UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Adebowale, K., Afolabi, T. & Olu-Owolabi, B., 2006. Functional, physicochemical and retrogradation properties of sword bean (Canavalia gladiata) acetylated and oxidized starches.. *Carbohydr. Polym,* pp. 93-101.

Agrotek, 2019. *agrotek.id.* [Online] Available at: https://agrotek.id [Diakses 21 Januari 2022].

Akuba, R. H., 2004. *Profil Aren.* Tondano, Balai Penelitian Tanaman Kelapa dan Palma Lain, pp. 1-9.

Alam, N., 2006. Potensi Batang Aren sebagai Sumber Pati untuk Instat Starch Noodle. *Jurnal Agroland,* pp. 121-128.

Alam, N. & Saleh, M. S., 2009. Karakteristik Pati dari Batang Pohon Aren pada berbagai Fase Pertumbuhan. *Jurnal Agroland,* pp. 199-205.

Annison, G., Illman, R. & Topping, D., 2003. Acetylated, propionylated or butyrylated starches raise large bowel short chain fatty acids preferentially when ed to rats. *J. Nutr.,* Volume 133, pp. 3523-3528.

AOAC, 1995. *Official Method of Analysis.* Washington DC: Association of Official Chemist.

Apriyantno, A., D. Fardiaz, N. L. P., Sedarnawati & Budiyanto, S., 1989. *Buku Petunjuk Praktikum : Analisis Pangan.* Bogor: IPB Press.

Ashenhurst, J., 2020. *Infrared Spectroscopy: A Quick Primer On Interpreting Spectra.*[Online]Available at:https://www.masterorganicchemistry.com/2016/11/23/quick_analysis_of_ir_spectra/ [Diakses 18 Februari 2022].

Ashogborn, A. O., 2021. Dual modification of various starches: Synthesis, properties and applications. *Food Chemistry,* Volume 342.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Atwell, W. et al., 1988. The Terminology and Methodology associated with Basic Starch Phenomena. *Cereal Food,* Volume 33, pp. 306-311.

Awokoya, K. N. et al., 2020. Impact of microwave irradiation energy levels on molecular rotation, structural, physicochemical, proximate and functional properties of potato (Ipomea batatas) starch. *Ghana J. Sci.,* 61(2), pp. 57-72.

Azzahra, S. F., 2019. Modifikasi Pati garut (Maranta Arundinacea) dengan Metode Asetilasi-Oksidasi dan Aplikasinya sebagai Pengganti Gelatin pada Marshmallow Cream. *Indonesian Journal of Materials Chemistry,* Volume 2, pp. 31-34.

Baker, R., Wong, H. & Robbins, K., 1994. *Fundamental of new foodproducts developmen.* Amsterdam: Elsevier Science.

Balet, S., Guelpa, A., Fox, G. & Manley, M., 2019. Rapid Visco Analyzer (RVA) as a tool for measuring starch-related physichochemical properties in cereals: a review. *Food Anal. Methods,* Volume 12, pp. 2344-2360.

Balet, S., Guelpa, A., Fox, G. & Manley, M., 2019. Rapid Visco Analyzer (RVA) as a Tool for Measuring Starch-Related Physicochemical Properties in Cereals: A Review. *Food Analytical Methods,* Volume 12, pp. 2344-2360.

Batey, I. L., 2007. Interpretation of RVA curves. Dalam: AS, penyunt. *The RVA Handbook.* St. Paul: AACC International, pp. 19-31.

BeMiller, J. & Whistler, R., 1984. *Starch: Chemistry and Technology.* 3rd penyunt. Burlington (UK): Academic Press.

BeMiller & N., J., 2018. Physical Modification of Starch. Dalam: *Starch in Food.* s.l.:Woodhead Publishing, pp. 223-253.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Bentacur, A. & Chel, G., 1997. Acid hydrolysis and characterization of Canavalia ensiformis starch. *Journal of Agricultural and Food Chemistri,* Volume 45, pp. 4237-4241.

