

DAFTAR PUSTAKA

- Abranches, P. A. S., Varejao, E. V. V., da Silva, C. M., de Fatima, A., Magalhaes, T. F. F., da Silva, D. L., de Resende-Stoianoff, M. A., Reis, S., Nascimento Jr., C. S., de Almeida, W. B., Figueiredo, I. M. and Fernandes, S. A., 2012, Complexes of Fluconazole with Sodium *p*-Sulfonatocalix[n]arenes: Characterization, Solubility and Antifungal Activity, *J. Name*, 1-9.
- Akinfalabi, S., Rashid, U., Yunus, R. and Taufiq-Yap, Y. H., 2017, Synthesis of Biodiesel from Fatty Acid Distillate using Sulfonated Palm Seed Cake Catalyst, *Renew. Energy*, 111, 611-619.
- Almeida, C. G., Souza, I. F., Liberto, N. A., da Silva, M. J., Fernandes, S. A. and le Hyaric, M., 2015, *p*-Sulfonic Acid Calix[n]arenes as Organocatalysts for the Transesterification Reaction of Passiflora Seed Oil, *Monatsch Chem.*, 1-8.
- Alshahateet, S. F., Kooli, F., Messali, M., Judeh, Z. M. A. and ElDhouhaibi, A. S., 2007, Synthesis and Supramolecularity of C-Phenylcalix[4]Pyrogallolarenes : Temperature Effect on the Formation of Different Isomers, *Mol. Cryst. Liq. Cryst.*, 474, 89-110.
- Arbain, N. H. dan Salimon, J., 2011, The Effects of Various Acid Catalyst on the Esterification of Jatropha Curcas Oil based Trimethylolpropane Ester as Biolubricant Base Stock, *E. J. Chem.*, 8, 33-40.
- Azizah, I. N., 2016, Sintesis C-alkilikaliks[4]pirogalolaril Dodekasinamat Dan Dodekabenzoat Serta Uji Aktivitasnya Sebagai Senyawa Tabir Surya, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Baghbanian, S. M., Babajani, Y., Tashakkorian, H., Khaksar, S. and Farhang, M., 2013, *p*-Sulfonic Acid Calix[4]arene: An Efficient Reusable Organocatalyst for the Synthesis of Bis(indolyl)methanes Derivatives in Water and under Solvent-Free Conditions, *C. R. Chim.*, 16, 129-134.
- Baghbanian, S. M., Khanzad, G., Vahdat, S. M. and Tashakkorian, H., 2015, *p*-Sulfonic Acid Calix[4]arene as an Efficient and Reusable Catalyst for the Synthesis of Acridinrdiones and Xanthenes, *Res. Chem. Intermed.*, 1-16.
- Banarjee, B., Bhunia, S. and Bhaumik, A., 2015, Self-Assembled Sulfated Zirconia Nanocrystals with Mesoscopic Void Space Synthesized via Ionic Liquid as a Porogen and Its Catalytic Activity fir the Synthesis of Biodiesel, *Appl. Catal. A*, 502, 380-387.
- Chandrasekran, S. and Enoch, I. V. M. V., 2015, Encapsulation of Chromen-4-one Schiff's bases by C-Hexylpyrogallol[4]arene and Its Structure, *J. Mol. Struct.*, 1102, 247-252.

- Coencicao, L. R. V., Carneiro, L., M., Rivaldi, J. D. and de Castro. H. F., 2016, Solid Acid as Catalyst for Biodiesel Production via Simultaneous Esterification and Transesterification of Macaw Palm Oil, *Ind. Crops Prod.*, 89, 416-424.
- Cruz, M., Pinho, S. C., Mota, R., Almeida, M. F. and Dias, J. M., 2018, Enzymatic Esterification of Acid Oil Refining : Effect of Enzyme Concentration, *Renew. Energy*, 124, 165-171.
- Da Silva, D. L., Fernandes, S. A., Sabino, A. A. and de Fatima, A., 2011, *p*-Sulfonic Acid Calixarenes as efficient and Reusable Organocatalysts for the Synthesis of 3,4-Dihydropyrimidin-2(1H)-ones/-thiones, *Tetrahedron Lett.*, 6328-6330.
- Dang, T. and Chen, B., 2013, Optimization in Esterification of Palmitic Acid with Excess Methanol by Solid Acid Catalyst, *Fuel Process. Technol.*, 109, 7-12.
