, 607. <https://doi.org/10.2147/ijgm.s19499>
- Kantrong, H., Charunuch, C., Limsangouan, N., & Pengpinit, W. (2018). Influence of process parameters on physical properties and specific mechanical energy of healthy mushroom-rice snacks and optimization of extrusion process parameters using response surface methodology. *Journal of Food Science and Technology*, 55(9), 3462–3472. <https://doi.org/10.1007/s13197-018-3271-2>
- Kaur, A., Kaur, S., Singh, M., Singh, N., Shevkani, K., & Singh, B. (2015). Effect of banana flour, screw speed and temperature on extrusion behaviour of corn extrudates. *Journal of Food Science and Technology*, 52(7), 4276–4285. <https://doi.org/10.1007/s13197-014-1524-2>
- Kazemzadeh, M. (2012). Introduction to Extrusion Technology. Dalam M. Maskan & A. Altan (Ed.), *Advances in Food Extrusion Technology* (hlm. 1–22). CRC Press.
- Kementerian Kesehatan RI. (2021, Desember 28). *Angka Stunting Turun di Tahun 2021*. <https://www.litbang.kemkes.go.id/angka-stunting-turun-di-tahun-2021/>
- Leonard, W., Zhang, P., Ying, D., & Fang, Z. (2020). Application of extrusion technology in plant food processing byproducts: An overview. *Comprehensive Reviews in Food Science and Food Safety*, 19(1), 218–246. <https://doi.org/10.1111/1541-4337.12514>
- Lillford, P. J. (2008). Extrusion. Dalam J. M. Aguilera & P. J. Lillford (Ed.), *Food Materials Science: Principles and Practice* (hlm. 415–436). Springer.
- Majumdar, R. K., & Singh, R. K. R. (2014). The effect of extrusion conditions on the physicochemical properties and sensory characteristics of fish-based expanded snacks. *Journal of Food Processing and Preservation*, 38(3), 864–879. <https://doi.org/10.1111/jfpp.12041>
- Mazlan, M. M., Talib, R. A., Mail, N. F., Taip, F. S., Chin, N. L., Sulaiman, R., Shukri, R., & Mohd Nor, M. Z. (2019). Effects of extrusion variables on corn-mango peel extrudates properties, torque and moisture loss. *International Journal of Food Properties*, 22(1), 54–70. <https://doi.org/10.1080/10942912.2019.1568458>
- Mazumder, P., Roopa, B. S., & Bhattacharya, S. (2007). Textural attributes of a model snack food at different moisture contents. *Journal of Food*



- Engineering, 79(2), 511–516.
<https://doi.org/10.1016/j.jfoodeng.2006.02.011>
- Moscicki, L., & van Zuilichem, D. J. (2011). Extrusion-Cooking and Related Technique. Dalam L. Moscicki (Ed.), *Extrusion-Cooking Techniques: Applications, Theory and Sustainability* (hlm. 1–24). Wiley-VCH.
- Moscicki, L., & Wojtowicz, A. (2011). Raw Materials in the Production of Extrudates. Dalam L. Moscicki (Ed.), *Extrusion-Cooking Techniques: Applications, Theory and Sustainability* (hlm. 45–64). Wiley-VCH.
- Mosibo, O. K., Ferrentino, G., Alam, M. R., Morozova, K., & Scampicchio, M. (2022). Extrusion cooking of protein-based products: potentials and challenges. Dalam *Critical Reviews in Food Science and Nutrition* (Vol. 62, Nomor 9, hlm. 2526–2547). Taylor and Francis Ltd.
<https://doi.org/10.1080/10408398.2020.1854674>
- Nyombaire, G., Siddiq, M., & Dolan, K. D. (2011). Physico-chemical and sensory quality of extruded light red kidney bean (*Phaseolus vulgaris L.*) porridge. LWT, 44(7), 1597–1602.
<https://doi.org/10.1016/j.lwt.2011.02.016>
- Offiah, V., Kontogiorgos, V., & Falade, K. O. (2019). Extrusion processing of raw food materials and by-products: A review. *Critical Reviews in Food Science and Nutrition*, 59(18), 2979–2998.