Bhosale, R. & Singhal, R., 2006. Process optimization for the synthesis of octenyl succinyl derivative of waxy corn and amaranth starches. *Carbohydr. Polym.,* Volume 66, pp. 521-527.

Biswas, A., Shorgen, R., Kim, S. & Willet, J., 2006. Rapid preparation of starch maleate half-esters. *Carbohidrate Polymers,* Volume 64, pp. 484-487.

Boye, J., Aksay, S. & Roufik, S., 2010. Comparison of the Functional Properties of Pea, Chickpea and Lentil Protein Concentration Processed using ultrafiltration and Isoelectric Precipitation Techniques. *Food Res, Int,* Volume 43, pp. 537-546.

Brasoveanu, M. & Nemtanu, M. R., 2013. Behavior of starch exposed to microwave radiation treatment. *Starch,* pp. 1-12.

Brounz, F., Kettlitz, B. & Arrigoni, E., 2002. Resistant starch and the butyrate revolution. *Trends Food Sci. Technol.,* Volume 13, pp. 251-261.

Budijanto, S. & Yuliyanti, 2012. Studi Persiapan Tepung Sorgum (Shorgum bicolor L. Moench) dan Aplikasinya pada Pembuatan Beras Analog. *Jurnal Teknologi Pertanian,* 13(3), pp. 177-186.

Caullet, C. & Nôtre, J. L., 2015. Vegetable Oil Biorefineries,. Dalam: A. Pandey, et al. penyunt. *Industrial Biorefineries & White Biotechnology.* s.l.:Elsevier, pp. 247-270.

Cereda, M., Vilpoux, O. & Demiate, I., 2003. Modified Starch. Dalam: *Book Technology, use and potentialities of Latin America Starchy Tubers.* Brazil: CPC International, Milho.

Chang, R. et al., 2021. Ultrasound assisted annealing production of resistant starches type 3 from fractionated debranched starch: Structural

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

characterization and in-vitro digestibility. *Food Hydrocolloids,* Volume 110.

Clark, J., 2002. *Factor influencing rate of reaction.* [Online] Available at: http:// [Diakses 4 Feburari 2022].

Clark, J., 2002. *Factors Influencing Rate of Reaction.* [Online] Available at: http://www.chemguide.co.uk/ [Diakses 11 Februari 2022].

Collado, L., Mabesa, L., G., O. C. & Corse, H., 2001. Bihon-Type Noodles from Heat Moisture Treated Sweet Potato Starch. *Journal of Food Science,* 66(4), pp. 604-609.

Collado, L., Mabesa, L., Oates, C. & Corke, H., 2001. Bihon-Types Noodles from Heat Moisture Treated Sweetpotato Starch. *Journal of Food Science,* 66(4), pp. 604-609.

Collusi, R. et al., 2017. Acetylated rice starches films with different level of amylose: mechanical, water vapor barrier, thermal, and biodegrability properties. *Food Chemistries,* Volume 221, pp. 1614-1620.

Colussi, R. et al., 2020. modifikasi ganda dapat secara signifikan mengubah sifat fisikokimia pati karena penataan ulang dalam butiran pati. *Food Chemistry,* Volume 318.

Craig, S. A. S., Clodualdo C, M., Seib, P. A. & Hoseney, R., 1989. Starch Paste Clarity. *Cereal Chem,* 66(3), pp. 173-182.

Craig, S. A. S. C., Maningat, P. A. S. & Hoseney, R. C., 1989. Starch paste clarity. *Cereal Chemistry,* pp. 173-182.

Crosbie, G., 1997. Properties of starch noodles as affected affectedby sweet potato genotypes. *Cereal Chem,* Volume 74, pp. 182-187.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Damat, Haryadi, Marsono, Y. & Cahyanto, M. N., 2008. Efek pH dan Konsentrasi Butirat Anhidrida selama Butirilisasi Pati Garut. *Agritech,* Volume 8, pp. 63-69.

