

DAFTAR PUSTAKA

- Abbas Butt, N., Mohsin Ali, T., & Hasnain, A. (2018). A Comprehensive Review on Scope, Characteristic And Applications Of Instant Starches In Food Products. In *Annals. Food Science and Technology* (Vol. 19, Issue 1). www.afst.valahia.ro
- Abbas, K. A., Khalil, S. K., & Hussin, A. S. M. (2010). *Modified Starches and Their Usages in Selected Food Products : A Review Study Modified Starches and Their Usages in Selected Food Products : A Review Study. May 2010*. <https://doi.org/10.5539/jas.v2n2p90>
- Abdullah, A. H. D., Chalimah, S., Primadona, I., & Hanantyo, M. H. G. (2018). Physical and chemical properties of corn, cassava, and potato starches. *IOP Conference Series: Earth and Environmental Science*, 160(1). <https://doi.org/10.1088/1755-1315/160/1/012003>
- Adebowale, K. O., Adeniyi Afolabi, T., & Lawal, O. S. (2002). Isolation, chemical modification and physicochemical characterisation of Bambarra groundnut (*Voandzeia subterranean*) starch and flour. *Food Chemistry*, 78(3), 305–311. [https://doi.org/10.1016/S0308-8146\(02\)00100-0](https://doi.org/10.1016/S0308-8146(02)00100-0)
- Adzahan, Noranizan. B. M. (2002). Modification of Wheat, Sago and Tapioca Starches By Irradiation and Its Effect on The Physical Properties of Fish Crackers (Keropok). In *Thesis*. Universiti Putra Malaysia.
- Alonso-Gomez, L., Niño-López, A. M., Romero-Garzón, A. M., Pineda-Gomez, P., del Real-Lopez, A., & Rodriguez-Garcia, M. E. (2016). Physicochemical transformation of cassava starch during fermentation for production of sour starch in Colombia. *Starch/Staerke*, 68(11–12), 1139–1147. <https://doi.org/10.1002/star.201600059>
- Ashogbon, A. O., & Akintayo, E. T. (2014). Recent trend in the physical and chemical modification of starches from different botanical sources: A review. In *Starch/Staerke* (Vol. 66, Issues 1–2, pp. 41–57). <https://doi.org/10.1002/star.201300106>
- Barbosa-Canovas, G. V, Ortega-rivas, E., Juliano, P., & Yan, H. (2005). *Food Powders, Physical Properties, Processing and Functionality*.
- Bemiller, J. N. (2018). Physical Modification of Starch. In *Starch in Food*. Elsevier Ltd. <https://doi.org/10.1016/B978-0-08-100868-3.00005-6>
- Bemiller, J. N., & Huber, K. C. (2015). *Physical Modification of Food Starch Functionalities*. <https://doi.org/10.1146/annurev-food-022814-015552>
- Benković, M., Srećec, S., Špoljarić, I., Mršić, G., & Bauman, I. (2015). Fortification of instant coffee beverages - influence of functional ingredients, packaging material and storage time on physical properties of newly formulated, enriched instant coffee powders. *Journal of the Science of Food and Agriculture*, 95(13), 2607–2618. <https://doi.org/10.1002/jsfa.6989>

- Beta, T., & Corke, H. (2001). Noodle quality as related to sorghum starch properties. *Cereal Chemistry*, 78(4), 417–420. <https://doi.org/10.1094/Cchem.2001.78.4.417>
- Bimo Setiarto, H., Amalia, L., Febriani, Y., Fitrilia, T., & Widhyastuti, N. (2019). Kimia Dan Kualitas Biologi Tepung Campolay (Pouteria Campheciana) The Effect Of Autoclaving-Cooling Cycle On Chemical Composition And Biological Quality Of Campolay Flour (Pouteria campheciana). 54–69.
- Bimo Setiarto, R. H., Isra, M., Andrianto, D., Widhyastuti, N., & Masrukhin. (2023). Improvement of Prebiotic Properties and Resistant Starch Content of Corn Flour (*Zea mays* L.) Momala Gorontalo Using Physical, Chemical and Enzymatic Modification. *Tropical Life Sciences Research*, 34(2), 255–278. <https://doi.org/10.21315/tlsr2023.34.2.13>
- Chen, F., Xie, F., Liu, P., & Chen, P. (2019). Structure, thermal stability and suspension rheological properties of alcohol-alkali-treated waxy rice starch. *International Journal of Biological Macromolecules*, 134, 397–404. <https://doi.org/10.1016/j.ijbiomac.2019.05.009>
- Chen, H. H., Wang, Y. S., Leng, Y., Zhao, Y., & Zhao, X. (2014). Effect of NaCl and sugar on physicochemical properties of flaxseed polysaccharide-potato starch complexes. *ScienceAsia*, 40(1), 60–68. <https://doi.org/10.2306/scienceasia1513-1874.2014.40.060>
- Chen, H., Xie, Y., Hu, X., Jin, Z., Xu, X., & Chen, H. (2014). Effect of repeated retrogradation on structural characteristics and in vitro digestibility of waxy potato starch Effect of repeated retrogradation on structural characteristics and in vitro digestibility of waxy potato starch. *Food Chemistry*, 163(June), 219–225. <https://doi.org/10.1016/j.foodchem.2014.04.102>
- Chen, J., & Jane, J. (1994a). Preparation of Cold-Water-Soluble Starch by Alcoholic-Alkaline Treatment. *Cereal Chemistry*, 71(16), 618–622.
- Chen, J., & Jane, J. (1994b). Properties of Granular Cold-Water-Soluble Starches Prepared by Alcoholic-Alkaline Treatments '. *Carbohydrates*, 71(6), 623–626.
- Chen, Y., Dai, G., & Gao, Q. (2020). Preparation and properties of granular cold-water-soluble porous starch. *International Journal of Biological Macromolecules*, 144, 656–662. <https://doi.org/10.1016/j.ijbiomac.2019.12.060>
- Chen, Y. F., Kaur, L., & Singh, J. (2017). Chemical Modification of Starch. In *Starch in Food: Structure, Function and Applications* (pp. 283–321). Elsevier. <https://doi.org/10.1016/B978-0-08-100868-3.00007-X>
- Choi, Y. J., Baik, M. Y., & Kim, B. Y. (2017). Characteristics of granular cold-water-soluble potato starch treated with alcohol and alkali. *Food Science and Biotechnology*, 26(5), 1263–1270. <https://doi.org/10.1007/s10068-017-0172-5>

