



DAFTAR PUSTAKA

- Adhvaryu, A. and Erhan, S. Z., 2002, "Epoxidized soybean oil as a potential source of high-temperature lubricants", *Ind Crops Prod*, 15 (3):247-254.
- Adhvaryu, A., Liu, Z., and Erhan, S. Z., 2005, "Synthesis of novel alkoxylated triacylglycerols and their lubricant base oil properties", *Ind Crops Prod*, 21:113-119.
- Aguilera, A.F., Tolvanen, P., Eränen, K., Levener, S., and Salmi, T., 2016, "Epoxidation of oleic acid under conventional heating and microwave radiation", *Chemical Engineering and Processing*, 102:70–87
- Akintayo, E. T., 2004, "Characteristics and composition of Parkia biglobossa and Jatropha curcas oils and cakes", *Biores Technol*, 92(3):307-310.
- Alagi, P. and Hong, S.C., 2015, "Vegetable Oil-Based Polyols for Sustainable Polyurethanes", *Macromol. Res.*, The Polymer Society of Korea and Springer.
- Al-Zuhair, S., Hasan, M., and Ramachandran, K.B., 2003, "Kinetics of The Enzymatic Hydrolysis of Palm Oil by Lipase", *Process Biochem.*, 38: 1155-1163.
- Al-Zuhair, S., Hasan, M., and Ramachandran, K.B., 2004, "Unsteady-State Kinetics of Lipolytic Hydrolysis of Palm Oil in A Stirred Bioreactor", *Biochem. Eng. J.*, 19:81–86.
- Aprilia, S., Fauzi, and Syamsuddin, Y., 2015, "Sintesis, Karakterisasi Pembuatan Polyol dari Minyak Kelapa Sawit (Crude Palm Oil)", *Seminar Nasional Teknik Kimia Teknologi Oleo Dan Petrokimia Indonesia*, ISSN 1907-0500.
- ASTM D1957-86(2001), "Standard Test Method for Hydroxyl Value of Fatty Oils and Acids (Withdrawn 2007)", *ASTM International*, West Conshohocken, PA, 1986.
- Awaja, F., Daver, F., Kosior, E., and Cser, F., 2004, "The Effect of Chain Extension On the Thermal Behaviour and Crystallinity of Reactive Extruded Recycled PET", *J. Therm. Anal. Calorim*, 78(3):865-884.
- Baekeland LH, US Patent No. 942699 (1907) Method of making insoluble products of phenol and formaldehyde.
- Bakare, I., Pavithran, C., Okieimen, F., and Pillai, C., 2006, "Polyesters from Renewable Resources: Preparation and Characterization", *J. Appl. Polym. Sci.*, 100(5):3748–55.
- Behr, A., Westfechtel, A., and Gomes, J.P., 2008, "Catalytic Processes for the Technical Use of Natural Fats and Oils", *Chem. Eng. Technol.*, 31, No. 5, 700 –714
- Beltrán, A.A., and Boyacá, L.A., 2011, "Preparation of Oleochemical Polyols Derived from Soybean Oil", *Lat. Am. Appl. Res.*, vol.41, no.1, Bahía Blanca ene.
- Berry, S.E., 2009, "Triacylglycerol structure and interesterification of palmitic and stearic acid-rich fats: an overview and implications for cardiovascular disease", *Nutrition Research Reviews*, 22: 3–17
- Biermann, U., Friedt, W., Lang, S., Lühs, W., Machmüller, G., and Metzger, J.O., 2000, "New Syntheses with Oils and Fats as Renewable Raw Materials for the Chemical Industry", *Angew. Chem., Int. Ed.*, 39:2206–24.
- Blayo, A., Gandini, A., and Le Nest, J.-F., 2001, "Chemical and rheological characterizations of some vegetable oils derivatives commonly used in printing inks", *Ind Crops Prod*, 14 (2):55-167.
- Bradley, G., Williams, D., and Lawton, M., 2005, "Aluminium triflate: a remarkable Lewis acid catalyst for the ring opening of epoxides by alcohols", *Org. Biomol. Chem.*, 3:3269-3272
- Budiyati, E., Budhijanto, Budiman, A., and Rochmadi, (2020b), "Kinetic study of epoxidation of Tung oil (*Reutealis trisperma* (Blanco) Airy Shaw) by peroxyacetic



SINTESIS VEGETABLE OIL-BASED POLYMERS DARI MINYAK KEMIRI SUNAN (Reutealis trisperma (Blanco) Airy Shaw)

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acid”, *IOP Conf. Series: Materials Science and Engineering*, vol 778: 012002. DOI: 10.1088/1757-899X/778/1/012048.