Damat, et al., 2018. *Teknologi Pati Termodifikasi dan Manfaatnya bagi Kesehatan.* Malang: UMM Press.

Das, A., Singh, S. & Riar, C., 2010. Effect of acetylation and dual modification on physico-chemical, rheological and morphological characteristics of sweet potato (Ipomoea batatas) starch. *Carbohydr. Polym,* Volume 80, pp. 725-732.

Deffenbaugh, L. & Walker, C., 1989. Comparison of Starch Pasting Properties in the Brabender Visco-Amylograph and The Rapid Visco-Analyzer. *Cereal Chem,* Volume 66, pp. 493-499.

Deka, D. & Sit, N., 2016. Dual Modification of Taro by Microwave and Other Heatmoisture Treatments. *International Journal of Biological Macromolecules,* Volume 92, pp. 416-422.

D'Silva, T. V., Taylor, J. R. & Emmambux, M. N., 2011. *Enhancement of the pasting properties of teff and maize starches through wet-heat processing with added stearic acid.* Lynwood Road, Republic of South Africa: University of Pretoria.

Effendi, D., 2010. Prospek pengembangan tanaman aren (Arenga pinnata Merr) mendukung kebutuhan bioetanol di Indonesia. *Perspektif,* Volume 9, pp. 36-46.

Fang, J., Fowler, P., Tomkinson, J. & Hill, C., 2002. The preparation and characterization of a series of chemically modified potato starches. *Carbohydr.,* Volume 47, pp. 245-252.

Farooq, Z., 2011. Novel food and industrial applications of pulse flours and fractions. *Pulse Food,* pp. 283-323.

Fennema, O. R., 1996. *Food Chemistry.* New York: Marcell Dekker Inc.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Firdayanti, M. & Handajani, M., 2005. Studi Karakteristik Dasar Limbah Industri Tepung Aren. *Jurnal Infrastruktur dan lingkungan Binaan,* 1(2), pp. 22-29.

Fitria, E., Hariyadi, P., Andarwulan, N. & Triana, R., 2018. Sifat Fisikokimia Pati Sagu Termodifikasi dengan Metode Oksidasi menggunakan Natrium Hipoklorit. *Jurnal Mutu Pangan,* 5(2), pp. 100-108.

Flores, P., Cruz, C. A. R. & Chavez-Esquivel, G., 2017. In vitro digestibility of ultrasound-treated corn starch. *Starch-Starke,* Volume 69, pp. 9-10.

Fortuna, T. et al., 2008. Some physicochemical properties of commercial modified starches irradiated with microwaves. *J. Polish Agric. Univ. Food Sci. Technol.*

Fuentez-Zaragoza, E., Riquelme-Navarette, M., Sanchez-Zapata, E. & Perez-Alvarez, J., 2010. Resistant Starch as Functional Ingredient: A Review. *Food Research International,* 43(4), pp. 1-12.

Gamel, T. et al., 2005. Effect of seed treatments on the chemical composition and properties of two amaranth species: starch and protein. *J. Sci. Food Agric.,* Volume 85, pp. 315-327.

Garg, S. & Jana, A. K., 2011. Characterization and evaluation of acylated starch with different acyl groups and degrees of substitution. *Carbohydrate Polymers,* 83(4), pp. 1623-1630.

Gonzalez, Z. & Perez, E., 2002. Effect of acetylation on some properties of rice starch. *Starch,* Volume 54, pp. 148-154.

Gonzalez, Z. & Perez, E., 2002. Evaluation of lentil starches modified by microwave irradiation and extrsion cooking. *Food Res. Int,* Volume 35, pp. 415-420.

Gudmundsson, M., 1992. Effects of an added inclusion-amylose complex on the retrogradation of some starches and amylopectin. *Carbohydrate Polymers,* Volume 12, pp. 299-304.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Gudmundsson, M., 1994. Retrogradation of starch and the role of its components. *Thermochimica Acta,* Volume 246, pp. 329-341.

