

8th Workshop on Fats and Oils as Renewable Feedstock for the Chemical Industry

Karlsruhe, Germany, March 29 – 31, 2015

Sunday, March 29, 2015

Registration

Registration will be opened from 14:30 - 19:00

- 15.45 **Welcome and Opening**
- Jürgen O. Metzger, *abiosus* e.V.
- Michael A. R. Meier, KIT
- 16.00 – 17.30 *First Session*
- Chair: Michael A. R. Meier*
- 16.00 – 16.30 **Single cell oil – realistic and unrealistic perspectives (M)**
L1 Alexander Steinbüchel, Institut für Molekulare Mikrobiologie und
Biotechnologie, Westfälische Wilhelms-Universität Münster,
Münster,
Germany
- 16.30 – 17.00 **Catalytic Functionalisation of Oleochemicals – New Developments
in Laboratory and Miniplants (M)**
L2 Arno Behr, Lehrstuhl für Technische Chemie, Fakultät Bio- und
Chemieingenieurwesen, Technische Universität Dortmund,
Dortmund,
Germany
- 17.00 – 17.30 **New Value Chains from Oil Crops to Long Chain Polyamides**
(M)
L3 Jean-Luc Dubois, Arkema France, Colombes, France
- 17.30 – 20.30 **Poster Session and Opening Mixer**
Posters will be displayed until the end of the workshop

(M) Main Lecture 30 min including discussion

(D) Discussion Lecture 20 min including discussion

Monday, March 30, 2015

- 9.00 – 10.30 *First morning session*
- Chair: Stefan Mecking*
- 9.00 – 9.30 **In-situ Spectroscopy of Liquid-phase Catalytic Processes with Biomass-derived Compounds (M)**
L4 Bert M. Weckhuysen, Xavier Ruiz Martinez, Inorganic Chemistry and Catalysis, Utrecht University, Utrecht, The Netherlands
- 9.30 – 9.50 **Synthesis of Saturated Branched Fatty Derivatives using a Process Combination of Homogeneous and Heterogeneous Catalysis in Miniplant Scale (D)**
L5 Jennifer Hasselberg, Arno Behr, Carsten Weiser, Jan Billy Bialy, Technische Universität (TU), Dortmund, Germany
- 9.50 – 10.10 **Isomerizing Metathesis as an Efficient Tool for the Generation of Biodiesel from Rapeseed Oil (D)**
L6 Kai F. Pfister, Sabrina Baader, Lukas J. Gooßen, Technical University of Kaiserslautern, Kaiserslautern, Germany
- 10.10 – 10.30 **Unravelling the Mechanism of the Isomerizing Alkoxyacylation of Plant Oils (D)**
L7 Verena Goldbach¹, Philipp Roesle¹, Josefine T. Christl¹, Florian Stempfle¹, Lucia Caporas², Stefan Mecking¹, ¹ Department of Chemistry, University of Konstanz, Konstanz, Germany; ² Department of Chemistry, University of Salerno, Italy
- 10.30 – 11.00 **Coffee break**
- 11.00 – 12.50 *Second morning session*
- Chair: Jean-Luc Dubois*
- 11.00 – 11.30 **Symbiosis of Chemistry and Biology: BASF's Biodegradable and Renewable Polymers (M)**
L8 Andreas Künkel, Robert Loos, Carsten Sinkel, BASF, Ludwigshafen, Germany
- 11.30 – 11.50 **Catalytic Copolymerization of Methyl 9,10-Epoxystearate and Cyclic Anhydrides (M)**
L9 Ursula Biermann¹, Ansgar Sehlinger², Michael A. R. Meier², Jürgen O. Metzger¹, ¹ Institute of Chemistry, University of Oldenburg, Oldenburg, Germany; ² Institute of Organic Chemistry, KIT, Karlsruhe, Germany

