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### Development of biopolymers and biomaterials from lipids

In recent years, the use of renewable natural resources have become the focus of research in supplementing and replacing traditional petrochemical products due to growing energy demands and environmental concerns. The utilization of lipids has been considered to play a primitive role towards sustainable development due to their large scale availability, built-in-functionality, biodegradability and no net CO<sub>2</sub> production. In addition, a broad range of monomers can be obtained from lipids as a single feedstock. These attributes make lipids a good fit for the development of renewable biomaterials. This Presentation will focus on the conversion of lipids, from various sources including waste streams such as waste cooking oil and lipids extracted from spent foul, into monomers, biopolymers and bionanocomposites using our patented technology. The ability for complete conversion of oils in just few minutes under solvent free conditions into monomers, biopolymers and bio-nanocomposites is undoubtedly an attractive concept from both an academic and an industrial point of view.

### Recent Publications

1. Jin, L.; Zeng, H.; Ullah, A. Rapid Copolymerization of Canola Oil Derived Epoxide Monomer with Anhydrides and Carbon Dioxide (CO<sub>2</sub>), *Polymer Chemistry*, 2017, Accepted DOI: 10.1039/C7PY01429E.
2. Jin, L.; Geng, K.; Arshad, M.; Ahmadi, R.; Ullah, A. Synthesis of Fully Biobased Polyesters from Plant Oil, *ACS Sustainable Chemistry & Engineering*, 2017, In Press; <http://dx.doi.org/10.1021/acssuschemeng.7b01668>.
3. Ahmadi, R.; Ullah, A. Microwave-assisted rapid synthesis of a polyether from a plant oil derived monomer and its optimization by Box–Behnken design, *RSC Advances*, 2017, 7, 27946–27959.
4. Ullah, A.; Arshad, M. Remarkably Efficient Microwave-Assisted Cross-Metathesis of Lipids in Solvent Free Conditions, *ChemSusChem*, 2017, 10, 2167-2174.
5. Arshad, M.; Pradhan, RA.; Ullah, A., Synthesis of lipid-based amphiphilic block copolymer and its evaluation as nano drug carrier, *Mater. Sci. Eng. C.*, 2017, 76: 217-223.

### Biography

Aman Ullah received his PhD (with distinction) in Chemical Sciences and Technologies in 2010 at the University of Genova, Italy by working together at Southern Methodist University, USA. He worked as a postdoctoral fellow before accepting an Assistant Professor position at the University of Alberta. He has recently developed and is teaching a new graduate course entitled "Renewable Biomaterials". This course deals with fundamentals in bio-based materials development, characterization, and various industrial applications. Current research, recent literature, and real-life applications of biomaterials/bionanomaterials in various industries are discussed throughout the course. Aman has published more than 45 papers in reputed journals and 3 patents/patent applications. He was named a Canadian Rising Star in Global Health by Grand Challenges Canada in 2012.

### Notes:

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