- Chung, H., Lim, H. S., & Lim, S. (2006). *Effect of partial gelatinization and retrogradation on the enzymatic digestion of waxy rice starch*. 43, 353–359. <https://doi.org/10.1016/j.jcs.2005.12.001>
- Ciric, J., Woortman, A. J. J., & Loos, K. (2014). Analysis of isoamylase debranched starches with size exclusion chromatography utilizing PFG columns. *Carbohydrate Polymers*, 112, 458–461. <https://doi.org/10.1016/j.carbpol.2014.05.093>
- Colussi, R., El Halal, S. L. M., Pinto, V. Z., Bartz, J., Gutkoski, L. C., Zavareze, E. da R., & Dias, A. R. G. (2015). Acetylation of rice starch in an aqueous medium for use in food. *LWT*, 62(2), 1076–1082. <https://doi.org/10.1016/j.lwt.2015.01.053>
- Demirkesen-Bicak, H., Tacer-Caba, Z., & Nilufer-Erdil, D. (2018). Pullulanase treatments to increase resistant starch content of black chickpea (*Cicer arietinum* L.) starch and the effects on starch properties. *International Journal of Biological Macromolecules*, 111, 505–513. <https://doi.org/10.1016/j.ijbiomac.2018.01.026>
- Dries, D. M., Gomand, S. V., Delcour, J. A., & Goderis, B. (2016). V-type crystal formation in starch by aqueous ethanol treatment: The effect of amylose degree of polymerization. *Food Hydrocolloids*, 61, 649–661. <https://doi.org/10.1016/j.foodhyd.2016.06.026>
- Dries, D. M., Gomand, S. V., Goderis, B., & Delcour, J. A. (2014). Structural and thermal transitions during the conversion from native to granular cold-water swelling maize starch. *Carbohydrate Polymers*, 114, 196–205. <https://doi.org/10.1016/j.carbpol.2014.07.066>
- Eastman, J. E. (1987). Cold Water Swelling Starch Composition. *Patent*.
- Englyst, H. N., Kingman, S. M., & Cummings, J. H. (1992). Classification and Measurement of Nutritionally Important Starch Fractions. *European Journal of Clinical Nutrition*, 46(July), S33–S50.
- Falade, K. O., & Ayetigbo, O. E. (2022). Influence of physical and chemical modifications on granule size frequency distribution, fourier transform infrared (FTIR) spectra and adsorption isotherms of starch from four yam (*Dioscorea* spp.) cultivars. *Journal of Food Science and Technology*, 59(5), 1865–1877. <https://doi.org/10.1007/s13197-021-05200-7>
- Farasara, R., Hariyadi, P., Fardiaz, D., & Dewanti-Hariyadi, R. (2014). Pasting Properties of White Corn Flours of Anoman 1 and Pulut Harapan Varieties as Affected by Fermentation Process. *Food and Nutrition Sciences*, 05(21), 2038–2047. <https://doi.org/10.4236/fns.2014.521215>
- Fitzpatrick, J. J., Lauwe, A. Van, Coursol, M., Brien, A. O., Fitzpatrick, K. L., Ji, J., & Miao, O. (2016). Investigation of the rehydration behaviour of food powders by comparing the behaviour of twelve powders with different properties. *Powder Technology*, 297, 340–348. <https://doi.org/10.1016/j.powtec.2016.04.036>