- 11.50 – 12.10 **Regioselective Acetoxylation of Limonene: Access to Renewable Building Blocks via Catalysis and the Passerini Three-component Reaction (D)**
L10 Marc von Czapwieski, Michael A.R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- 12.10 – 12.30 **Vegetable Plant Oils as a Versatile Source of Greener Thermoplastics: Example of Non-isocyanate Polyurethanes (D)**
L11 Etienne Grau, Henri Cramail, Bordeaux University – CNRS, Bordeaux, France
- 12.30 – 12.50 **New Bio-based Hyperbranched Polyesters (D)**
L12 Blandine Testud, Etienne Grau, Daniel Taton, Henri Cramail, Bordeaux University – CNRS, Bordeaux, France
- 12.50 – 14.00 **Lunch break**
- 14.00 – 15.30 *First afternoon session*
Chair: Charlotte Williams
- 14.00 – 14.30 **Sustainable Synthesis of Amines – Direct Amination of Alcohols with NH₃ (M)**
L13 Dieter Vogt, School of Chemistry, University of Edinburgh, Edinburgh, UK
- 14.30 – 14.50 **Reductive Amination of Dodecanol with NH₃ over Heterogeneous Catalysts (D)**
L14 Atte Aho, Åbo Akademi University, Åbo Finland
- 14.50 – 15.10 **Reactions of Methyl 9-Oxo-10-undecenoate (D)**
L15 Hans J. Schäfer, Ludger Hinkamp, Organisch-Chemisches Institut, University of Münster, Münster, Germany
- 15.10 – 15.30 **Sugar Derived Amphiphiles as Crude Oil Thickening Agents – Influence on Type and Complexity (D)**
L16 Malick Samateh, Swapnil R. Jadhav, George John, City College of New York, City University of New York, New York, USA
- 15.30 – 16.00 **Coffee break**

16.00 – 17.20 *Second afternoon session*

Chair: Arno Behr

16.00 – 16.30 **Catalyst Selection for Development of Chemical Processes Based on Fats and Oils (M)**

L17 Aalbert Zwijnenburg, Johnson Matthey Chemicals GmbH, Emmerich, Germany

16.30 – 16.50 **Skeletal Isomerisation of Oleic Acid over Ferrierite: Influence of Acid Site Number, Accessibility and Strength on Activity and Selectivity (D)**

L18 Sophie C.C. Wiedemann¹, Ramon Oord², Tanja van Bergen-Brenkman¹, Bas Wels¹, Pieter C. A. Bruijninx², Bert M. Weckhuysen², ¹ Croda Nederland BV, The Netherlands; ² Utrecht University, Utrecht, The Netherlands

16.50 – 17.10 **Rhodium-Catalyzed Hydroformylation of Triglycerides in Aqueous Media Using Supramolecular Emulsifiers (D)**

L19 Théodore Vanbésien, Frédéric Hapiot, Eric Monflier, Université d'Artois, Lens Cedex, France

17.10 – 17.30 **Rhodium-Catalyzed Functionalization of Mono-Unsaturated Fatty Acids (D)**

L20 S. Eschig, C. Schirp, T. Salthammer, Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, Braunschweig, Germany

19.30 *Conference Dinner*

Renaissance Karlsruhe Hotel

Tuesday, March 31, 2015

9.00 – 10.40 *First morning session*

Chair: Aalbert Zwijnenburg

9.00 – 9.30
L21 **Vegetable Oils as Raw Materials for Polymer Nanoparticles (M)**
Pedro Araujo, Department of Chemical Engineering and Food Engineering, Federal University of Santa Catarina, Florianópolis, Brazil

9.30 – 9.50
L22 **Reactivity and Release of Plant Oils from Loaded Poly(styrene-co-maleimide) Nanoparticles (D)**
Pieter Samyn, Dirk Stanssens, Leo Vonck, Henk Van den Abbeele, University of Freiburg, Freiburg, Germany

9.50 – 10.10
L23 **From Plant Oils to Plant Foils: Straightforward Functionalization and Crosslinking of Natural Plant Oils with Triazolinediones (D)**
Kevin De Bruycker, Oğuz Türünç, Stijn Billiet, Samira Ouardad, Johan Winne, Filip E. Du Prez, Ghent University, Ghent, Belgium

10.10 – 10.40
L24 **Using Fatty Acid Derived Epoxides to Prepare New Polyesters and Polycarbonates (M)**
Charlotte K. Williams¹, M. A. R. Meier², Mathias Winkler², Charles Romain¹, ¹Department of Chemistry, Imperial College London, London, UK; ²Institute of Organic Chemistry, KIT, Karlsruhe, Germany

10.40 – 11.10 **Coffee Break**

11.00 – 12.50 *Second morning session*

Chair: Dieter Vogt

11.10 – 11.40
L25 **Glycerol Valorisation Example in the Context of Oil Plants Biorefineries Design (M)**
Franck Dumeignil, Lille University, UCCS UMR CNRS 8181, Villeneuve d'Ascq, France

11.40 – 12.00
L26 **High Intensified Selective Synthesis of Partial Diglycerol Esters of Undecylenic Acid in Direct Esterification Reaction Melted Gel Conditions (D)**
Gildas Nyame Mendendy Boussambe, Romain Valentin, Zéphirin Mouloungui, Laboratoire de Chimie Agro-Industrielle, INP-ENSIACET
Toulouse, France and INRA, UMR 1010 CAI, Toulouse, France

