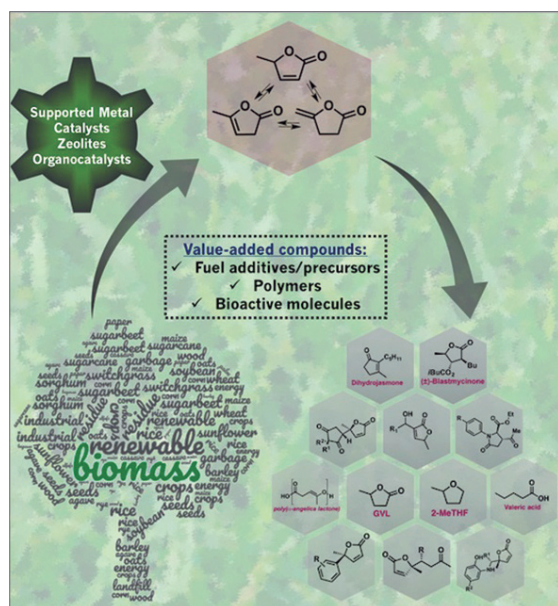


GREEN CHEMISTRY: SUSTAINABLE SYNTHETIC METHODS EMPLOYING BENIGN SOLVENTS, SAFER REAGENTS, AND BIO-RENEWABLE FEEDSTOCK

The Centre of Excellence for Research in Sustainable Chemistry (CERSusChem) is a GSK-FAPESP Engineering Research Centre whose core mission is to develop world-class research and, in addition, effective means for technology transfer and knowledge dissemination. Although CERSusChem headquarter is based at the Chemistry Department of the Federal University of São Carlos, it is composed by 18 faculty members from 5 different public universities: UFSCar, UNICAMP, USP, UNESP and UFSC. The Centre features novel strategies from across pharma, biotech and academia to meet current challenges in organic synthesis encompassing the principles of sustainable chemistry, which involves: organocatalysis, biocatalysis, multicomponent reactions, nanomaterials, photo- and electrochemistry, solvent-free approaches or use of biobased solvents, and new models for protein ligand assays. The technology transfer, education and knowledge dissemination actions aim to involve all segments of society, and special attention has been given to produce experimental training focused in qualifying industry employees and secondary school teachers.



Graphical abstract of the CERSusChem review: Lima CGS, Monteiro JL, Lima TD, Paixao MW, Correa AG. 2018 Angelica Lactones: From Biomass-Derived Platform Chemicals to Value-Added Products. *ChemSusChem*. **11**(1): 25-47. DOI: 10.1002/cssc.201701469

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ABOUT THE PROJECT

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Engineering Research Centers/Applied Research Center
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MAIN PUBLICATIONS

Jorge EYC, Lima TD, Lima CGS, Marchini L, Castelblanco WN, Rivera DG, Urquieta-Gonzalez EA, Varma RS, Paixao MW. 2017 Metal-exchanged magnetic beta-zeolites: valorization of lignocellulosic biomass-derived compounds to platform chemicals. *Green Chem*. **19**(16):3856-3868.

dos Santos DA, Deobald AM, Cornelio VE, Avila RMD, Cornea RC, Bernasconi GCR, Paixao MW, Vieira PC, Correa AG. 2017 Asymmetric synthesis and evaluation of epoxy-acyloxycarboxamides as selective inhibitors of cathepsin L. *Bioorg. Med. Chem*. **25**(17): 4620-4627.

Saba S, Rafique J, Franco MS, Schneider AR, Espindola L, Silva DO, Braga AL. 2018. Rose Bengal catalysed photo-induced selenylation of indoles, imidazoles and arenes: a metal free approach. *Org. Biomol. Chem*. **16**(6):880-885.

SUMMARY OF RESULTS

In its initial two years, the CERSusChem activities have been focused on the development of stereoselective, eventually one-pot, sequences leading to complex hybrid molecules. These approaches enable the incorporation of different molecular fragments into a single skeleton at a very low synthetic cost. Thus, by using organocatalysts, new bioactive compounds such as natural product-like hydroquinolines, hydantoins, γ -butenolides, triazoles, and peptidomimetics have been efficiently prepared. Furthermore, employing photochemical approaches allowed us to successfully achieve important *N*-heterocycles. Studies with nanomaterials has allowed to contribute in different areas, including the upgrading of biomass-derived compounds. Concerning the biocatalysis, results on nitrile hydratases, transaminases and imine reductases have showed that those are able to promote reactions with high selectivity. The anchoring of target enzymes in solid matrixes and their use in bioaffinity chromatography is also promising. Regarding the transfer of knowledge and technology activities, one of the highlights is the webinar program, with broad audience in academy and industry.