Haroon, M. et al., 2016. Chemical Modification of Starch and its application as an adsorbent material. *RSC Advances,* Volume 6, pp. 78264-78285.

Haryadi, 2002. *The Current Status and Future Prospects of Sago The Current Status and Future Prospects of Sago Cecil, J. E., (eds.).* Tokyo, Universal Academy Press, Inc..

Haryadi, 2006. *Teknologi Pengolahan Beras.* Yogyakarta: Gadjah Mada University Press.

Hehamahua, Z. N., 2021. *Modifikasi Pati Aren (Arenga pinnata) menggunakan Radiasi Microwave dan Asetilasi terhadap Karakteristik Fisikokimia: Pengaruh Kadar Air dan Daya Microwave [SKRIPSI].* Yogyakarta: Universitas Gadjah Mada.

Herlina, 2010. Karakteristik sifat fisik, kimia, dan fungsional bahan pati umbi hembili (Dioscorea esculenta L.) termodifikasi secara ikatan silang dengan natrium tripolifosfat. *Agrotek,* 4(1), pp. 60-67.

J.Warren, F., J.Gidley, M. & M.Flanagan, B., 2016. Infrared spectroscopy as a tool to characterise starch ordered structure—a joint FTIR–ATR, NMR, XRD and DSC study. *Carbohydrate Polymers,* Volume 139, pp. 35-42.

Jyothi, A. N., Rajasekharan, K. N., Moorthy, S. N. & Sreekumar, J., 2005. Microwave-Assisted Synthesis and Characterization of Succinate Derivaties of Cassava (Manihot esculenta Crantz) Starch. *Starch/Starke,* Volume 57, pp. 556-563.

Kang, X. et al., 2022. The formation of starch-lipid complexes by microwave heating. *Food Chemistry,* Volume 382.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Kartikasari, S., Sari, P. & Subagio, A., 2016. Karakterisasi Sifat Kimia, Profil Amilografi (RVA). dan Morfologi Granula (SEM) Pati Singkong Termodifikasi Secara Biologi. *Jurnal Agroteknologi,* 10(1), pp. 12-24.

Kementan RI, 2018. *Kembangkan Diversifikasi Pangan Berbasis Sagu, Kementan Gandeng FAO.* [Online] Available at: https://www.pertanian.go.id/home/?show=news&act=view&id=2472

Khurshida, S., Das, M. J., Deka, S. C. & Sit, N., 2021. Effect of dual modification sequence on physicochemical, pasting, rheological and digestibility properties of cassava starch modified by acetic acid and ultrasound. *International Journal of Biological Macromolecules,* Volume 188, pp. 649-656.

Koswara, S., 2009. *Teknologi Modifikasi Pati,* Semarang: Unimus.

Kusnandar, F., 2010. *Kimia Pangan : Komposisi Makro.* 1 penyunt. Jakarta: Dian Rakyat.

Larrauri, J. A., Ruperez, P., Borroto, B. & Saura Calixto, S., 1996. Mango peels as a new tropical fibre; Preparation and characterization. *Lebensm Wissenschaft und Technology,* pp. 729-733.

Laufenberg, G. & Schulze, N., 2009. A Modular Strategy for Processing of Fruit and Vegetable Wastes into Value-added Products. *Woodhead Publishing Series in Food Science, Technology and Nutrition,* Volume 2, pp. 286-353.

Lawal, O., 2004. Composition, physicochemical properties and retrogradation characteristics of native, oxidised, acetylated and acid-thinned new cocoyam (Xanthosoma sagittifolium) starch. *Food Chemistry,* Volume 87, pp. 205-218.

Lewandowicz, G., Fornal, J. & Walkowski, A., 1997. 1997. *Carbohydrate Polymers,* Volume 34, p. 213.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Lewandowicz, G., Jankowski, T. & Fornal, J., 2000. Effect of microwave radiation on physico-chemical properties and structure of cereal starches. *Carbohydr.,* Volume 42, pp. 193-199.