12.00 – 12.20	One Step Biodiesel Manufacture of Acid Oils via MSA Catalysis (D)
L27	<u>Axel Ingendoh</u> , Ralf Tuerck, InaChem GmbH, Odenthal, Germany
12.20 – 12.40	Biodiesel Production via Catalytic Hydrodeoxygenation of Fatty acids derived from Chlorella algae and tall oil
L28	<u>Imane Hachemi</u> , Åbo Akademi University, Åbo, Finland
12.40 – 14.00	Lunch break
14.00 – 15.30	<i>Afternoon session</i>
	<i>Chair: Alexander Steinbüchel</i>
14.00 – 14.30	Algae Oils as a Unique Source of Chemicals (M)
L29	Florian Stempfle, Philipp Roesle, Sandra K Heß, Julia Zimmerer, Carolina Rio-Bartulos, Bernard Lepetit, Angelika Eckert, Peter Kroth, <u>Stefan Mecking</u> , Department of Chemistry, University of Konstanz, Konstanz, Germany
14.30 – 14.50	Synthesis and Characterization of Innovative Materials Based on Triglycerides from Microalgae (D)
L30	<u>Alice Arbenz</u> , Luc Averous, ICPEES, CNRS UMR 7515, Strasbourg, France
14.50 – 15.20	Algae for the Production of Advanced Biofuels
L31	<u>D. Behrendt</u> , C.Schreiber, A.Müller, U.Schurr, IBG-2: Pflanzenwissenschaften, Forschungszentrum Jülich GmbH, Jülich
15.20	Poster Award and Closing Remarks
	Best Poster Award
	Award committee (Pedro Araujo, Franck Dumeignil, Xavier Ruiz Martinez)
	Closing remarks
	Michael A. R. Meier
15.30	End of Workshop

Posters

- P1 **Jatropha curcas hydroxylated and urethanated polymeric material – Preparation and characterization**
Cecilia Olufunke Akintayo¹, Emmanuel Temitope Akintayo², Habibat Omolara Adubiaro¹, ¹ Federal University, Oye Ekiti, Ekiti State, Nigeria, ² Ekiti State University, Ado Ekiti, Ekiti State, Nigeria
- P2 **Solid acid catalysts based on polyoxometalate for esterification of acetic acid with heptanol**
ALI M. ALSALME, Abdulaziz Alghamdi, King Saud University, RIYADH, Saudi Arabia
- P3 **Synthesis of Nickel Nanoparticles From N,N'-Dialkylimidazolium Chloronickel(II) Ionic Liquid and their application as catalysts for bio-diesel production**
Abdulaziz Ali Alghamdi, Ali M. Alsalmeh, King Saud University, RIYADH, Saudi Arabia
- P4 **Synthesis and Antimicrobial properties of Citronellol Based Surface Active Ionic Liquids (SAILs)**
Vinay Chauhan, Sukhprit Singh, Department of Chemistry, Guru Nanak Dev University, Amritsar, India
- P5 **Hydrophobe-free miniemulsion polymerization: towards high solid content of fatty acid-based poly(urethane-urea) latexes**
Estelle Rix, Etienne Grau, Henri Cramail, LCPO CNRS Bordeaux University, Bordeaux, France
- P6 **Statistical quantification of vegetable oils based on PCA and PLS analysis of vibrational spectra**
Pieter Samyn, University of Freiburg, Freiburg, Germany
- P7 **Bio-based additives for PLA- A case study of oleo-product development**
THOMAS LEBARBE¹, ETIENNE GRAU², HENRI CRAMAIL², CARINE ALFOS¹, ¹ ITERG, Pessac, France; ² LCPO CNRS Bordeaux University, Bordeaux, France
- P8 **Towards Resource Efficient Synthesis of novel Long-Chain-Polyesters from Renewable Feedstocks via hydroformylation**
Thomas Seidensticker, Andreas J. Vorholt, Arno Behr, Technische Universität (TU) Dortmund, Dortmund, Germany
- P9 **Synthesis and Characterization of New Polymers from Adenopus breviflorus benth oil, Styrene and Divinyl Benzene by Cationic Polymerization**
Emmanuel T Akintayo¹, Sabine Beuermann², ¹ Ekiti State University, Ado-Ekiti, Nigeria; ² Institut für Technische Chemie, TU Clausthal, Clausthal-Zellerfeld, Germany