- Ge, X., Shen, H., Su, C., Zhang, B., Zhang, Q., Jiang, H., Yuan, L., Yu, X., & Li, W. (2021). Pullulanase modification of granular sweet potato starch: Assistant effect of dielectric barrier discharge plasma on multi-scale structure, physicochemical properties. *Carbohydrate Polymers*, 272. <https://doi.org/10.1016/j.carbpol.2021.118481>
- Geng, D. H., Tang, N., Gan, J., & Cheng, Y. (2024). Two-step modification of pullulanase and transglucosidase: A novel way to improve the gel strength and reduce the digestibility of rice starch. *International Journal of Biological Macromolecules*, 266. <https://doi.org/10.1016/j.ijbiomac.2024.130992>
- Gidley, M. J., & Bulpin, P. V. (1987). Crystallisation Of Malto-Oligosaccharides As Models Of The Crystalline Forms Of Starch: Minimum Chain-Length Requirement For The Formation Of Double Helices In *Carbohydrate Resew&* (Vol. 161).
- Goni, I., Garcia-Diz, L., Ma, E., & Saura-Calixto, F. (1996). Analysis of resistant starch: a method for foods and food products. In *Food Chemistry* (Vol. 56, Issue 95).
- Han, J., & Lim, S. (2004). Structural changes in corn starches during alkaline dissolution by vortexing. *Carbohydrate Polymers*, 55, 193–199. <https://doi.org/10.1016/j.carbpol.2003.09.006>
- Harianie, L., Yunianta, & Argo, B. D. (2009). Pembuatan Pati Tinggi Amilosa Secara Enzimatis Dari Pati Ubi Kayu (*Manihot Esculenta*) Dan Aplikasinya Untuk Pembuatan Maltosa. *El-Hayah*, 1(1), 14–24. <https://doi.org/10.18860/elha.v1i1.1683>
- Hasjim, J., & Jane, J.-L. (2009). Production of Resistant Starch by Extrusion Cooking of Acid-Modified Normal-Maize Starch Abstract : The objective of this study was to utilize extrusion cooking and hydrothermal treatment to produce. *Journal of Food Science*, 74(7), C556–C562. <https://doi.org/10.1111/j.1750-3841.2009.01285.x>
- Hedayati, S., Majzoobi, M., Shahidi, F., Koocheki, A., & Farahnaky, A. (2016). Effects of NaCl and CaCl₂ on physicochemical properties of pregelatinized and granular cold-water swelling corn starches. *Food Chemistry*, 213, 602–608. <https://doi.org/10.1016/j.foodchem.2016.07.027>
- Hedayati, S., Shahidi, F., Koocheki, A., Farahnaky, A., & Majzoobi, M. (2016). Physical properties of pregelatinized and granular cold water swelling maize starches at different pH values. *International Journal of Biological Macromolecules*. <https://doi.org/10.1016/j.ijbiomac.2016.06.020>
- Hogekamp, S., & Schubert, H. (2003). Rehydration of Food Powders. *Food Science Technology International*. <https://doi.org/10.1177/108201303034938>
- Hongsprabhas, P., Israkarn, K., Kananurux, N., & Sajjaanantakul, T. (2014).

*Characteristics of Thai Yam (*Dioscorea alata* L .) and Spherulitic Structure in Starch Film.*