- Budiyati, E., Rochmadi, Budiman, A., and Budhijanto, (2020a), “Studies on epoxidation of tung oil with hydrogen peroxide catalyzed by sulfuric acid”, *Bulletin of Chemical Reaction Engineering & Catalysis*, 15(3):674–686. doi: 10.9767/BCREC.15.3.8243.674-686.
- Bueno-Ferrer, C., Garrigós, M. C., and Jiménez, A., 2012, “Characterization and thermal stability of poly(vinyl chloride) plasticized with epoxidized soybean oil for food packaging”, *Polym. Degrad. Stab.*, 95:2207–2212.
- Bunker, S.P. and Wool, R.P., 2002, “Synthesis and characterisation of monomers and polymers for adhesives from methyl oleate”, *J Polym Sci A Polym Chem*, 40: 451–458
- Cai, C., Dai, H., Chen, R., Su, C., Xu, X., Zhang, S., and Yang, L., 2008, “Studies on the kinetics of in-situ epoxidation of vegetable oils”, *Eur. J. Lipid Sci. Technol.*, 110:341–346. <http://dx.doi.org/10.1002/ejlt.200700104>.
- Campanella, A. and Baltana’s, M. A., 2007, “Degradation of the oxirane ring of epoxidized vegetable oils in a liquid–liquid–solid heterogeneous reaction system”, *Chem Eng Process*, 46:210-221.
- Carothers WH. US Patents 2130947 and 2130948; 1938.
- Chajęcka, J.M., 2011, Synthesis of Biodegradable and Biocompostable Polyester, Dissertation, Instituto Superior Tecnico, Universidade Técnica de Lisboa.
- Chasar, D. W. and Hughes, M. J., 2003, “Method of making oleochemical oil-based polyols”, *United States Patent Application Publication*, p. US 2003/0088054 A1.
- Chou, T-C., and Chang, J-Y., 1986, “Acetic Acid as An Oxygen Carrier Between Two Phases for Epoxidation of Oleic Acid”, *Chemical Engineering Communications*, 41:1-6, 253-266
- Chua, S-C, Xu, X., and Guo, Z., 2012, “Emerging sustainable technology for epoxidation directed toward plant oil-based plasticizers”, *Process Biochem*, 47(10):1439–1451. doi: 10.1016/j.procbio.2012.05.025.
- Clayden, J., Warren, S., and Greeves, N., 2000, "Organic Chemistry" Oxford
- Curtis, J., Liu, G., Omonov, T and Kharraz, E. 2013. Polyol Synthesis from Fatty Acids and Oils”, *US Patent Appl. Pub.*, No: US 0274494 A1.
- Dai, H., Yang, L., and Lin, B., 2009 ‘Synthesis and characterization of the different soy-based polyols by ring opening of epoxidized soybean oil with methanol, 1,2-ethanediol and 1,2-propanediol’, *JAOCs, Journal of the American Oil Chemists’ Society*, 86(3), pp. 261–267. doi: 10.1007/s11746-008-1342-7.
- Danova, A., Tarigan, D., dan Akkas, E., 2015, “Pembuatan Senyawa Poliol sebagai Bahan Dasar Pelumas melalui Reaksi Epoksidasi dan Hidroksilasi Minyak Biji Kelor (Moringa oleifera)”, *Prosiding Seminar FMIPA UNMUL 2015*, Samarinda, Indonesia ISBN: 978-602-72658-0-6
- Datta, J. and Glowinska, E., 2014, “Chemical Modifications of Natural Oils and Examples of Their Usage for Polyurethane Synthesis”, *J. Elastom. Plast.*, 46:33-42.
- De Espinosa, L.M. and Meier, M.A.R., 2011, “Plant Oils: The Perfect Renewable Resource for Polymer Science?”, *Eur. Polym J.*, 47:837-52.
- de Haro, J.C., Izarra, I., Rodríguez, J.F., Perez, A., and Carmona, M., 2016, “Modelling the Epoxidation Reaction of Grape Seed Oil by Peracetic Acid”, *J. Cleaner Prod.*, page 1-7.
- Derawi, D. and Salimon, J., 2010, “Optimization on Epoxidation of Palm Olein by Using Performic Acid”, *E-Journal of Chemistry*, 7(4):1440-1448.



SINTESIS VEGETABLE OIL-BASED POLYMERS DARI MINYAK KEMIRI SUNAN (Reutealis trisperma (Blanco) Airy Shaw)

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DerkSEN, J.T.P., Cuperus, F.P., and Kolster, P., 1996, "Renewable resources in coatings technology: a review", *Prog. Org. Coat.*, 27:45–53.

Desroches, M., Caillol, S., Lapinte, V., Auvergne, R., and Boutevin, B., 2011, "Synthesis of Biobased Polyols by Thiol-Ene Coupling from Vegetable Oils", *International Journal of Biological Macromolecules*, Elsevier, 44(8):2489–2500. dx.doi.org/10.1016/j.molbiol.2010.09.020

Desroches, M., Escouvois, M., Auvergne, R., Caillol, S., and Boutevin, B., 2012, "From Vegetable Oils to Polyurethanes: Synthetic Routes to Polyols and Main Industrial Products", *Polym. Rev.*, 52:38-79.