- P10 **Synthesis of macrocyclic lactones with musk odor by ring closing metathesis using oleic and 9-decenoic acids as building blocks**
Adrian Sytniczuk, Karol Grela, Biological and Chemical Research Centre, Department of Chemistry, Warsaw University, Warsaw, Poland
- P11 **Chemical Valorization of Cashew Nut Shell Liquid by Isomerizing Metathesis**
Sabrina Baader¹, Stefania Andrada Trita, Patricia E. Podsiadly, David J. Cole-Hamilton², Lukas J. Gooßen¹, ¹ Technische Universität Kaiserslautern, Kaiserslautern, Germany; ² University of St. Andrews, St. Andrews, Scotland, UK
- P12 **Synthesis of plant oil derived polyethers by the GaBr₃-catalyzed reduction of carboxylic acid esters**
Patrick-Kurt Dannecker¹, Ursula Biermann², Jürgen O. Metzger², Michael A.R. Meier¹, ¹ Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany; ² University of Oldenburg, Oldenburg, Germany
- P13 **Triazolinediones as a rapid functionalization and crosslinking tool of plant oil-based step-growth polymers**
Laetitia Vlamincq, Kevin De Bruycker, Oguz Türünç, Samira Ouardad, Filip E. du Prez, University of Gent, Gent, Belgium
- P14 **Process Development for the Hydroformylation of Methyl 10-Undecenoate Using Water/Butanol-Solvent Systems – From Laboratory to Miniplant Scale**
Tom Gaide, Jens Dreimann, Arno Behr, Andreas J Vorholt, Technische Universität (TU) Dortmund, Dortmund, Germany
- P15 **Long-chain unsymmetrical α,ω -difunctional compounds from fatty acids with complete feedstock molecule utilization**
Timo Witt, Florian Stempfle, Philipp Roesle, Stefan Mecking, Department of Chemistry, University of Konstanz, Konstanz, Germany
- P16 **Synthesis of Polyethers from Fatty Alcohols by Allyl-Activation**
Veronika R. Huber, Herbert M. Riepl, Weihenstephan-Triesdorf University of Applied Sciences, Straubing, Germany
- P17 **Electrochemistry for the conversion of free fatty acids and triglycerides in organic and aqueous media**
Tatiane R. dos Santos¹, Uwe Schröder², Falk Harnisch¹, ¹ Helmholtz-Zentrum für Umweltforschung GmbH – UFZ, Leipzig, Germany; ² Technische Universität Braunschweig, Braunschweig, Germany
- P18 **Linear Long-Chain Aliphatic Polyamides – Fatty Acid Based Polycondensates and Novel Approaches via ADMET Copolymerization**
Justus Walter, Patrick Ortmann, Tobias A Lemke, Brigitta Schemmer, Stefan Mecking, Department of Chemistry, University of Konstanz, Konstanz, Germany

- P19 **Liquid solid phase behavior of ternary fatty acid systems of palmitic, stearic, oleic and linoleic acid**
Karl Andreas Eckert, Sunanda Dasgupta, Benjamin Selge, Peter Ay, Brandenburg University of Technology, Cottbus-Senftenberg, Germany
- P20 **A modified Wacker Oxidation process: efficient oxyfunctionalization of renewable raw materials**
Marc von Czapwieski, Michael A.R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- P21 **Epoxidized vegetable oils as glycerol based alkyd resins modifiers**
Hanna Nosal, Janusz Nowicki, Marek Warzała, Jan Mosio-Mosiewski, Dorota Stańczyk, Institute of Heavy Organic Synthesis "Blachownia", Kędzierzyn-Koźle, Poland
- P22 **Efficient and Sustainable Synthesis of High Viscosity Fatty Acid Esters**
Dorota Stańczyk, Janusz Nowicki, Jan Mosio-Mosiewski, Marek Warzała, Hanna Nosal, Institute of Heavy Organic Synthesis "Blachownia", Kędzierzyn-Koźle, Poland
- P23 **Syntheses and Characterization of Crosslinked High-Oleic Sunflower Oil for Biolubricant Applications**
Franziska Huß, Werner Pauer, Hans-Ulrich Moritz, University of Hamburg, Hamburg, Germany
- P24 **Amphiphilic ionic liquids with dual functions – surfactant and catalyst**
Dorota Stańczyk, Janusz Nowicki, J. Łuczak, Hanna Nosal, Institute of Heavy Organic Synthesis "Blachownia", Kędzierzyn-Koźle, Poland
- P25 **Modified starch and β -cyclodextrin obtained from Ugi five-component reactions with carbon dioxide**
Rebekka Schneider, Ansgar Sehlinger, Michael A. R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- P26 **Catalytic Decarbonylation of Biosourced Substrates**
Jeremy Ternel¹, Thomas Lebarbe², Eric Monflier¹, Frederic Hapiot¹, ¹ Université d'Artois, Lens Cedex, France; ² ITERG, Pessac, France
- P27 **Synthesis of Modified Polycaprolactams Based on Renewable Resources**
Stefan Oelmann, Michael A. R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- P28 **Pressure Sensitive Adhesives from Plant-based Oils: Synthesis and Adhesive Properties**
Wiebke Maassen^{1,2}, Norbert Willenbacher², Michael A. R. Meier¹, ¹ Institute of Organic Chemistry, KIT; ² Institute for Mechanical Process Engineering and Mechanics, KIT, Karlsruhe, Germany

