

NOVEL SULFONATED IONIC LIQUIDS AS EFFECTIVE CATALYSTS FOR MILD ESTERIFICATION TO ETHYLESTER BIODIESEL

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Recently it became known that second generation biodiesel produced from waste nonedible animal fats and vegetable oils containing approximately 1-30% of free fatty acids could serve as competitive locally produced liquid fuel useful e.g. to drive agricultural machinery. Because methanol used for production of fatty acid methylesters (FAME) or animal fat methylesters (AFME) is produced from natural gas, there is a need to substitute it for more renewable bioethanol. This work focuses on the development of cheap, stable, and very effective ionic liquids used as homogeneous acidic catalysts useful for cleaner, and cheaper production of FAEE – fatty acid ethylesters from free fatty acids. Five prepared ionic liquids, isolated and characterized by NMR, HPLC, TLC, MS, and melting points, remain separated after cooling down the esterification mixture, this being homogeneous at the reaction temperature. Ionic liquids were not detected using MS in produced biodiesel. Using these easy melting solids as catalysts, conversion of oleic and palmitic acids to FAME or FAEE was monitored using original HPLC MS method. Yields over 90 % were obtained after a few hours of reflux. Catalyst stays fully active after 4 regeneration cycles.

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