Dinda, S., Patwardhan, A.V., Goud, V.V., and Pradhan, N.C., 2008, "Epoxidation of Cottonseed Oil by Aqueous Hydrogen Peroxide Catalysed by Liquid Inorganic Acids", *Bioresour. Technol.*, 99:3737–44.

Dinda, S., Goud, V.V., Patwardhan, A.V., and Pradhan, N.C., 2010, "Selective Epoxidation of Natural Triglycerides Using Acidic Ion Exchange Resin as Catalyst", *Asia-Pac. J. Chem. Eng.*, 6: 870–878.

Dinda, S., Ravisankar, V., and Puri, P., 2016, "Development of Bio-epoxide from Nahor (Mesua ferrea Linn) Oil", *Journal of the Taiwan Institute of Chemical Engineers*, 65:399–404

Dutta, N., Karak, N., and Dolui, S. K., 2004, "Synthesis and characterization of polyester resins based on Nahar seed oil", *Prog Org Coat*, 49(2):146-152.

Fenollar, O., García, D., Sánchez, L., López, J., and Balart, R., 2009, "Optimization of the curing conditions of PVC plastisol based on the use of an epoxidized fatty acid ester Plasticizer", *Eur. Polym. J.*, 45:2674–2684.

Firouzabadi, H., Iranpoor, N., Jafari, A. A., and Makarem, S., 2006, "Aluminumdodecatungstophosphate (AlPW12O40) as a reusable Lewis acid catalyst: Facile regioselective ring opening of epoxides with alcohols, acetic acid and thiols", *J. Mol. Catal. A: Chem.*, 250:237-242

Gala, S., 2013, "Sintesa Poliol dari Minyak Sawit dengan Reaksi Epoksidasi dan Hidroksilasi", *Chemica*, 12(2):36-43.

Gallo, J. M. R., Teixeira, S., and Schuchardt, U., 2006, "Synthesis and characterization of niobium modified montmorillonite and its use in the acid-catalyzed synthesis of b-hydroxyethers", *Appl. Catal. A*, 311:199-203

Gan, L.H., Goh, S.H., and Ooi, K.S., 1992, "Kinetic Studies of Epoxidation and Oxirane Cleavage of Palm Olein Methyl Esters", *J. Am. Oil Chem. Soc.*, Vol. 69. no. 4: 347-351.

Gandini, A., 2011, "The irruption of polymers from renewable resources on the scene of macromolecular science and technology", *Green Chem.*, 13, 1061:1061–1083

Gonçalves, K.M., Sutili, F.K., Leite, S.G.F., Souza, R.O.M.A., and Ramos Leal, I.C., 2012, "Palm Oil Hydrolysis Catalyzed by Lipases Under Ultrasound Irradiation—The Use of Experimental Design as A Tool for Variables Evaluation", *Ultrasonics Sono-chemistry*, 19: 232–236.

Goud, V.V., Patwardhan, A.V., and Pradhan, N.C., 2006, "Studies on the Epoxidation of Mahua Oil (Madhumica Indica) by Hydrogen Peroxide", *Bioresour. Technol.*, 97 :1365–1371.

Goud, V.V., Patwardhan, A.V., Dinda, S., and Pradhan, N.C., 2007, "Epoxidation of Karanja (Pongamia Glabra) Oil Catalysed by Acidic Ion Exchange Resin", *Eur. J. Lipid Sci. Technol.*, 109:575–584.

Goud, V.V., Dinda, S., Patwardhan, A.V., and Pradhan, N.C., 2010, "Epoxidation of Jatropha (Jatropha Curcas) Oil by Peroxyacids", *Asia-Pac. J. Chem. Eng.*, 5: 346–354.