<https://doi.org/10.1080/10408398.2018.1480007>
- Oliveira, D. P. L., Soares Júnior, M. S., Bento, J. A. C., dos Santos, I. G., & Ferreira, T. A. P. de C. (2021). Influence of extrusion conditions on the physical and nutritional properties of snacks from maize and pearl millet. *Journal of Food Processing and Preservation*, 45(3).
<https://doi.org/10.1111/jfpp.15215>
- Peksa, A., Kita, A., Carbonell-Barrachina, A. A., Miedzianka, J., Kolniak-Ostek, J., Tajner-Czopek, A., Rytel, E., Siwek, A., Miarka, D., & Drozdz, W. (2016). Sensory attributes and physicochemical features of corn snacks as affected by different flour types and extrusion conditions. LWT, 72, 26–36. <https://doi.org/10.1016/j.lwt.2016.04.034>
- Purwestri, R. C., Barati, Z., Wirawan, N. N., Fahmi, I., Lauvai, J., & Scherbaum, V. (2018). What explains stunting among children living in a rice surplus area in Central Java, Indonesia? Dalam *Diversity and change in food wellbeing - Cases from Southeast Asia and Nepal* (hlm. 137–151). Wageningen Academic Publishers.
https://doi.org/10.3920/978-90-8686-864-3_7
- Putri, D. T. P. (2022). *Karakteristik Fisik dan Kimia Ekstrudat Berbahan Dasar Grit Jagung dan Tepung Gaplek dengan Perlakuan Komposisi dan Kadar Air Awal Bahan* [Skripsi]. Universitas Gadjah Mada.
- Ramírez-Rivera, E. J., Hernández-Santos, B., Juárez-Barrientos, J. M., Torruco-Uco, J. G., Ramírez-Figueroa, E., & Rodríguez-Miranda, J. (2021). Effects of formulation and process conditions on chemical composition, color parameters, and acceptability of extruded insect-rich snack. *Journal of Food Processing and Preservation*, 45(5).
<https://doi.org/10.1111/jfpp.15499>



- Ramos Diaz, J. M., Sundarajan, L., Kariluoto, S., Lampi, A. M., Tenitz, S., & Jouppila, K. (2017). Effect of Extrusion Cooking on Physical Properties and Chemical Composition of Corn-Based Snacks Containing Amaranth and Quinoa: Application of Partial Least Squares Regression. *Journal of Food Process Engineering*, 40(1). <https://doi.org/10.1111/jfpe.12320>
- Rathod, R. P., & Annapure, U. S. (2017). Physicochemical properties, protein and starch digestibility of lentil based noodle prepared by using extrusion processing. *LWT*, 80, 121–130. <https://doi.org/10.1016/j.lwt.2017.02.001>
- Riaz, M. N. (2001). Selecting the Right Extruder. Dalam R. Guy (Ed.), *Extrusion Cooking: Technologies and Applications* (hlm. 29–50). Woodhead Publishing Limited.
- Ruiz-Ruiz, J., Martínez-Ayala, A., Drago, S., González, R., Betancur-Ancona, D., & Chel-Guerrero, L. (2008). Extrusion of a hard-to-cook bean (*Phaseolus vulgaris* L.) and quality protein maize (*Zea mays* L.) flour blend. *LWT*, 41(10), 1799–1807. <https://doi.org/10.1016/j.lwt.2008.01.005>
- Sahasakul, Y., Aursalung, A., Thangsiri, S., Wongchang, P., Sangkasa-ad, P., Wongpia, A., Polpanit, A., Inthachat, W., Temviriyankul, P., & Suttisansanee, U. (2022). Nutritional Compositions, Phenolic Contents, and Antioxidant Potentials of Ten Original Lineage Beans in Thailand. *Foods*, 11(14). <https://doi.org/10.3390/foods11142062>
- Schulze, D. (2007). *Powders and Bulk Solids: Behavior, Characterization, Storage and Flow*. Springer-Verlag.
