Hydrothermal and assisted microwaved syntheses of Stanno and Yttrium metallosilicates as heterogeneous catalyst for biodiesel production and environmental remediation.

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This study reports the synthesis, physicochemical characterization by X-ray powder diffraction (XRD), scanning electron microscopy (SEM) and solid-state MAS NMR (^{1}H, ^{23}Na, ^{29}Si and ^{89}Y and ^{119}Sn MAS NMR) of a stanno and yttrium metallosilicate and their application as a heterogeneous catalyst for biodiesel production via ethanolysis and methanolysis routes using edible, non-edible an waste oils as feedstocks and environmental remediation. Heterogenous catalytic studies in the transesterification of refined edible, non-edible, and waste oils have resulted in high yields of FAMEs and FAEEs (fatty acid methyl and ethyl esters), nevertheless the highest FAMES (98.2%) and FAEEs (96.6%) yields were obtained for non-edible microalgae oil extracted from the genetically modified heterotrophic algal strain *Prototheca moriformis*. Catalytic studies also using non-edible macaw palm oil (*Acrocomia aculeata*) with a high content of free fatty acids (FFAs) demonstrated that the catalyst could simultaneously perform esterification and transesterification reactions using using different sources of lipids feedstocks, notably those that do not compete with food production [1]. On the other hand, Yttrium metallosilicate were very efficient in the separation, binding and chemical stabilization of hazardous inorganic, organic and radioactive species such as lead ($Pb^{2+,}$ Cd^{2+}, Ba^{2+} , Cs^{+} and Sr^{2+}) in aqueous systems.

1.Da Silva, A., Santisteban, A.N., Vasconcellos, A., Paula, A.S., Giotto, Aranda, D.A.G., M.V., Jaeger,C., and Nery, J.G. Journal of Environmental Chemical Engineering. https://doi.org/10.1016/j.jece.2018.08.047

Financial Support: FAPESP, CNPq and Capes