- Guillen, M. D., Ruiz, A., Cabo, N., Chirinos, R., and Pascual, G., 2003, "Characterization of Sacha Inchi (*Plukenetia volubilis* L.) Oil by FTIR Spectroscopy and 1H NMR Comparison with Linseed Oil", *J Am Oil Chem Soc*, 80(8):755-762.
- Guner, F.S., Yagci, Y., and Erciyes, A.T., 2006, "Polymers from Triglyceride Oils", *Prog. Polym. Sci.*, 31:633-70.
- Gunstone, F.D., 2004, "The Chemistry of Oils and Fats: Sources, Composition, Properties, and Uses", *Blackwell publishing Ltd.*, CRC Press, Oxford, UK.
- Guo, A., Cho, Y. and Petrovic, Z.S., 2000, "Structure and Properties of Halogenated and Nonhalogenated Soy-Based Polyols", *J. Polym. Sci., Part A: Polym. Chem.*, 38: 3900-3910.
- Guo, A., Demydov, D., Zhang, W. and Petrovic, Z.S., 2002, "Polyols and Polyurethanes from Hydroformylation of Soybean Oil", *J. Polym. Environ.*, 10:49-52.
- Guo, A., Javni, I., and Petrovic, Z.S., 2000, "Rigid Polyurethane Foams Based on Soybean Oil", *J. Appl. Polym. Sci.*, 77: 467-473.
- Guo, A., Zhang, W. and Petrovic, Z.S., 2006, "Structure-Property Relationships in Polyurethanes Derived from Soybean Oil", *J. Mater. Sci.*, 41:4914-4920.
- Guo, Y., Hardesty, J., Maasingill, J., 2007, "Hydrolysis of Epoxidized Soybean Oil in the Presence of Phosphoric Acid", *J Am Oil Chemists' Soc*, 84:929-935.
- Haryanto, Rochmadi, dan Budiman, A., 2005, "Kinetika Reaksi Poliesterifikasi Gliserol-Asam Adipat", *Teknosaains*, 18 (1).
- Herman, M. dan Pranowo, D., 2011, "Karakteristik Buah dan Minyak Kemiri Minyak (Reutealis trisperma (Blanco) Airy Shaw) Populasi Majalengka dan Garut", *Buletin Ristri*, 2(1):21-27.
- Herman, M., Syakir, M., Pranowo, D., Saefudin dan Sumarto, 2013, "Kemiri Sunan (Reutealis trisperma (Blanco) Airy Shaw) Tanaman Penghasil Minyak Nabati dan Konservasi Lahan" *IAARD Press. Jakarta*.
- Hill, K., 2000, "Fats and oils as oleochemical raw materials", *Pure Appl Chem*, 72(7):1255-1264.
- Höfer, R., Daute, P., Grützmacher, R., and Westfechtel, A., 1997, "Oleochemical Polyols - A New Raw Material Source for Polyurethane Coatings and Floorings" *Journal of Coatings Technology*, 69. 65-72.
- Hosamani, K. M., Ganjihal, S. S., and Chavadi, D. V., 2004, "Alternanthera triandra seed oil: A moderate source of ricinoleic acid and its possible industrial utilization", *Ind Crops Prod.*, 19(2):133-136.
- Huang, J., Akita, T., Faye, J., Fujitani, T., Takei, T., and Haruta, M., 2009, "Propene Epoxidation with Dioxygen Catalyzed by Gold Clusters", *Angew. Chem. Int. Ed.*, 48:7862-7866
- Hwang, H.-S. and Erhan, S., 2001, "Modification of Epoxidized Soybean Oil for Lubricant Formulations with Improved Oxidative Stability and Low Pour Point", *J Am Oil Chemists' Soc*, 78:1179-1184.
- Hwang, H.-S., Adhvaryu, A., and Erhan, S., 2003, "Preparation and Properties of Lubricant Basestocks from Epoxidized Soybean Oil and 2-Ethylhexanol", *J Am Oil Chemists' Soc*, 80:811-815.
- Ifa, L., Sumarno, S., Susianto, S., dan Mahfud, M., 2012, "Model Kinetika Reaksi Pembentukan Polyol Berbasis Minyak Sawit", *Reaktor*, 14(1):1-8.
- Ikuhori, E.U., Obuleke, R.O., and Okieimen, F.E., 2007, "Studies on the Kinetics of Epoxidation of the Methyl Esters of Parkia Biglobosa Seed Oil", *Journal of Macromolecular Science, Part A: Pure and Applied Chemistry*, 44(2):235-238.
- DOI: 10.1080/10601320601031424