Lewicka, K., Siemion, P. & Kurcok, P., 2015. Chemical Modifications of Starch: Microwave Effect. *International Journal of Polymer Science,* pp. 1-10.

Lima, D. et al., 2020. Ozone modification of arracacha starch: Effect on structure and functional properties. *Food Hydrocolloids,* Volume 108.

Lin, D. et al., 2019. Study on preparation and physicochemical properties of hydroxypropylated starch with different degree of substitution under microwave assistance. *International Journal of Biological Macromolecules,* Volume 125, pp. 290-299.

Liu, J., Ming, J., Li, W. & Zhao, G., 2012. Synthesis, characterisation and in vitro digestibility of carboxymethyl potato starch rapidly prepared with microwave-assistance. *Food Chemistry,* 133(4), pp. 1196-1205.

Lopez, O. V., Zaritzky, N. E. & Garcia, M. A., 2010. Physicochemical characterization of chemically modified corn starches related to rheological behavior, retrogradation and film forming capacity. *Journal of Food Engineering,* Volume 100, pp. 160-168.

Luo, Z. et al., 2006. Effect of microwave irradiation on the physicochemical properties of normal maize, waxy maize and amylomaize V starches. *Starch,* Volume 58, pp. 468-474.

Mailhot, W. & Patton, J., 1988. Criteria of Flour. Dalam: *Wheat Chemistry and Technology.* St. Paul, Minnesota: American Association of Cereal Chemists, pp. 69-90.

Marcin, L., Magdalena, M. & Anna, O., 2009. *Microwave-assisted Enzymatic hidrolysis of Starch.* Krakow, Poland, Department of Food technology.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Marsono, Y., 2004. *Serat Pangan dalam Perspektif Ilmu Gizi. Pidato Pengukuhan Jabatan Guru Besar Fakultas Teknologi Pertanian, Universitas gadjah Mada,* s.l.: s.n.

Maulani, R., Fardiaz, D., Kusnandar, F. & Candra, S., 2014. Characterization of chemical and physical properties of hydroxypropilated and cross-linked arrowroot (Marantha arundinacea) starch. *Journal of Engineering,* Volume 45B, pp. 207-221.

Maulani, R. R., Fardiaz, D., Kusnandar, F. & Sunarti, T. C., 2013. Sifat Fungsional Pati garut Hasil Modifikasi Hidrosipropilasi dan Taut Silang. *J. Teknol. dan Industri Pangan,* Volume 24, pp. 60-67.

Miller, G. L., 1959. Use of Dinitrosalicyclic Acid Reagent for Determination of Reducing Sugar. *Analytical Chemistry,* pp. 426-428.

Moin, A., Ali, T. M. & Hasnain, A., 2016. Effect of succinylation on functional and morphological properties of starches from broken kernels of Pakistani Basmati and Irri rice cultivars. *Food Chemistry,* Volume 191, pp. 52-58.

Muhammad, K. et al., 2000. Effect of pH on phosphorilation of sago starch. *Carbohydrate Polymers,* 42(1), pp. 85-90.

Muin, R., Lestari, D. & Sari, T. W., 2014. Pengaruh Konsentrasi Asam Sulfat dan Waktu Fermentasi terhadap Kadar Bioetanol yang dihasilkan dari Biji Alpukat. *Jurnal Teknik Kimia,* Volume 20, pp. 1-7.

Nadiah, N. I., Syahariza, Z. & Uthumporn, U., 2015. Effect of Microwave Heating on Potato and Tapioca Starches in Water Suspension. *International Journal on Advanced Science Engineering and Information Technology,* Volume 5, pp. 264-271.

Nandiyanto, A. B. D., Oktiani, R. & Ragadhita, R., 2019. How to Read and Interpret FTIR Spectroscope of Organic Material. *Indonesian Journal of Science and Technology,* 4(1), pp. 97-118.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Nasrulloh, Putri, L. S. E. & Haris, A., 2013. Hidrolisis asam dan enzimatis pati ubi jalar (Ipomoea batatas) menjadi glukosa sebagai substrat fermentasi etanol. *Bioteknologi,* 10(2), pp. 51-59.

