Potential of Bio-char from Microalgae as a Heterogeneous Acid Catalyst for Biodiesel Production

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Biodiesel is an attractive alternative to fossil fuel because of its similar characteristics to petro-diesel, its manufacturing processes generally contain a step carried out by either alkaline or acid homogeneous catalyst. However, the conventional liquid catalyst must be removed by a rather complex purification process. Solid heterogeneous catalysts have a potential to overcome these problems, strong acidic ion exchange resins and inorganic-oxide solid acids were studied but those have some undesirable characteristics, such as high cost, low activity, etc. In this study, bio-char from microalgae was tested as a potential matrix to be used for solid acid catalyst. The bio-char based catalyst was prepared after reacting bio-char with sulfuric acid and was tested catalytic activity for transesterification of tri-olein and esterification of oleic acid using methanol. The potential of bio-char as a heterogeneous acid catalyst for biodiesel production was higher than that of Nafion, a representative strong acidic ion exchange resin.