- SINTESIS VEGETABLE OIL-BASED POLYMERS DARI MINYAK KEMIRI SUNAN (Reutealis trisperma (Blanco) Airy Shaw)**
- ENI BUDIYATI, Prof. Ir. Rochmadi, S.U., Ph.D., IPU.; Prof. Dr.Eng. Ir. Arief Budiman, M.S., IPU.; Ir. Budhijanto, S.T., M.J., Mohamed, N., Jamaludin, S.K., Som, A.M., and Daud, A.R.M., 2014, "Epoxidation of Palm Kernel Oil-based Crude Oleic Acid", *Advanced Materials Research*, 906:125-130. doi:10.4028/www.scientific.net/AMR.906.125
- Kantam, M. L., Aziz, K., Jeyalakshmi, K., and Likhar, P., 2003, "Bis(cyclopentadienyl)zirconium dichloride: an efficient catalyst for highly selective formation of β -alkoxy alcohols via ring opening of 1,2-epoxides with alcohols", *R. Catal. Lett.*, 89:95-97
- Kementan, 2011a, "Surat Keputusan Menteri Pertanian 4044/Kpts/SR.120/9/2011 tentang Pelepasan Kemiri Sunan 1 sebagai Varietas Unggul", Kementerian Pertanian, Jakarta.
- Kementan, 2011b, "Surat Keputusan Menteri Pertanian 4000/Kpts/SR.120/9/2011 tentang Pelepasan Kemiri Sunan 2 sebagai Varietas Unggul", Kementerian Pertanian, Jakarta.
- Khot, S. N., Lascala, J. J., Can, E., Morye, S. S., Williams, G. I., Palmese, G. R., Kusefoglu, S. H., and Wool, R. P., 2001, "Development and application of triglyceride-based polymers and composites", *J Appl Polym Sci.*, 82 (3):703-723.
- Kircher, K. 1987, "Chemical Reactions in Plastics Processing", *Munich Vienna New York: Hanser Publisher*.
- Kluth, H., Gruber, B., Meffert, A., and Huebner, W., 1988, "Polyurethane Prepolymers Based on Oleochemical Polyols, Their Production and Use", *The United States Patent and Trademark Office*, U.S. Patent 4742087.
- Knezevic, Z., Bobic, S., Milutinovic, A., Obradovic, B., Ljiljana Mojovic, L., and Bugarski, B., 2002, "Alginate-Immobilized Lipase by Electrostatic Extrusion for The Purpose of Palm Oil Hydrolysis in Lecithin/Isooctane System", *Process Biochem.*, 38: 313-318
- Kousaalya, A.B., Beyene, S.D., Gopala, V., Ayalew, B., and Pilla, S., 2018, "Green epoxy synthesized from Perilla frutescens: A study on epoxidation and oxirane cleavage kinetics of high-linolenic oil", *Industrial Crops & Products*, 123:25–34. DOI: 10.1016/j.indcrop.2018.06.047.
- Latere, J.P., Mohanty, A.K., Misra, M., and Drzal, L.T., 2005, "Biobased Polyurethanes and Their Composites: Present Status and Future Perspective", *Natural fibers, Biopolymers, and Biocomposites*, CRC Press, The United States of America.
- Li, Y., Luo, X., and Hu, S., 2015, "Bio-based Polyols and Polyurethanes", *Springer Briefs in Green Chemistry for Sustainability*, 79:42
- Liu, Z. and Erhan, S.Z., 2010, "Ring-Opening Polymerization of Epoxidized Soybean Oil", *J Am Oil Chem Soc*, 87:437–444. DOI 10.1007/s11746-009-1514-0
- Lligadas, G., Ronda, J.C., Galia, M., and Cadiz, V., 2013, "Renewable Polymeric Materials from Vegetable Oils: A Perspective", *Mater. Today.*, 16:337-43.
- Loontjens, T., Pauwels, K., Derkx, F., Neilen, M., Sham, C.K., and Serne, M., 1997, "The Action of Chain Extenders in Nylon-6, PET, and Model Compounds", *J. Appl. Polym. Sci.*, 65(9):1813-1819.
- Lozada, Z., Suppes, G.J., Tu, Y., and Hsieh, F., 2009, "Soy-based polyols from oxirane ring opening by alcoholysis reaction", *J. Appl. Polym. Sci.*, 113:2552–2560.
- Mecking, S., 2004, "Nature or petrochemistry? -biologically degradable materials", *Angew Chem Int Ed Engl.*, 43(9):1078-85.
- Miao, S.D., Wang, P., Su, Z.G., and Zhang, S.P., 2014, "Vegetable-Oil-Based Polymers as Future Polymeric Biomaterials", *Acta Biomater.*, 10:1692-704.
- Mirza-Aghayan, M., Alizadeh, M., Tavana, M., and Boukherroub, R., 2014, "Graphite oxide: A simple and efficient solid acid catalyst for the ring-opening of epoxides by