- De Assis, J. V., Abranches, P. A. S., Braga, I. B., Zuniga, O. M. P., Sathicq, A. G., Romanelli, G. P., Sato, A. G. and Fernandes, S. A., 2012, *p*-Sulfonic Acid Calix[n]arene-Functionalized Alkyl-Bidged Organosilica in Esterification Reactions, *J. Name*, 1-5.
- De Assis, J. V., Teixeira, M. G., Soares, C.G.P., Lopes, J.F., Carvalho, G. S. L., Lourenco, M. C. S., de Almeida, M. V., de Lameida, W. B. and Fernandes, S. A., 2012, Experimental and Theoretical NMR Determination of Isoniazid and Sodium *p*-Sulfonatocalix[n]arenes Inclusion Complexes, *Eur. J. Pharm. Sci.*, 47, 539-548.
- Fache, M., B. Boutevin, B. and Caillol S., 2015, Vanillin Production from Lignin and Its Use as Renewable Chemical, *ACS Sustainable Chem. Eng.*, 1-24.
- Fattore, E. and Fanelli, R., 2013, Palm Oil and Palmitic Acid: A Review on Cardiovascular Effects and Carcinogenicity, *Int. J. Food Sci. Nutr.*, 64, 5, 648-659.
- Fernandes, S. A., Natalino, R., da Silva, M. J. and Lima, C. F., 2012, A Comparative Investigation of Palmitic Acid Esterification over *p*-Sulfonic Acid Calix[4]arene an Sulfuric Acid Catalyst via ¹H NMR Spectroscopy, *Catal. Commun.*, 26, 127-131.
- Fernandes, S. A., Natalino, R., Gazolla, P. A. R., da Silva, M. J. and Jham, G. N., 2012, *p*-Sulfonic Acid Calix[n]arenes as Homogeneous and Recyclable Organocatalysts for Esterification Reactions, *Tetrahedron Lett.*, 53, 1630-1633.
- Fleisher, V. L. and Andryukhova, M. V., 2012, Preparative Synthesis of Fragrance Substances Based on Vanillin and Veratraldehyde, *Proceedings of BSTU*, Minsk.
- Fulmer, G. R., Miller, A. J. M., Sherden, H. N., Gottlieb, H. E., Nudelman, A., Stoltz, B. M., Bercaw, J. E. And Golberg, K. I., 2010, NMR Chemical Shifts of

- Trace Impurities: Common Laboratory Solvents Relevant to the Organometallic Chemist, *Organometallics*, 29, 2176-2179.
- Funck, M., Guest, D. P., and Cave, G. W. V., 2010, Microwave-Assisted Synthesis of Resorcin[4]arene and Pyrogallol[4]arene Macrocycles, *Tetrahedron Lett.*, 51, 6399-6402.
- Gaeta, C., Caruso, T., Mincoelli, M., Troisi, F., Vasca, E. and Neri P., 2008, *p*-Sulfonatocalix[7]arene: Synthesis, Protolysis and Binding Ability, *Tetrahedron*, 64, 5370-5378.
- Galaverna, R. S., Bataglion, G.A., Heerdt, G., de Sa, G.F., Daroda, R., Cunha, V.S., Morgon, N.H. and Eberlin, M.N., 2015, Are Benzoic Acids Always More Acidic Than Phenols? The Case of ortho-, meta- and para-Hydroxybenzoic Acids, *Eur. J. Org. Chem.*, 2189-2196.
- Gallage, N. J. and Moller, B. L., 2015, Vanillin-Bioconversion and Bioengineering of the Most Popular Plant Flavor and Its De Novo Biosynthesis in the Vanilla Orchid, *Mol. Plant*, 8, 40-57.
- Gandara, F., Gutierrez-Puble, E., Iglesias, M., Snejko, N. and Monge, M. A., 2010, Isolated Hexanuclear Hydroxo, Lanthanide Secondary Building Units in a Rare-Earth Polymeric Framework Based on *p*-Sulfonatocalix[4]arene, *Cryst. Growth Des.*, 10, 1, 128-134.
- Grigoreva, N. G., Suleimanova, A. M., Agliullin, M. R. and Kupetov, B. I., 2014, Synthesis of Carboxylic Acid Esters in the Presence of Micro- and Mesoporous Aluminosilicates, *Russ. J. Appl. Chem.*, 87, 6, 773-779.
- Griffin, P., 2007, Pyrogallolarenes : A Synthetic Investigation, *Thesis*, Dublin City University, Dublin.