- Hoover, R., & Zhou, Y. (2003). *In vitro and in vivo hydrolysis of legume starches by α -amylase and resistant starch formation in legumes — a review*. 54, 401–417. [https://doi.org/10.1016/S0144-8617\(03\)00180-2](https://doi.org/10.1016/S0144-8617(03)00180-2)
- Husna, N. E., Arpi, N., Novita, M., & Safriani, D. (2021). Natural spontaneous fermentation effects on the properties of sweet potato flour and the resulting wet noodles. *IOP Conference Series: Earth and Environmental Science*, 667(1). <https://doi.org/10.1088/1755-1315/667/1/012089>
- Hutabarat, D. J. C., & Stevensen, J. (2023). Physicochemical Properties of Enzymatically Modified Starch: A Review. *IOP Conference Series: Earth and Environmental Science*, 1169(1). <https://doi.org/10.1088/1755-1315/1169/1/012093>
- Isra, M., Andrianto, D., Haryo, R., & Setiarto, B. (2023). Effect of Debranching Pullulanase for Resistant Starch Levels and Prebiotic Properties of High Carbohydrate Foods: Meta-Analysis Study. *Philippine Journal of Science*, 152, 173–3.
- Jane, J., & Ames IA. (1993). *Mechanism of Starch Gelatinization in Neutral Salt Solutions*. <https://doi.org/10.1002/star.19930450502>
- Jane, J., & Seib, P. A. (1991). *Preparation of Granular Cold Water Swelling/Soluble Starches By Alcoholic-Alkali Treatments* (Patent 5,057,157).
- Jiang, H., Jane, J. A. Y. L. I. N., Acevedo, Di., Green, An., Shinn, Ge., Schrenker, D., Srichuwong, S., Campbell, M. A. R. K., & Wu, Y. (2010). Variations in Starch Physicochemical Properties from a Generation-Means Analysis Study Using Amylomaize V and VII Parents. *Journal of Agricultural and Food Chemistry*, 5633–5639. <https://doi.org/10.1021/jf904531d>
- Kahar, U. M., Ng, C. L., Chan, K. G., & Goh, K. M. (2016). Characterization of a type I pullulanase from *Anoxybacillus* sp. SK3-4 reveals an unusual substrate hydrolysis. *Applied Microbiology and Biotechnology*, 100(14), 6291–6307. <https://doi.org/10.1007/s00253-016-7451-6>
- Keeratiburana, T., Hansen, A. R., Soontaranon, S., Blennow, A., & Tongta, S. (2020). Porous high amylose rice starch modified by amyloglucosidase and maltogenic α -amylase. *Carbohydrate Polymers*, 230. <https://doi.org/10.1016/j.carbpol.2019.115611>
- Kiatponglarp, W., Tongta, S., Rolland-Sabaté, A., & Buléon, A. (2015). Crystallization and chain reorganization of debranched rice starches in relation to resistant starch formation. *Carbohydrate Polymers*, 122, 108–114. <https://doi.org/10.1016/j.carbpol.2014.12.070>
- Klaochanpong, N., Puttanlek, C., Rungsardthong, V., Pucha-arnon, S., & Uttapap, D. (2015). Physicochemical and structural properties of

- debranched waxy rice, waxy corn and waxy potato starches. *Food Hydrocolloids*, 45, 218–226. <https://doi.org/10.1016/j.foodhyd.2014.11.010>
- Lai, S., Xie, H., Hu, H., Ouyang, K., Li, G., Zhong, J., Hu, X., Xiong, H., & Zhao, Q. (2024). V-type granular starches prepared by maize starches with different amylose contents: An investigation in structure, physicochemical properties and digestibility. *International Journal of Biological Macromolecules*, 266. <https://doi.org/10.1016/j.ijbiomac.2024.131092>
- Le Corre, D., Bras, J., & Dufresne, A. (2010). Starch Nanoparticles : A Review. *Biomacromolecules*, 11(5), 1139–1153.
- Lee, D. J., Kim, J. M., & Lim, S. T. (2021). Characterization of resistant waxy maize dextrins prepared by simultaneous debranching and crystallization. *Food Hydrocolloids*, 112. <https://doi.org/10.1016/j.foodhyd.2020.106315>
- Lee, H., & Park, I. (2020). The influence of starch modification with amylosucrase treatment on morphological features. *Processes*, 8(11), 1–8. <https://doi.org/10.3390/pr8111409>
- Lertwanawatana, P., Frazier, R. A., & Niranjana, K. (2015a). High pressure intensification of cassava resistant starch (RS3) yields. *Food Chemistry*, 181, 85–93. <https://doi.org/10.1016/j.foodchem.2015.02.005>
- Lertwanawatana, P., Frazier, R. A., & Niranjana, K. (2015b). High pressure intensification of cassava resistant starch (RS3) yields. *Food Chemistry*, 181, 85–93. <https://doi.org/10.1016/j.foodchem.2015.02.005>
- Lestari, O. A., Kusnandar, F., & Palupi, N. S. (2015). Pengaruh Heat Moisture Treated (HMT) Terhadap Profil Gelatinisasi Tepung Jagung Heat Moisture Treated (HMT) Influence on Corn Flour Gelatinization Profiles. *Jurnal Teknologi Pertanian*, 16(1), 75–80.
- Li, E., Hasjim, J., Gilding, E. K., Godwin, I. D., Li, C., & Gilbert, R. G. (2019). The Role of Pullulanase in Starch Biosynthesis, Structure, and Thermal Properties by Studying Sorghum with Increased Pullulanase Activity. *Starch/Staerke*, 71(9–10). <https://doi.org/10.1002/star.201900072>
- Li, W., Tian, X., Wang, P., Saleh, A. S. M., Luo, Q., Zheng, J., Ouyang, S., & Zhang, G. (2016). International Journal of Biological Macromolecules Recrystallization characteristics of high hydrostatic pressure gelatinized normal and waxy corn starch. *International Journal of Biological Macromolecules*, 83, 171–177. <https://doi.org/10.1016/j.ijbiomac.2015.11.057>
- Li, X., Cao, C., Yuan, D., Liu, Q., & Zhao, J. (2022). Effects of the Incorporation of Calcium Chloride on the Physical and Oxidative Stability of Filled Hydrogel Particles. *Foods*, 11(3). <https://doi.org/10.3390/foods11030278>
- Liu, G., Gu, Z., Hong, Y., Cheng, L., & Li, C. (2017). Structure, functionality and applications of debranched starch: A review. In *Trends in Food Science*

and Technology (Vol. 63, pp. 70–79). Elsevier Ltd.
<https://doi.org/10.1016/j.tifs.2017.03.004>

