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## Rapid conversion of lipids into biopolymers and conjugates

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Solvent free conversion of canola oil and fatty acid methyl esters (FAME's) derived from canola oil and waste cooking oil under microwave irradiation demonstrated dramatically enhanced rates. The microwave-assisted reactions lead to the most valuable terminal olefins with enhanced yields, purities and dramatic shortening of reaction times. Various monomers/chemicals were prepared in high yield in very short time. The complete conversions were observed at temperatures as low as 50°C within less than five minutes. The products were characterized by GC-MS, GC-FID and NMR. The prepared monomers were further converted into biopolymer and characterized in detail. In another approach, amphiphilic ABA type PEG-Lipid conjugated macromolecules have been synthesized using the copper-catalyzed azide-alkyne cycloaddition commonly termed as "click chemistry. Characterization of the conjugates has been carried out with the help of 1H-NMR, FTIR and GPC. The conjugates were evaluated for the encapsulation and release of an anticonvulsant drug (carbamazepine) as a hydrophobic drug model in the study. The micellization, drug encapsulation and release behavior of macromolecules was investigated by dynamic light scattering (DLS), transmission electron microscope (TEM) and fluorescence spectroscopy. From the results, it has been concluded that the nanoparticles had different average sizes due to different ratio of hydrophilic contents in the conjugate backbone. The amphiphilic particle size and structure could be altered by changing the ratio of hydrophilic and hydrophobic contents. The *in vitro* drug encapsulations highlighted that all the drug-loaded micelles had spherical or near-spherical morphology. *In vitro* drug release study showed the controlled release of hydrophobic drug over a period of 50 hours. The results indicate that there is great potential of renewable lipid-based micelle nanoparticles to be used as hydrophobic drug carriers.

### 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 is currently working as an Assistant Professor at the Department of Agricultural, Food and Nutritional Science, University of Alberta. He has published more than 25 papers in reputed journals and 3 patents/patent applications. He was named a Canadian Rising Star in Global Health by Grand Challenges Canada.

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