- Han, C., Zeng, L., Li, H. and Xie, G., 2009, Colorimetric Detection of Pollutant Aromatic Amines Isomers with *p*-Sulfonatocalix[6]arene-Modified Gold Nanoparticles, *Sens. Actuators B*, 137, 704-709.
- Harizal, 2015, Sintesis C-4-alkoksifenilkaliks[4]pirogalolaril Benzoat-sinamat Sebagai Senyawa Tabir Surya, *Disertasi*, Universitas Gadjah Mada, Yogyakarta.
- Illiachi, L. A., Montalvo-Acosta, J.J., Quiroga, J., Abonia, R., Sortino, M., Zacchino, S. and Insuasty, B., 2017, Synthesis and DFT Calculations of Novel Vanillin-Chalcones and Their 3-Aryl-5-(4-(2-(dimethylamino)-ethoxy)-3-methoxyphenyl)-4,5-dihydro-1H-pyrazole-1-carbaldehyde Derivatives as Antifungal Activities, *Molecules*, 22, 1-21.
- Indrawan, N., Thapa, S., Rahman, S. F., Park, J., Park, S., Wijaya, M. E., Gobikrishnan, S., Purwanto, W. W. and Park, D., 2017, Palm Biodiesel in the Indonesian Power Sector, *Environ. Technol. Innovation*, 7, 110-127.

- Jelsma, I., Slingerld, M., Giller, K. E. and Bijman, J., 2017, Collective Action in a Smallholder Oil Palm Production System in Indonesia: The Key to Sustainable and Inclusive Smallholder Palm Oil ?, *J. Rural Stud.*, 54, 198-210.
- Jin, T., 2010, Near-Infrared Fluorescence Detection of acetylcholine in Aqueous Solution Using a Complex of Rhodamine 800 and *p*-Sulfonato-Calix[8]arene, *Sensors*, 10, 2438-2449.
- Koushki, M., Nahidi, M. and Cheraghali F., 2015, Physico-Chemical Properties, Fatty Acid Profil and Nutrition in Palm Oil, *J. Paramed. Sci.*, 6, 3, 118-134.
- Kumar, R., Sharma., P. K. and Mishra, P. S., 2012, A Review on the Vanillin Derivatives Showing Various Biological Activities, *Int. J. Pharm. Tech.*, 4, 1, 266-279.
- Kumari, H., Erra, L., Webb, A. C., Bhatt, P., Barnes, C. L., Deakyne, C. A., Adams, J. E., Barbour, L. J. and Atwood, J. L., 2013, Pyrogallol[4]arenes as Frustrated Organic Solids, *J. Am. Chem. Soc.*, 1-5.
- Lakouraj, M. M., Tashakkorian, H. and Rouhi, M., 2013, One-Pot Synthesis of Xanthones and Dixanthones using Calix[4]arene Sulfonic Acid under Solvent Free Condition, *Chem. Sci. Trans.*, 2, 3, 739-748.
- Lamoureux, G. and Agüero, C., 2009, A Comparison of Several Modern Alkylating Agents, *ARKIVOC*, 251-264.
- Leka, Z., Novakovic, S. B., Bogdanovic., Muskinja, J. and Vukicevic, R. D., 2013, 4-Ethoxy-3-Methoxybenzaldehyde, *Acta Cryst.*, 69.
- Li, J., Zhang, S., Chen., Y., Du, X. and Yu, J., 2014, Coordination Polymeric Chain Formed *p*-Sulfonatocalix[4]arene and Organotin. Synthesis and Crystal Structure, *Inorg. Chem. Commun.*, 47, 93-95.
- Ling, I. and Raston, C. L., 2017, Primary and Secondary Directing Interactions of Aquated Lanthanide(III) Ions with *p*-Sulfonated calix[n]arene, *Coord. Chem. Rev.*, 1-26.
- Maerz, A. K., 2011, Synthesis and Characterization of Host-Guest Complexes: Metal-Organic Nanocapsules Using Aryl-subtitutes Pyrogallol[4]arenes, *Dissertation*, University of Missouri-Columbia, Columbia.
- Maharani, I.T., 2017, Sintesis Dan Uji Kinerja Asam Butil Lignosulfonat Dan Selulosa Sulfat Dari Tandan Kosong Kelapa Sawit Sebagai Surfaktan Untuk Bahan Enhanced Oil Recovery (EOR), *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Makha, M., 2001, Novel Sulfonated Extended Arm Calixarenes, *Thesis*, Monash University, Victoria.

