

Enzymatic biodiesel synthesis from canola oil in supercritical carbon dioxide

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Enzymatic synthesis of biodiesel from canola oil using different immobilized enzymes (Novozym 435, Lipozyme TL IM, Lipozyme RM IM) under supercritical carbon dioxide (ScCO₂) has been studied. ScCO₂ is especially favored among media, because it is non-toxic, nonflammable and suitable for easy separation of products (biodiesel and glycerol). The reaction conditions of pressure, enzyme loading amount (%), temperature, agitation speed, time and methanol/oil molar ratio were 100 bar, 35%, 50°C, 300 rpm, 3 hr, and 3, where methanol was added stepwise to alleviate substrate inhibition of the enzyme by methanol. Among tested enzymes, Lipozyme TL IM showed the highest conversion (86.9%) under the reaction conditions, showing potential as a low-cost biocatalyst for biodiesel production.