- Liu, W., Hong, Y., Gu, Z., Cheng, L., Li, Z., & Li, C. (2017). In structure and in-vitro digestibility of waxy corn starch debranched by pullulanase. *Food Hydrocolloids*, 67, 104–110.
<https://doi.org/10.1016/j.foodhyd.2016.12.036>
- Lu, Z. H., Li, L. Te, Min, W. H., Wang, F., & Tatsumi, E. (2005). The effects of natural fermentation on the physical properties of rice flour and the rheological characteristics of rice noodles. *International Journal of Food Science and Technology*, 40(9), 985–992. <https://doi.org/10.1111/j.1365-2621.2005.01032.x>
- Luo, Y., Liu, X., Ke, Z., Yang, J., Li, Y., Xie, X., & Li, L. (2023). Insight into the improvement in pasting and gel properties of waxy corn starch by critical melting treatments. *International Journal of Biological Macromolecules*, 253. <https://doi.org/10.1016/j.ijbiomac.2023.127285>
- Ma, Z., & Boye, J. I. (2018). Research advances on structural characterization of resistant starch and its structure-physiological function relationship: A review. *Critical Reviews in Food Science and Nutrition*, 58(7), 1059–1083. <https://doi.org/10.1080/10408398.2016.1230537>
- Majzoobi, M., & Farahnaky, A. (2021a). Granular cold-water swelling starch; properties, preparation and applications, a review. *Food Hydrocolloids*, 111. <https://doi.org/10.1016/j.foodhyd.2020.106393>
- Majzoobi, M., & Farahnaky, A. (2021b). Granular cold-water swelling starch; properties, preparation and applications, a review. *Food Hydrocolloids*, 111. <https://doi.org/10.1016/j.foodhyd.2020.106393>
- Majzoobi, M., Kaveh, Z., Blanchard, C. L., & Farahnaky, A. (2015). Physical properties of pregelatinized and granular cold water swelling maize starches in presence of acetic acid. *Food Hydrocolloids*. <https://doi.org/10.1016/j.foodhyd.2015.06.002>
- Marsono, Y. (2016). Proceeding International food conference 2016. *The Role and Mechanism of Resistant Starch (RS) in Reducing Plasma Glucose Concentration*, 23–28.
- Masina, N., Choonara, Y. E., Kumar, P., du Toit, L. C., Govender, M., Indermun, S., & Pillay, V. (2017). A review of the chemical modification techniques of starch. In *Carbohydrate Polymers* (Vol. 157, pp. 1226–1236). Elsevier Ltd. <https://doi.org/10.1016/j.carbpol.2016.09.094>
- Miao, M., Jiang, B., & Zhang, T. (2009). Effect of pullulanase debranching and recrystallization on structure and digestibility of waxy maize starch. *Carbohydrate Polymers*, 76(2), 214–221.
<https://doi.org/10.1016/j.carbpol.2008.10.007>
- Min, H. (2017). Production of cold water-viscous corn starch by heat-moisture

treatment and alcoholic-alkaline treatment: Physicochemical and digestion properties. *Thesis*. Seoul National University.

- Miyazaki, M., Van Hung, P., Maeda, T., & Morita, N. (2006). Recent advances in application of modified starches for breadmaking. *Trends in Food Science & Technology*, *17*, 591–599. <https://doi.org/10.1016/j.tifs.2006.05.002>
- Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscopy of organic material. *Indonesian Journal of Science and Technology*, *4*(1), 97–118. <https://doi.org/10.17509/ijost.v4i1.15806>
- Neelam, K., Vijay, S., & Lalit, S. (2012). Various Techniques For The Modification Of Starch And The Applications Of Its Derivatives. *International Research Journal Of Pharmacy IRJP*, *2012*(5), 25–31. www.irjponline.com
- Nisha, M., & Satyanarayana, T. (2016). Characteristics, protein engineering and applications of microbial thermostable pullulanases and pullulan hydrolases. In *Applied Microbiology and Biotechnology* (Vol. 100, Issue 13, pp. 5661–5679). Springer Verlag. <https://doi.org/10.1007/s00253-016-7572-y>
- Niu, D., Cong, H., Zhang, Y., Mchunu, N. P., & Wang, Z. X. (2022). Pullulanase with high temperature and low pH optima improved starch saccharification efficiency. *Scientific Reports*, *12*(1). <https://doi.org/10.1038/s41598-022-26410-9>
- Palguna, I. G. P. A., Sugiyono, & Hariyanto, B. (2014). Karakteristik Pati Sagu yang Dimodifikasi dengan Perlakuan Gelatinisasi dan Retrogradasi Berulang. *Pangan*, *23*(Juni), 146–156.
- Pathak, A. D., Tranca, I., Nedea, S. V., Zondag, H. A., Rindt, C. C. M., & Smeulders, D. M. J. (2017). First-Principles Study of Chemical Mixtures of CaCl₂ and MgCl₂ Hydrates for Optimized Seasonal Heat Storage. *Journal of Physical Chemistry C*, *121*(38), 20576–20590. <https://doi.org/10.1021/acs.jpcc.7b05245>
- Polesi, L. F., & Sarmiento, S. B. S. (2011). Structural and physicochemical characterization of RS prepared using hydrolysis and heat treatments of chickpea starch. *Starch/Staerke*, *63*(4), 226–235. <https://doi.org/10.1002/star.201000114>
- Punia Bangar, S., Ashogbon, A. O., Singh, A., Chaudhary, V., & Whiteside, W. S. (2022). Enzymatic modification of starch: A green approach for starch applications. In *Carbohydrate Polymers* (Vol. 287). Elsevier Ltd. <https://doi.org/10.1016/j.carbpol.2022.119265>
- Qiu, C., Yang, J., Ge, S., Chang, R., Xiong, L., & Sun, Q. (2016). Preparation and characterization of size-controlled starch nanoparticles based on short linear chains from debranched waxy corn starch. *LWT*, *74*, 303–310.

