metals introduced during the saponification process play a direct role as catalysts during the reaction. This research investigated the effect of metal ion composition on the decarboxylation percentage of MBS and the level of unsaturation in producing green diesel. The results showed that composition of the metal mixture certainly affects the liquid product of metal basic soap as observed by the analysis of percentage decarboxylation results. Out of the three Mg-Zn basic soaps produced, the metal basic soap prepared with the 9:3 mole ratio of Mg to Zn was observed to archive a higher percentage of decarboxylation with 31.26%. Except Mg, the quantity of the other metal used; in this instance Zn, seemed to affect the level of unsaturation of fatty acid chains as the peaks observed on the FTIR spectra of liquid products seem to diminish. The findings indicate that controlling the metal ion composition can help optimize the decarboxylation process and enhance the alkane to alkene fraction of green diesel production.

Key words:
Green diesel, Metal basic soap, Decarboxylation, Unsaturation, Metal ion

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Electropolymerization of EDOT (3,4-Ethylenedioxythiophene) with Berberine isolated from *Coscinium fenestratum*

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D-A type polymers (Donor –Acceptor) are the third generation of the ECPs (Electronically Conducting Polymers) and used in optoelectronic devices and bio imaging techniques. Electropolymerization has become a convenient method for synthesizing and characterizing them and leads to synthesize stoichiometrically controlled block copolymers. Currently available D-A type ECPs utilize synthetic D and A materials although there are many naturally available materials that fulfil requirements as A or D units and it would open up horizon of a novel area of materials designed. This study extended to form acceptors isolated from natural products and chemically modified to attach suitable donor segments which is beneficial in bypassing tedious chemical synthesis strategies involving expensive and hazardous chemicals. Berberine (9,10-dimethoxy-5,6-dihydro-2H-7λ5- [1,3] dioxolo[4,5-g] isoquinolino[3,2-a] isoquinolin-7-ylium) which is an extendedly conjugated cation with an electron-rich methylenedioxy and methoxy donor (D) moieties and electron-deficient isoquinolium acceptor (A) moieties, was isolated from methanolic extract of the stem of *Coscinium fenestratum* and the structure was confirmed by 1H-NMR spectroscopic data. Electro polymerization with ethylenedioxythiophene (EDOT) give novel D-A type polymers. In the investigated potential range irreversible peaks which are lower potential than the monomer was observed at +0.8 V and +1.7 V in the first scan. During successive scans, their height was found to increase through the next cycles. The morphological structure of the polymer confirmed that the structure of polymer is different than monomer structure. The advanced functional materials thus derived from natural products will be important as future optronic and photonic devices for myriad of applications in optical, electronic, bio-imaging, disease diagnosis and treatment technologies.

Keywords:
Berberine, *Coscinium fenestratum*, electro-polymerization, 3,4-Ethylenedioxythiophene, advanced functional materials