- Mutlu, V. N. and Yilmaz, S., 2016, Esterification of Cetyl Alcohol with Palmitic Acid over WO₃/Zr-SBA-15 and Zr-SBA-15 Catalyst, *Appl. Catal. A*, 522, 194-200.
- Natalino, R., Varejao, E. V. V., da Silva, M. J., Cardoso, A. L. and Fernandes, A., 2014, *p*-Sulfonic Acid Calix[n]arene: The Most Active and Water Tolerant Organocatalyst in Esterification Reactions, *Catal. Sci. Technol.*, 4, 1369-1376.
- Negin, S., Li, R., Kulikov, O. V., Daschbach, M. M. and Gokel, G. W., 2014, Ion Transport through Bilayer Membranes Mediated by Pyrogallol[4]arenes, *Inorg. Chim. Acta*, 417, 177-185.
- Palermo, V. M., Sathicq, A., Liberto, N., Fernandes, S., Langer, P., Jios, J. and Romanelli, G., Calix[n]arene: Active Organocatalyst for the Synthesis of Densely Functionalized Piperidines by One-Pot Multicomponent Procedure, *Tetrahedron Lett.*, 57, 2019-2054.
- Pappalardo, V. M., Boeriu, C. G. m Zaccherias F. and Ravasio. N., 2017, Synthesis and Characterization of Aabinose-Palmitic Acid Esters by Enzymatic Esterification, *J. Mol. Catal. B: Enzym*, 433, 383-390
- Pratiwi, A. R., 2017, Sintesis C-arilikaliks[4]pirogalolarena Dan Uji Aktivitasnya Sebagai Senyawa Antioksidan, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Pfeiffer, C. R., Feaster, K. A., Dalgarno, S. J. and Atwood, J. L., 2015, Synthesis and Characterization of Aryl-substituted Pyrogallol[4]arenes and Resorcin[4]arenes, *Cryst. Eng. Comm.*, 1-8.
- Pod'yachev, S. N., Mustafina, A. R., Koppehele, A. H., Gruner, M., Habicher, W. D., Buzykin, B. I. and Konovalov, A. I., 2004, Synthesis of Per-O-(carboxymethyl)Calix[4]pyrogallols and Their Complexation with Some Alkaline Metal and Lanthanide Ions, *Russ. Chem. Bull.*, 53, 6, 1181-1188.
- Poonjarernsilp, C., Sano, N. and Tamon, H., 2014, Hydrothermally Sulfonated Single-Walled Carbon Nanohorns for Use as Solid Catalyst in Biodiesel Production by Esterification of Palmitic Acid, *Appl. Catal. B*, 147, 726-732.
- Rajput, A. P. and Nagarale, D. V., 2016, Modern Synthetic Tool L-Proline as an Organocatalyst, *J. Chem. Pharm. Res.*, 8, 7, 557-575.
- Rego, Y. F., da Silva, C. M., da Silva, D. L., da Silva, J. G., Ruiz, A. L. T. G., de Carvalho, J. E., Fernandes, S. A. and de Fatima, A., 2016, Phthalazine-triones: Calix[4]arene-assisted Synthesis using Green Solvents and Their Anticancer Activities Against Human Cancer Cells, *Arabian J. Chem.*, 1-9.
- Saravanan, K., Tyargi, B., Shukla, R. and Bajaj, H. C., 2015, Esterification of Palmitic Acid with Methanol over Template-assisted Mesoporous Sulfated Zirconia Solid Acid Catalyst, *Appl. Catal. B*, 172-173, 108-115.

- Saravanan, K., Tyargi, B., Shukla, R. and Bajaj, H. C., 2016, Solvent Free Synthesis of Methyl Palmitate over Sulfated Zirconia Solid Acid Catalyst, *Fuel*, 165, 298-305.
- Saravanan, C., Chitumalla, R. M., Ashwin, B. C. M. A., Senthilkumaran, M., Suresh, P., Jang, J. and Mareeswaran, P. M., 2018, Effectual Binding of Gallic Acid with *p*-Sulfonatocalix[4]arene: An Experimental and Theoretical Interpretation, *J. Lumin.*, 196, 392-398.