- Seth, D., Badwaik, L. S., & Ganapathy, V. (2015). Effect of feed composition, moisture content and extrusion temperature on extrudate characteristics of yam-corn-rice based snack food. *Journal of Food Science and Technology*, 52(3), 1830–1838. <https://doi.org/10.1007/s13197-013-1181-x>
- Shah, T. R., Prasad, K., & Kumar, P. (2016). Maize—A potential source of human nutrition and health: A review. *Cogent Food and Agriculture*, 2(1). <https://doi.org/10.1080/23311932.2016.1166995>
- Sharifi, S., Majzoobi, M., & Farahnaky, A. (2021). Effects of particle size and moisture content of maize grits on physical properties of expanded snacks. *Journal of Texture Studies*, 52(1), 110–123. <https://doi.org/10.1111/jtxs.12565>
- Sharma, C., Singh, B., Hussain, S. Z., & Sharma, S. (2017). Investigation of process and product parameters for physicochemical properties of rice and mung bean (*Vigna radiata*) flour based extruded snacks. *Journal of Food Science and Technology*, 54(6), 1711–1720. <https://doi.org/10.1007/s13197-017-2606-8>
- Silva, E. M. M. da, Ascheri, J. L. R., Carvalho, C. W. P. de, Takeiti, C. Y., & Berrios, J. de J. (2014). Physical characteristics of extrudates from corn flour and dehulled carioca bean flour blend. *LWT*, 58(2), 620–626. <https://doi.org/10.1016/j.lwt.2014.03.031>
- Singh, B., Rachna, Hussain, S. Z., & Sharma, S. (2015). Response Surface Analysis and Process Optimization of Twin Screw Extrusion Cooking of



- Potato-Based Snacks. *Journal of Food Processing and Preservation*, 39(3), 270–281. <https://doi.org/10.1111/jfpp.12230>
- Singh, R. P., & Heldman, D. R. (2009). *Introduction to Food Engineering* (Fourth). Academic Press.
- Singha, P., Singh, S. K., Muthukumarappan, K., & Krishnan, P. (2018). Physicochemical and nutritional properties of extrudates from food grade distiller's dried grains, garbanzo flour, and corn grits. *Food Science and Nutrition*, 6(7), 1914–1926. <https://doi.org/10.1002/fsn3.769>
- Stojceska, V., Ainsworth, P., Plunkett, A., & İbanoğlu, Ş. (2009). The effect of extrusion cooking using different water feed rates on the quality of ready-to-eat snacks made from food by-products. *Food Chemistry*, 114(1), 226–232. <https://doi.org/10.1016/j.foodchem.2008.09.043>
- World Health Organization. (2018). *Reducing Stunting in Children: equity considerations for achieving the Global Nutrition Targets 2025*. <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>
- Yacu, W. A. (2012). Extruder Selection, Design, and Operation for Different Food Applications. Dalam M. Maskan & A. Altan (Ed.), *Advances in Food Extrusion Technology* (hlm. 23–68). CRC Press.
- Yagci, S., & Göögüs, F. (2009). Development of extruded snack from food by-products: A response surface analysis. *Journal of Food Process Engineering*, 32(4), 565–586. <https://doi.org/10.1111/j.1745-4530.2007.00232.x>
- Yagci, S., & Gogus, F. (2012). Quality Control Parameters of Extrudates and Methods for Determination. Dalam M. Maskan & A. Altan (Ed.), *Advances in Food Extrusion Technology* (hlm. 297–326). CRC Press.
- Yu, L., Ramaswamy, H. S., & Boye, J. (2012). Twin-screw Extrusion of Corn Flour and Soy Protein Isolate (SPI) Blends: A Response Surface Analysis. *Food and Bioprocess Technology*, 5(2), 485–497. <https://doi.org/10.1007/s11947-009-0294-8>
- Zambrano, Y., Contardo, I., Moreno, M. C., & Bouchon, P. (2022). Effect of Extrusion Temperature and Feed Moisture Content on the Microstructural Properties of Rice-Flour Pellets and Their Impact on the Expanded Product. *Foods*, 11(2). <https://doi.org/10.3390/foods11020198>
- Zhu, L. J., Shukri, R., De Mesa-Stonestreet, N. J., Alavi, S., Dogan, H., & Shi, Y. C. (2010). Mechanical and microstructural properties of soy protein - High amylose corn starch extrudates in relation to physiochemical changes of starch during extrusion. *Journal of Food Engineering*, 100(2), 232–238. <https://doi.org/10.1016/j.jfoodeng.2010.04.004>