<https://doi.org/10.1016/j.lwt.2016.07.062>

- Raigond, P., Ezekiel, R., & Raigond, B. (2015). Resistant starch in food: A review. In *Journal of the Science of Food and Agriculture* (Vol. 95, Issue 10, pp. 1968–1978). John Wiley and Sons Ltd. <https://doi.org/10.1002/jsfa.6966>
- Reddy, C. K., Pramila, S., & Haripriya, S. (2015). Pasting, textural and thermal properties of resistant starch prepared from potato (*Solanum tuberosum*) starch using pullulanase enzyme. *Journal of Food Science and Technology*, 52(3), 1594–1601. <https://doi.org/10.1007/s13197-013-1151-3>
- Reddy, I., & Seib, P. A. (2000). *Modified Waxy Wheat Starch Compared to Modified Waxy Corn Starch*. 31, 25–39.
- Sajilata, M. G., Singhal, R. S., & Kulkarni, P. R. (2006). Resistant Starch — A Review. *Comprehensive Reviews in Food Science and Food Safety*, 5(Figure 2), 1–17.
- Sandhu, H. P. S., Manthey, F. A., & Simsek, S. (2012). Ozone gas affects physical and chemical properties of wheat (*Triticum aestivum* L.) starch. *Carbohydrate Polymers*, 87(2), 1261–1268. <https://doi.org/10.1016/j.carbpol.2011.09.003>
- Šárka, E., & Dvořáček, V. (2017). Waxy starch as a perspective raw material (a review). In *Food Hydrocolloids* (Vol. 69, pp. 402–409). Elsevier B.V. <https://doi.org/10.1016/j.foodhyd.2017.03.001>
- Shanita Safii, N., & Haron, H. (2011). Amylose and Amylopectin in Selected Malaysian Foods and its Relationship to Glycemic Index. *Article in Sains Malaysia*, 865–870. <https://www.researchgate.net/publication/281277415>
- Shi, J., Sweedman, M. C., & Shi, Y. C. (2018a). Structural changes and digestibility of waxy maize starch debranched by different levels of pullulanase. *Carbohydrate Polymers*, 194, 350–356. <https://doi.org/10.1016/j.carbpol.2018.04.053>
- Shi, J., Sweedman, M. C., & Shi, Y. C. (2018b). Structural changes and digestibility of waxy maize starch debranched by different levels of pullulanase. *Carbohydrate Polymers*, 194, 350–356. <https://doi.org/10.1016/j.carbpol.2018.04.053>
- Shi, J., Sweedman, M. C., & Shi, Y. C. (2021). Structure, birefringence and digestibility of spherulites produced from debranched waxy maize starch. *International Journal of Biological Macromolecules*, 183, 1486–1494. <https://doi.org/10.1016/j.ijbiomac.2021.05.127>
- Shi, M., Chen, Y., Yu, S., & Gao, Q. (2013). Preparation and properties of RS III from waxy maize starch with pullulanase. *Food Hydrocolloids*, 33(1), 19–25. <https://doi.org/10.1016/j.foodhyd.2013.02.018>
- Singh, J., Singh, N., Sharma, T. R., & Saxena, S. K. (2003). *Physicochemical* ,

rheological and cookie making properties of corn and potato flours. 83, 387–393. [https://doi.org/10.1016/S0308-8146\(03\)00100-6](https://doi.org/10.1016/S0308-8146(03)00100-6)