- Sari, R., 2017, Sintesis C-arilkaliks[4]pirogalolarena dan C-alkilkaliks[4]pirogalolarena serta Uji Aktivitasnya sebagai Senyawa Antioksidan, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Sathicq, A. G., Liberto, N. A., Fernandes, S. A. and Romanelli, G. P., 2015, Solvent-free Multicomponent Synthesis of 2-Arylpyridines using *p*-Sulfonic Acid Calix[6]arene as a Reusable Catalyst, *C. R. Chim.*, 18, 374-378.
- Sayin, S. and Yilmaz, M., 2014, Bronsted Acidic Magnetic Nano-Fe₃O₄-adorned Calix[n]arene Sulfonic Acids: Synthesis and Application in the Nucleophilic Substitution of Alcohols, *Tetrahedron*, 6669-6676.
- Sayin, S. and Yilmaz, M., 2016, Synthesis and Investigation of Catalytic Affinities of Water-soluble Amphiphilic Calix[n]arene Surfactants in the Coupling Reaction of some Heteroaromatic Compounds, *Tetrahedron*, 72, 6528-6535.
- Schnatwinkel, B., Rekharsky, M. V., Borovkov, V. V., Inoue, Y. and Mattay, J., 2009, Pyrogallol[4]arenes as Artificial Receptors for L-Carnitine, *Tetrahedron Lett.*, 50, 1374-1376.
- Selva, M. and Perosa, A., 2008, Green Chemistry Metrics: A Comparative Evaluation of Dimethyl Carbonate, Methyl Iodide, Dimethyl Sulfate and Methanol as Methylating Agents, *Green Chem.*, 10, 457-464.
- Setyawan, T., 2013, Sintesis Senyawa Tabir surya Turunan Kaliks[4]resorsinarena Benzofenon dari Vanilin, *Tesis*, Universitas Gadjah Mada, Yogyakarta.
- Shaikh, I. R., 2014, Organocatalyst: Key Trends in Green Synthetic Chemistry, Challenges, Scope towards Heterogenization and Importance from Research and Industrial Point of View, *J. Catal.*, 1-36.
- Sliwa, W. and Deska, M., 2008, Calixarene Complexes with soft Metal Ions, *ARKIVOC*, 1, 87-89.
- Tashakkorian, H., Lakouraj, M. M. and Rouhi, M., 2015, *p*-Sulfonic Acid Calixarenes as an Efficient Catalyst for One-Pot Synthesis of Pharmaceutically Significant Coumarin Derivatives under Solvent-Free Condition, *Int. J. Med. Chem.*, 1-8.

- Wan, D., Liu, H., Jin, M., Pu, H. and Wang, G., 2014, Facile Williamson Etherification of Hyperbranched Polyglyceol and Subtle Core-dependent Supramolecular Guest Selection of the Resulting Molecular Nanocapsule, *Eur. Polym. J.*, 55, 9-16.
- Waidely, E., Pumilia, C., Malagon., A., Vargas, E. F., Li, S. and Leblanc, R. M., 2015, Host-Guest Complexation of A Pyrogallol[4]arene Derivative at the Air-Water Interface, *Langmuir*, 31, 1368-1375.
- Yaakob, A. Q. and Bhatia, S., 2004, Esterification of Palmitic Acid with Methano in the Presence of Macroporous Ion Exchange Resin as Catalyst, *IJUM Eng. J.*, 5, 2, 35-51.
- Yadav, G. D. and Lande, S. V., 2006, Rate Intensive and Selective Etherification of Vanillin with Benzyl Chloride under Solid-liquid Phase Transfer Catalysis by Aqueous Omega Phase, *J. Mol. Catal. A: Chem.*, 244, 271-277.
- Yan, C., Chen, W., Jiang, T. and Yao, Y., 2007, Microwave Irradiation Assisted Synthesis, Alkylation Reaction and Configuration Analysis of Aryl Pyrogallol[4]arenes, *Tetrahedron*, 51, 6399-6402.
- Yasmin, L., Coyle, T., Stubbs, K. A. and Rason, C. L., 2013, Stereospecific Synthesis of Resorcin[4]arenes and Pyrogallol[4]arenes in Dynamic Thin Films, *Chem. Comm.*, 49, 10932-10934.
- Ziaja, P., Jodko-Piorecka, K., Kuzmicz, R. and Litwinienko, 2012, Calix[4]pyrogallolarenes as Novel High Temperature Inhibitors of Oxidative Degradation of Polymers, *Polym. Chem.*, 3, 93-95.