Nugent, A., 2005. Health properties of resistant starch. British Nutrition Foundation. *Nutrition Bulletin,* Volume 30, pp. 27-54.

Nurhayati, 2019. Modifikasi Pati secara asetilasi dan Aplikasinya pada Pembentukan Film. *Agrotek,* Volume 6, pp. 2356-2234.

Olayinka, O., Owolabi, B. & Adebowale, K., 2011. Effect of succinylation on the physicochemical, rheological, thermal and retrogradation properties of red and white sorghum starches. *Food Hydrocolloids,* Volume 25, pp. 515-520.

Oyeyinka, S. A. et al., 2021. A Review on The Physicochemical Properties of Starches Modified by Microwave Alone and in Combination with Other Methods. *International Journal of Biological Macromolecules,* Volume 176, pp. 87-95.

Perera, A., Meda, V. & Tyler, R., 2010. Resistant Starch: A Review of Analytical protocol for determining resistant starch and of factors affecting the resistant starch content of food. *Food Res Int.,* Volume 43, pp. 1959-1974.

Perera, A., Meda, v. & Tyler, R., 2010. Resistant Starch: A Review of Analytical protocol for determining resistant starch and pf factor affecting the resistant starch content of food. *Food Res. Int.,* Volume 43, pp. 1959-1974.

Piyachomkan, K. et al., 2002. Edible canna (Canna edulis) as a complementarystarch source to cassava for the starch industry. *Industrial Crops and Products,* Volume 76, pp. 341-349.

Pontoh, J., 2004. *Sifat-Sifat Pati Aren dan Pemanfaatannya dalam Produk Pangan dan Industri.* Tondano, Universitas Sam Ratulangi, pp. 107-112.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Rahim, A., 2012. *DISESRTASI: KARAKTERISTIK PATI AREN HASIL BUTIRILISASI DAN POTENSI FUNGSIONAL RESISTANT STARCH,* YOGYAKARTA: UGM.

Rahim, A., 2012. *Karakteristik Pati Aren Hasil Butirilsasi dan Potensi Fungsional Resistant Starch-nya [DISERTASI].* Yogyakarta: Universitas Gadjah Mada.

Rahim, A. et al., 2021. Pengaruh Konsentrasi Sodium Trimetaphosphate dan Sodium Tripolyphosphat terhadap Karakteristik Kimia Pati Aren Modifikasi. *Agrointek,* Volume 15, pp. 389-298.

Rahim, A., Alam, N., Haryadi & Santoso, U., 2010. Pengaruh Konsentrasi Pati Aren dan Minyak Sawit terhadap Sifat Fisik dan Meklanik Edible Film. *Jurnal Agroland,* 12(1), pp. 38-46.

Rahim, A., Alam, N., Hutomo, G. S. & Kadir, S., 2016. *Teknologi Modifikasi Pati Aren.* Yogyakarta: Magnum Pustaka Utama.

Rahim, A. & haryadi, 2008. Pengaruh Cara Bubur pada Pengolahan Instant Starch Noodle dari Pati Aren terhadap Sifat Fisikokimia. *Jurnal Agroland,* pp. 18-21.

Ratnayake, W. & Jackson, D., 2008. Thermal behavior of resistant starches RS. *Journal of Food Science,* 73(5), pp. 356-366.

Ruslan, S. M., Baharuddin & Taskirawati, I., 2018. Potensi dan Pemanfaatan Tanaman Aren (Arenga Pinnata) dengan Pola Agroforestri di Desa Palakka, Kecamatan Barru, Kabupaten Barru. *Jurnal Perennial,* 14(1), pp. 24-27.

Sasaski, T. & Matsuki, J., 1998. Effect of Wheat Starch Structure on Swelling Power. *Cereal Chem.,* 75(4), pp. 525-529.