- Singh, K., & Singh, N. (2005). Food Chemistry Physicochemical and thermal properties of starches separated from corn produced from crosses of two germ pools. *Food Chemistry*, 89, 541–548. <https://doi.org/10.1016/j.foodchem.2004.03.007>
- Singh, N., Inouchi, N., & Nishinari, K. (2006). Structural, thermal and viscoelastic characteristics of starches separated from normal, sugary and waxy maize. *Food Hydrocolloids*, 20(6), 923–935. <https://doi.org/10.1016/j.foodhyd.2005.09.009>
- Suarni, S., Aqil, Muh., & Subagio, H. (2019). Potensi Pengembangan Jagung Pulut Mendukung Diversifikasi Pangan / Potency of Waxy Corn Development to Support Food Diversification. *Jurnal Penelitian Dan Pengembangan Pertanian*, 38(1), 1. <https://doi.org/10.21082/jp3.v38n1.2019.p1-12>
- Sun, J., Wang, F., Sui, Y., She, Z., Zhai, W., Wang, C., & Deng, Y. (2012). Effect of particle size on solubility, dissolution rate, and oral bioavailability: Evaluation using coenzyme Q10 as naked nanocrystals. *International Journal of Nanomedicine*, 7, 5733–5744. <https://doi.org/10.2147/IJN.S34365>
- Surendra Babu, A., & Parimalavalli, R. (2018). Effect of pullulanase debranching and storage temperatures on structural characteristics and digestibility of sweet potato starch. *Journal of the Saudi Society of Agricultural Sciences*, 17(2), 208–216. <https://doi.org/10.1016/j.jssas.2016.04.005>
- Syamsir, E., Hariyadi, P., Fardiaz, D., & Andarwulan, N. (2012). Pengaruh Proses Heat-Moisture Treatment (Hmt) Terhadap Karakteristik Fisikokimia Pati [Effect of Heat-Moisture Treatment (HMT) Process on Physicochemical Characteristics of Starch]. *Jurnal Teknologi Dan Industri Pangan*, 23(1), 100–106. <https://doi.org/10.6066/5302>
- Vamadevan, V., & Bertoft, E. (2015). Structure-function relationships of starch components. In *Starch/Staerke* (Vol. 67, Issues 1–2, pp. 55–68). Wiley-VCH Verlag. <https://doi.org/10.1002/star.201400188>
- Vanier, N. L., El Halal, S. L. M., Dias, A. R. G., & da Rosa Zavareze, E. (2017). Molecular structure, functionality and applications of oxidized starches: A review. In *Food Chemistry* (Vol. 221, pp. 1546–1559). Elsevier Ltd. <https://doi.org/10.1016/j.foodchem.2016.10.138>
- Wang, W., Zhou, H., Yang, H., & Cui, M. (2016). Effects of salts on the freeze–thaw stability, gel strength and rheological properties of potato starch. *Journal of Food Science and Technology*, 53(9), 3624–3631. <https://doi.org/10.1007/s13197-016-2350-5>
- Wei, C., Ge, Y., Zhao, S., Liu, D., Jiliu, J., Wu, Y., Hu, X., Wei, M., Wang, Y., Wang, W., Wang, L., & Cao, L. K. (2022). Effect of Fermentation Time

on Molecular Structure and Physicochemical Properties of Corn Ballast Starch. *Frontiers in Nutrition*, 9. <https://doi.org/10.3389/fnut.2022.885662>