- Monono, E.M., Haagenson, D.M., and Wiesenborn, D.P., 2015, “Characterizing the Epoxidation Process Conditions of Canola Oil for Reactor Scale-Up”, *Ind Crops Prod.*, 67:364–372. <http://dx.doi.org/10.1016/j.indcrop.2015.01.061>
- Mosiewicki, M.A., and Aranguren, M.I., 2013, “A Short Review on Novel Biocomposites Based on Plant Oil Precursors”, *Eur. Polym. J.*, 49:1243–56.
- Mungroo, R., Pradhan, N.C., Goud, V.V., and Dalai, A.K., 2008, “Epoxidation of canola oil with hydrogen peroxide catalyzed by acidic ion exchange resin”, *J. Am. Oil Chem. Soc.*, 85:887–896. <http://dx.doi.org/10.1007/s11746-008-1277-z>.
- Navarro, R., Perrino, M. P., Tardajos, M. G., and Reinecke, H., 2010, “Phthalate Plasticizers Covalently Bound to PVC: Plasticization with Suppressed Migration”, *Macromolecules*, 43:2377–2381.
- Nohra, B., Candy, L., Blanco, J.F. Guerin, C. Raoul, Y. and Moulooungui, Z., 2013, “From Petrochemical Polyurethanes to Biobased Polyhydroxyurethanes”, *Macromolecules*, 46, 3771: A-V.
- Noor, I.M., Hasan, M., and Ramachandran, K.B., 2003, “Effect of Operating Variables on The Hydrolysis Rate of Palm Oil by Lipase”, *Process Biochem.*, 39:13–20
- Nowak, J.A., Zilner, T.A., and Mullin, L.P., 2003, “In-situ Formation of Peracid From Organic Acid and Oxidizing Agent”, Patent no. US 6740763 B1.
- Okieimen, F.E., Bakare, I.O., and Okieimen, C.O., 2002, “Studies in the Epoxidation of Rubber Seed Oil”, *Ind. Crops Prod.*, 15:139–144
- Omonov T.S., Kharraz E., and Curtis J.M., 2017, “Camelina (Camelina Sativa) oil polyols as an alternative to Castor oil”, *Industrial Crops & Products*, 107:378–385. DOI: 10.1016/j.indcrop.2017.05.041.
- Pantone, V., Laurenza, A.G., Annese, C., Fracassi, F., Fusco, C., Nacci, A., Russo, A., and D’Accolti, L., 2017, “Methanolysis of epoxidized soybean oil in continuous flow conditions”, *Industrial Crops & Products*, 109:1–7
- Paquot, C., 1979, “Standard Methods for the Analysis of Oils, Fats, and Derivatives, Part 1”, sixth ed. Pergamon, Oxford, 66–70.
- Persico, P., Ambrogi, V., Acierno, D., and Carfagna, C., 2009, “Processability and Mechanical Properties of Commercial PVC Plastisols Containing Low-Environmental-Impact Plasticizers”, *J. Vinyl Addit. Technol.*, 15:139–146.
- Petrovic, Z., Guo, A., and Javni, I., 2000, “Process for the preparation of vegetable oil-based polyols and electroninsulating casting compounds created from vegetable oil-based polyols”, *United States Pat. USOO6107433A*.
- Petrovic, Z.S., 2008, “Polyurethanes from Vegetable Oils”, *Polym. Rev.*, 48:109–55.
- Petrovic, Z.S., Guo, A., and Javni, I., 2003, “Process for the Preparation of Vegetable Oil Based Polyols and Electroinsulating Casting Compounds Created from Vegetable Oils-Based Polyols”, *The United States Patent and Trademark Office*, U.S. Patent 6573354.
- Petrovic, Z.S., Zlatanic, A., Lava, C.C., and Sinadinovic-Fiser, S., 2002, “Epoxidation of Soybean Oil in Toluene with Peroxoacetic and Peroxoformic Acids-Kinetics and Side Reactions”, *Eur. J. Lipid Sci Technol.*, 104:293–9.
- Phuaha, E., Lai, O., Choongc, T.S., Tand, C., and Loe, S., 2012, “Kinetic Study on Partial Hydrolysis of Palm Oil Catalyzed by Rhizomucor miehei Lipase”, *J. Mol. Catal. B: Enzym.*, 78: 91–97.



SINTESIS VEGETABLE OIL-BASED POLYMERS DARI MINYAK KEMIRI SUNAN (Reutealis trisperma (Blanco) Airy Shaw)

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Pranowo, D., Herman, M., dan Syafaruddin, 2015, "Potensi Pengembangan Kemiri Sunan (Reutealis Trisperma (Blanco) Airy Shaw) di Lahan Terdegradasi", *Perspektif*, 14 (2): 87-101

Raffa, P., Coltelli, M.B., Savi, S., Bianchi, S., and Castelvetro, V., 2012, "Chain Extension and Branching of Poly(ethylene terephthalate) (PET) with Di- and Multifunctional Epoxy or Isocyanate Additives: An Experimental and Modelling Study", *React. Funct. Polym.*, 72(1):50-60.

Rahayu, S.S., Bendiyasa, I.M., Muhandis dan Purwandaru, U., 2005, "Hidrolisis Minyak Sawit: Katalitik dan Non Katalitik", *Forum Teknik*, 29: 182-189.

Rangarajan, B., Havey, A., Grulke, E.A., and Culnan, P.D., 1995, "Kinetic Parameters of a Two-Phase Model for In-situ Epoxidation of Soybean Oil", *J. Am. Oil Chem. Soc.*, 72(10):1161–1169. <http://dx.doi.org/10.1007/BF02540983>.

Rios, L.A., Weckes, P.P., Schuster, H., and Hölderich, W.F., 2005, "Mesoporous and Amorphous Ti-Silicas on the Epoxidation of Vegetable Oils", *J. Catal.*, 232:19–26.