Schoch, T. J., 1942. Non-carbohydrate subtances in the cereal starches. *J. Am. Chem. Soc.,* Volume 64, p. 2954.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Shameer, P. M. & Nishath, P. M., 2019. Exploration and enhancement on fuel stability of biodiesel: A step forward in the track of global commercialization. Dalam: M. R. Abul Kalam Azad, penyunt. *Advanced Biofuels.* s.l.:Woodhead Publishing, pp. 181-213.

Singh, J., Kaur, L. & McCarthy, O., 2007. Factor influencing the physicochemical, morphological, thermal and rheological properties of some chemically modified starches for food applications - A review. *Food Hydrocolloids,* Volume 21, pp. 1-22.

Singh, N., Chawla, D. & Singh, J., 2004. Influence of acetic acid anhydride on physicochemical, morphological, and thermal properties of corn and potato starch. *Food Chem,* pp. 601-608.

Singh, S., Raina, C., Bawa, A. & Saxena, D., 2005. Effect of heat-moisture treatment and acid modification on rheological, texturaland differential scanning calorimetry characteristics of sweetpotato starch. *J Food Sci,* Volume 70, pp. 373-378.

Solomons, T., 1990. *Fundamentals of Organic Chemistry.* 3rd penyunt. New York: John Wiley and Sons.

Steffe, J., 1996. *Rheological Methods in Food Process Engineering.* 2nd penyunt. Michigan: Freeman Press.

Supardan, A. D., Achmadi, S. S. & Irawadi, T. T., 2014. Sintesis Pati Jagung Terfosforilasi melalui Teknik Gelombang Mikro. *Jurnal Teknologi Pangan dan Hasil Pertanian,* Volume 25, pp. 1-6.

Takazawa, F., Silva, G., Konkel, F. & Demiate, I., 2004. Characterization of tropical starch modified with potassium permanganate and lactic acid.. *Braz. Arch. Biol. Techn,* 47(6), pp. 921-931.

Tester, R. F. & Morrison, R. W., 1990. Swelling and Gelatinization of Cereal Starches. I. Effect of amylopectin, amylose, and lipids. *Cereal Chem,* 67(6), pp. 551-557.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Tharanathan, R., 2002. Food-dericed carbohydrates: Structural complexity and functional diversity. *Critical Review in Biotechnology,* 22(1), pp. 65-84.

Torruco-uco, J. & Bentacur-Ancona, D., 2007. Physicochemical and functional properties of makal (Xanthosoma yucatanensis) starch. *Food Chem,* Volume 101, pp. 1319-1326.

Tosh, S. & Yada, S., 2010. Dietary fibres in pulse seeds and fractions: characterization, functional attributes, and applications. *Food Rest, Int,* Volume 43, pp. 450-460.

Treppe, K., Dixit, O., Mollekopf, N. & Fiala, P., 2011. Vacuum microwave treatment of potato starch and the resultant modification of properties.. *Chemie Ingenieur Technik,* 83(3), pp. 262-272.

Udagawa, E., Matsuda, H., Tanaka, M. & Shirai, T., 2017. The Effect of Heat-acid Treatment on the Formation of Resistant Starch and the Estimated Glycemic Index in Potatoes. *Japanese Society of Applied Glycoscience,* Volume 64, pp. 75-80.

Varavinit, S. et al., 2003. Effect of Amylose Content on Gelatinization, Retrogradation and Pasting Properties of Flours from Different Cultivars of Thai Rice. *Starch - Starke,* 55(9), pp. 410-415.

Varavinit, S. et al., 2003. Effect of Amylose Content on Gelatinization, Retrogradation and Pasting Properties of Flours from Different Cultivars of Thai Rice. *Starch/Starke,* 55(9), pp. 410-415.

Wang, L. et al., 2022. Influence of ultrasound and microwave treatments on the structural and thermal properties of normal maize starch and potato starch: A comparative study. *Food Chemistry,* Volume 377.