- P29 **Renewable Polymers from Itaconic Acid by Polycondensation and Ring-Opening-Metathesis Polymerization**
Matthias Winkler¹, Talita M. Lacerda^{1,2}, Felix Mack¹, Michael A. R. Meier¹,
Institute of Organic Chemistry, KIT, Karlsruhe, Germany; ² São Carlos Institute
of Chemistry and Department of Materials Engineering/São Carlos School of
Engineering, University of São Paulo, São Carlos, SP, Brazil
- P30 **Modified Poly(ϵ -caprolactone)s: An Efficient and Renewable Access via Thia-Michael Addition and Baeyer–Villiger Oxidation**
Matthias Winkler, Yasmin S. Raupp, Hanna E. Wagner, Lenz A. M. Köhl,
Michael A. R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- P31 **Sustainable and Environmentally Friendly Alkylations of Phenols with Organic Carbonates and its Application on Organosolv Lignin**
Lena Charlotte Over, Oliver Kreye, Michael A. R. Meier, Institute of Organic
Chemistry, KIT, Karlsruhe, Germany
- P32 **Glycerol-mediated liquefaction of lignin residue for preparation of lignol**
Eun Yeol Lee, Department of Chemical Engineering, Kyung Hee University,
Gyeonggi-do, Republic of Korea
- P33 **Catalytic Carbonylation of Crude Algae Oil Lipids**
Sandra K. Hess¹, Philipp Roesle¹, Florian Stempfle¹, Julia Zimmerer¹, Stefan
Mecking¹, Daniela Ewe², Carolina Río-Bártolus², Bernard Lepetit², Angelika
Eckert², Peter Kroth², ¹ Department of Chemistry, ² Department of Biology,
University of Konstanz, Konstanz, Germany
- P34 **Synthesis of defined star polymers using ADMET-polymerization and post-polymerization modification via thiol-click chemistry**
Maike Unverferth, Michael A. R. Meier, Institute of Organic Chemistry, KIT,
Karlsruhe, Germany
- P35 **A SUSTAINABLE ROUTE TO TERMINAL EPOXIDES FROM FAMES**
Chiara Palumbo, Cristina Tiozzo, Rinaldo Psaro, Nicoletta Ravasio, Matteo
Guidotti, CNR-Institute of Molecular Sciences and Technologies, Milano, Italy
- P36 **Thermoplastic polyester elastomers based on plant-oil derived long-chain crystallizable aliphatic hard segments**
Brigitta Schemmer, Florian Stempfle, Stefan Mecking, Department of
Chemistry, University of Konstanz, Konstanz, Germany
- P37 **Use of waste frying oil for the biotechnological production of surface-active hydrolysates of industrial interest**
Ignacio Moya-Ramírez, Alejandro F. Arteaga, Manuela M. Lechuga-Villena,
Encarnación Jurado, Miguel García-Román, University of Granada,
Granada, Spain

- P38 **Two-phase olive mill waste as feedstock for biosurfactant production by *Bacillus subtilis* DSM 3526**
Danielle Maass¹, Ignacio Moya Ramírez¹, Alejandro F. Arteaga², Deisi Vaz², S. M.A. Guelli U. De Souza¹, R.C. S.C. Valle¹, Miguel García Román²,
¹ Federal University of Santa Catarina, Florianópolis, Brazil; ² University of Granada, Granada, Spain
- P39 **The Sustainable Derivatization of Starch with Organic Carbonates: Renewable Feedstock for the Chemical Industry**
Zafer Söyler, Michael A. R. Meier, Institute of Organic Chemistry, KIT, Karlsruhe, Germany
- P40 **New approach to monomer synthesis for polyamide production from local plant oils**
Christian Beck, Herbert M. Riepl, Weihenstephan-Triesdorf University of Applied Sciences, Straubing, Germany