

Preparation of solid catalyst using scallop shells for biodiesel production from waste coffee grounds via one-step direct process

손은경, 임가희, 염승호<sup>†</sup>

강릉원주대학교

(shyeom@gwnu.ac.kr<sup>†</sup>)

Solid catalysts have many advantages over homogeneous chemical catalyst; easy separation and repeated use. Solid catalysts for biodiesel production was manufactured by calcination scallop shells at 700 °C for 4 h, and the major composition of the resultant catalysts was calcium oxide (98.4%). Waste coffee grounds with 13.5% of lipid content was used as a feedstock for biodiesel via one-step direct process where lipid extraction and transesterification of the lipids with methanol are conducted simultaneously in a reactor. Six factors including catalyst concentration, methanol loading, n-hexane loading, temperature, time, and agitation speed were considered. Among the factors, catalyst concentration was the most dominant one. Unlike homogeneous catalysts, agitation speed and temperature were significant on biodiesel yield. Optimal conditions for biodiesel yield was determined, and the highest biodiesel yield (9.1%) was obtained under the optimal conditions.