Wang, L. et al., 2022. Synthesis, characterisation and in vitro digestibility of carboxymethyl potato starch rapidly prepared with microwave-assistance. *Food Chemistry,* Volume 377.

UNIVERSITAS GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Wang, X. et al., 2008. Studi on the morphology, crystalline structure and thermal properties of yam starch acetates with different degree subtitution. *Science in China Series BChemistry,* 51(9), pp. 859-865.

Wang, X. et al., 2020. Research advances in chemical modifications of starch for hydrophobicity. *Carbohydrate Polymer,* Volume 240.

Wang, X. et al., 2011. Preparation and characterisation of octenyl succinate starch as a delivery carrier for bioactive food components. *Food Chem,* Volume 126, pp. 1218-1225.

Wang, Z. et al., 2022. Cassava starch: Chemical modification and its impact on functional properties and digestibility, a review. *Food Hydrocolloids.*

Wattanachant, S., Muhammad, K. H. D. & Rahman, R., 2003. Effect of crosslinking reagents and hydroxypropilation levels on dual-modified sago starch properties. *Food Chem,* Volume 80, pp. 463-471.

Whistler, R. & Doane, W., 1961. Characterization of intermediary fractions of high amylose corn starches. *Cereal Chem,* Volume 38, pp. 251-255.

WIlkins, M. et al., 2003. Variability in starch acetylation efficiency from commercial waxy corn hybrids. *Cereal Chem,* 80(1), pp. 68-71.

Winarno, F., 1984. *Kimia Pangan dan Gizi.* Jakarta: Gramedia.

Wirakartakusumah, M., Syarief, R. & Syah, D., 1989. Pemanfaatan Teknologi Pangan Dalam Pengolahan Singkong. *Buletin Pusbangtepa,* Volume 7, p. 18.

Wotton, M. & Bamunuarachchi, A., 1979. Application of DSC to starch gelatinization. *Starch,* Volume 31, pp. 201-204.

Xu, Y., Miladinove, V. & Hanna, M., 2004. Synthesis Characterization of Starch Acetates with High Subtitution. *Cereal Chemistry,* 81(6), pp. 735-740.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/

Xu, Y., Miladinov, V. & Hanna, M., 2004. Synthesis and Characterization of Starch Acetates with High Subtitution. *Cereal Chemistry,* Volume 81, pp. 735-740.

Yanti, S., 2014. *[Tesis} Karakteristik Fisikokimia Pati Umbi Keladi Sebaring (Alocasia macrorhiza) Karakteristik Fisikokimia Pati Umbi Keladi Sebaring (Alocasia macrorhiza).* Medan: Fakultas Pertanian Universitas Sumatera Utara.

Zailani, M. A., Kamilah, H., Husaini, A. & Sarbini, S. R., 2021. Physicochemical properties of microwave heated sago (Metroxylon sagu) starch. *Journal of Food,* 19(1), pp. 596-605.

Zhao, B. et al., 2019. Physicochemical properties and digestion of the lotus seed starch-green tea polyphenol complex under ultrasound-microwave synergistic interaction. *Ultrasonic-Sonochemistry,* Volume 52, pp. 50-61.

Zhao, K. et al., 2018. Microwave Pretreated Esterification improved Subtitution Degree, Structural and Physicochemical Properties of Potato Starch Esters. *LWT-Food Sci. Technol,* Volume 90, pp. 116-123.

UNIVERSITAS
GADJAH MADA
PENGARUH KONSENTRASI ASAM BUTIRAT DALAM PROSES MODIFIKASI GANDA MENGGUNAKAN MICROWAVE DAN BUTIRILISASI TERHADAP KARAKTERISTIK FISIKOKIMIA DAN KADAR PATI RESISTEN PADA PATI AREN (Arenga pinnata)
RAMADHAN HADINATA, Dr. Andriati Ningrum S.T.P., M.Agr., Aulia Ardhi, S.T.P., M.Sc.
Universitas Gadjah Mada, 2022 | Diunduh dari http://etd.repository.ugm.ac.id/