- Wu, S., Chen, H., Tong, Q., Xu, X., & Jin, Z. (2009). Preparation of maltotriose by hydrolyzing of pullulan with pullulanase. *European Food Research and Technology*, 229(5), 821–824. <https://doi.org/10.1007/s00217-009-1118-9>
- Xia, W., Zhang, K., Su, L., & Wu, J. (2021). Microbial starch debranching enzymes: Developments and applications. In *Biotechnology Advances* (Vol. 50). Elsevier Inc. <https://doi.org/10.1016/j.biotechadv.2021.107786>
- Xiao, W., Shen, M., Ren, Y., Wen, H., Li, J., Rong, L., Liu, W., & Xie, J. (2022). Controlling the pasting, rheological, gel, and structural properties of corn starch by incorporation of debranched waxy corn starch. *Food Hydrocolloids*, 123. <https://doi.org/10.1016/j.foodhyd.2021.107136>
- Xu, P., Zhang, S. Y., Luo, Z. G., Zong, M. H., Li, X. X., & Lou, W. Y. (2021). Biotechnology and bioengineering of pullulanase: state of the art and perspectives. In *World Journal of Microbiology and Biotechnology* (Vol. 37, Issue 3). Springer Science and Business Media B.V. <https://doi.org/10.1007/s11274-021-03010-9>
- Yan, H., & Zhengbiao, G. U. (2010). Morphology of modified starches prepared by different methods. *Food Research International*, 43(3), 767–772. <https://doi.org/10.1016/j.foodres.2009.11.013>
- Yang, Q. Y., Lu, X. X., Chen, Y. Z., Luo, Z. G., & Xiao, Z. G. (2019). Fine structure, crystalline and physicochemical properties of waxy corn starch treated by ultrasound irradiation. *Ultrasonics Sonochemistry*, 51, 350–358. <https://doi.org/10.1016/j.ultsonch.2018.09.001>
- Ye, F., Xiao, L., Liang, Y., Zhou, Y., & Zhao, G. (2019). Spontaneous fermentation tunes the physicochemical properties of sweet potato starch by modifying the structure of starch molecules. *Carbohydrate Polymers*, 213, 79–88. <https://doi.org/10.1016/j.carbpol.2019.02.077>
- Yu Yali, Yao Wang, Dingbo Lin, Xinxin Li, J. L. (2018). Preparation and properties of granular cold-water-soluble maize starch by ultrasonic assisted alcoholic-alkaline treatment. *Starch/Starke*, 22.
- Yuan, M. L., Lu, Z. H., Cheng, Y. Q., & Li, L. Te. (2008). Effect of spontaneous fermentation on the physical properties of corn starch and rheological characteristics of corn starch noodle. *Journal of Food Engineering*, 85(1), 12–17. <https://doi.org/10.1016/j.jfoodeng.2007.06.019>
- Yulistiani, R., Dhiyarti (2020). Pengaruh Konsentrasi Substrat Dan Lama Inkubasi Terhadap Karakteristik Fisik Dan Kimia Pati Walur (*Amorphophallus Variabilis*) Termodifikasi Secara Enzimatis. 52(1). Program Studi Teknologi Pangan Fakultas Teknik Universitas Pembangunan Nasional, M., & Timur Jl Raya Rungkut Madya Gunung

Anyar Surabaya, J.

- Zaragoza, E., Sa, E., Sendra, E., Sayas, E., & Pe, A. (2011). Resistant starch as prebiotic : A review. 406–415. <https://doi.org/10.1002/star.201000099>
- Zhang, B., Cui, D., Liu, M., Gong, H., Huang, Y., & Han, F. (2012). Corn porous starch: Preparation, characterization and adsorption property. *International Journal of Biological Macromolecules*, 50(1), 250–256. <https://doi.org/10.1016/j.ijbiomac.2011.11.002>
- Zhang, H., He, F., Wang, T., & Chen, G. (2022). Insights into the interaction of CaCl₂ and potato starch: Rheological, structural and gel properties. *International Journal of Biological Macromolecules*, 220, 934–941. <https://doi.org/10.1016/j.ijbiomac.2022.08.135>
- Zhang, X., Guo, D., Xue, J., Yanniotis, S., & Mandala, I. (2017). The effect of salt concentration on swelling power, rheological properties and saltiness perception of waxy, normal and high amylose maize starch. *Food and Function*, 8(10), 3792–3802. <https://doi.org/10.1039/c7fo01041a>
- Zhang, X., Jiang, X., Jiang, T., Gan, L., Zhang, X., & Dai, H. (2012a). The plasticizing mechanism and effect of calcium chloride on starch/poly(vinyl alcohol) films. *Carbohydrate Polymers*, 90(4), 1677–1684. <https://doi.org/10.1016/j.carbpol.2012.07.050>
- Zhang, X., Jiang, X., Jiang, T., Gan, L., Zhang, X., & Dai, H. (2012b). The plasticizing mechanism and effect of calcium chloride on starch/poly(vinyl alcohol) films. *Carbohydrate Polymers*, 90(4), 1677–1684. <https://doi.org/10.1016/j.carbpol.2012.07.050>
- Zhao, T., Li, X., Zhu, R., Ma, Z., Liu, L., Wang, X., & Hu, X. (2019). Effect of natural fermentation on the structure and physicochemical properties of wheat starch. *Carbohydrate Polymers*, 218, 163–169. <https://doi.org/10.1016/j.carbpol.2019.04.061>
- Zhou, L., Zheng, X., He, X., Li, M., Dai, L., Qiu, C., McClements, D. J., Qin, Y., & Sun, Q. (2024). Effects of recrystallization degree on structure and digestibility of debranched starch. *International Journal of Biological Macromolecules*, 281. <https://doi.org/10.1016/j.ijbiomac.2024.136546>
- Zhu, B., Liu, J., & Gao, W. (2016). Ultrasonics Sonochemistry Process optimization of ultrasound-assisted alcoholic-alkaline treatment for granular cold water swelling starches. *Ultrasonics - Sonochemistry*. <https://doi.org/10.1016/j.ultsonch.2016.08.025>
- Zia-ud-Din, Xiong, H., & Fei, P. (2017). Physical and chemical modification of starches: A review. *Critical Reviews in Food Science and Nutrition*, 57(12), 2691–2705. <https://doi.org/10.1080/10408398.2015.1087379>