Robinson, M. W. C., Buckle, R., Mabbett, I., Grant, G. M., and Graham, A. E., 2007, Mesoporous aluminosilicate promoted alcoholysis of epoxides. *Tetrahedron Lett.*, 48, 4723-4725

Rogers, M.E. and Long, T.E., 2003, "Synthetic methods in step-growth polymers", New York: John Wiley and Sons.

Rubio, M., Ramirez-Galicia, G., and Lopez-Nava, L.J., 2005, "Mechanism formation of peracids", *J. Mol. Struct.*, 726:261–269.

Rukmini, A. and Raharjo, S., 2010, "Pattern of Peroxide Value Changes in Virgin Coconut Oil (VCO) Due to Photo-Oxidation Sensitized by Chlorophyll", *J. Am. Chem. Soc.*, 87:1407-1412.

Rupilius, W. and Ahmad, S., 2007, "Palm Oil and Palm Kernel Oil as Raw Materials for Basic Oleochemicals and Biodiesel", *Eur. J. Lipid Sci. Technol.*, 109:433–439.

Rüsch gen Klaas, M. and Warwel, S., 1999, "Complete and Partial Epoxidation of Plant Oils by Lipase- Catalyzed Perhydrolysis", *Ind. Crop Prod.*, 9:125–32.

Sahoo, S., Kalita, H., Mohanty, S., and Nayak, S.K, 2016, "Synthesis of Vegetable Oil-Based Polyurethane: A Study on Curing Kinetics Behavior", *International Journal of Chemical Kinetics*, DOI 10.1002/kin.21020

Salehi, P., Seddighi, B., Irandoost, M., and Behbahani, F. K., 2000, "Ferric Perchlorate: An Efficient Reagent for Regio- and Stereoselective Alcoholysis and Hydrolysis of Epoxides", *Synth. Commun.*, 30:2967-2973

Salimon J. and Salih N. 2009. Oleic Acid Diesters: Synthesis, Characterization and Low Temperature Properties. *European Journal of Scientific Research* 32(2):216–222.

Salmiah, 2002, "Palm-Based Polyols and Polyurethane, MPOB Technology, Vol. 24.

Satyarthi, J.K., Srinivas, D., and Ratnasamy, P., 2011, "Hydrolysis of Vegetable Oils and Fats to Fatty Acids Over Solid Acid Catalysts", *Applied Catalysis A: General*, 391:427–435

Setyawardhani, D.A., Distantina, S., Budianto, R., dan Swarte, W., 2010, "Penggeseran Reaksi Kesetimbangan Hidrolisis Minyak dengan Pengambilan Gliserol untuk Memperoleh Asam Lemak Jenuh dari Minyak Biji Karet", *Prosiding Seminar Nasional Teknik Kimia Kejuangan*, Yogyakarta, 20 Januari 2010: 1-5

Shaari, N. Z. B. K., Ismail, T. N. M. B. T., Hassan, H. A., Lye, O. T., and Ahmad, S., 2013, "Process for the Production of Polyurethane Products", *US Patent 8,501,826*, Washington, DC, U.S. Patent and Trademark Office.

Shamel, M.M., Ramachandran, K.B., Hasan, M., and Al-Zuhair, S., 2007, "Hydrolysis of Palm and Olive Oils by Immobilized Lipase Using Hollow Fiber Reactor", *Biochemical Engineering Journal*, 34: 228–235



Sharma, V. and Kundu, P.P., 2008, "Condensation Polymers from Natural Oils", *Prog. Polym. Sci.*, 33:1199-215.

Sherringham, J.A., Clark, A.J., and Keene, B.R.T., 2000, "New chemical feedstocks from unsaturated oils", *Lipid Technol.*, 12:129-132

Shrivastava, A., 2018, "Introduction to Plastics Engineering: Polymerization", 17-48.
doi:10.1016/B978-0-323-39500-7.00002-2

Silva, M. A. D., Vieira, M. G. A., Maçumoto, A. C. G., and Beppu, M. M., 2011, "Polyvinylchloride (PVC) and natural rubber films plasticized with a natural polymeric Plasticizer obtained through polyesterification of rice fatty acid", *Polym. Test.*, 30:478-484.

Solomon, T.W.G., Fryhle, C.B., and Snyder, S.A., 1983, Organic Chemistry, 11th ed., John Wiley & Sons, Inc.

Sudradjat, R., Yulita, R. I., dan Setiawan, D., 2010, "Pembuatan Poliol dari Minyak Jarak Pagar sebagai Bahan Baku Poliuretan", *Jurnal Penelitian Hasil Hutan*, 28(3):231-240.

Tran, P., Graiver, D. and Narayan, R., 2005, "Ozone-mediated polyol synthesis from soybean oil", *JAOCs, Journal of the American Oil Chemists' Society*, 82(9):653-659. doi: 10.1007/s11746-005-1124-z.

Tsuzuki, T., Tokuyama, Y., Igarashi, M., Nakagawa, K., Ohsaki, Y., Komai, M., and Miyazawa, T., 2004, " α -Eleostearic Acid (9Z11E13E-18:3) Is Quickly Converted to Conjugated Linoleic Acid (9Z11E-18:2) in Rats", *The Journal of Nutrition*, 134:2634-2639, <https://doi.org/10.1093/jn/134.10.2634>

Venkatesh, D. and Jaisankar, V., 2018, "A Kinetic Study of Certain Vegetable Oil Based Polyurethane", *International Journal of Science and Engineering Investigations*, 7(73):44-51.

Vieira, M. G. A., Silva, M. A. D., Santos, L. O. D., and Beppu, M. M., 2011, "Natural-based Plasticizers and biopolymer films: A review", *Eur. Polym. J.*, 47:254-263.

Vossen, H.A.M. and Umali, B.E., 2002, "Plant Resources of South-East Asia No 14", *Prosea Foundation*, Bogor, Indonesia

Warwel, S., Bru"se, F., Demes, C., Kunz, M., and gen Klaas, M.R., 2001, "Polymers and surfactants on the basis of renewable resources", *Chemo-sphere*, 3(1):39-48.

Williams, C.K., 2007, "Synthesis of functionalized biodegradable polyesters", *Chem Soc Rev.*, 36(10):1573-80.

Wu, S. and Soucek, M. D., 1998, "Oligomerization mechanism of cyclohexene oxide", *Polymer*, 39:3583-3586.

Wu, Z., Nie, Y., Chen, W., Wu, L. Chen, P., Lu, M., Yu, F., and Ji, J., 2016, "Mass Transfer and Reaction Kinetics of Soybean Oil Epoxidation in a Formic Acid-Autocatalyzed Reaction System", *The Canadian Journal of Chemical Engineering*, 9999:1-7. doi:10.1002/cjce.22526.

Yadav, G.D. and Satoskar, D.V., 1997, "Kinetics of Epoxidation of Alkyl Esters of Undecylenic Acid: Comparison of Traditional Routes vs Ishii-Venturello Chemistry", *J. Am. Chem. Soc.*, 74:397-407

Yadav, G.D., Singh, S., 2014, "Ring Opening of Epoxides with Alcohols Using Fe(Cp)2BF4 as Catalyst", *Tetrahedron Letters*, 55(29):3979-3983. <https://doi.org/10.1016/j.tetlet.2014.05.017>.

Yarapathi, R. V., Reddy, S. M., and Tammishetti, S., 2005, "Polymer supported ferric chloride: Regiospecific nucleophilic ring opening of epoxides", *React. Funct. Polym.*, 64:57-161

Yow, C.J. and Liew, K.Y., 1999, "Hydrolysis of Palm Oil Catalyzed by Macroporous Cation-Exchanged Resin", *J. Am. Oil Chem. Soc.*, 76:529-533.



SINTESIS VEGETABLE OIL-BASED POLYMERS DARI MINYAK KEMIRI SUNAN (Reutealis trisperma (Blanco) Airy Shaw)

- ENI BUDIYATI, Prof. Ir. Rochmadi, S.U., Ph.D., IPU.; Prof. Dr.Eng. Ir. Arief Budiman, M.S., IPU.; Ir. Budhijanto, S.T.,
Universitas Gadjah Mada, 2021 | Diunduh dari <http://etd.repository.ugm.ac.id/>
- Záher, F.A., El-Mallah, M.H., and El-Hefnawy, M.M., 1989, "Kinetics of oxirane cleavage in epoxidized soybean oil", *J. Am. Oil Chem. Soc.*, 66:698–700. <http://dx.doi.org/10.1007/BF02669955>.
- Zakavi, S., Karimipour, G. R., and Gharab, N. G., 2009, "Meso-tetraarylporphyrin catalyzed highly regioselective ring opening of epoxides with acetic acid", *Catal. Commun.*, 10:388-390
- Zhao, X., Zhang, T., Zhou, Y., and Liu, D., 2007, "Preparation of Peracetic Acid from Hydrogen Peroxide; Part I: Kinetics for Peracetic Acid Synthesis and Hydrolysis", *J. Mol. Catal. A: Chem.*, 271:246–252
- Zheng, X., Tang, L., Zhang, N., Gao, Q., Zhang, C., and Zhu, Z., 2003, "Dehydrochlorination of PVC Materials at High Temperature", *Energy & Fuels*, 17:896-900.
- Zlatanić, A., Lava, C., Chang, W., and Petrović, Z.S., 2004, "Effect of Structure on Properties of Polyols and Polyurethanes Based on Different Vegetable Oils", *J. Polym. Sci., Part B: Polym. Phys.*, 42:809-819.