

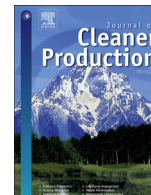


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# Journal of Cleaner Production

journal homepage: [www.elsevier.com/locate/jclepro](http://www.elsevier.com/locate/jclepro)



Note from the field

## Utilization of palm fatty acid distillate in methyl esters preparation using $\text{SO}_4^{2-}/\text{TiO}_2\text{--SiO}_2$ as a solid acid catalyst



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### ARTICLE INFO

#### Article history:

Received 28 July 2015

Received in revised form

17 December 2015

Accepted 29 December 2015

Available online 7 January 2016

#### Keywords:

Biodiesel

Methyl ester

Palm fatty acid distillate

Sulphated solid acid

Response surface methodology

Fine chemical

### ABSTRACT

The use of by-products, particularly in the biodiesel industry, has gained much attention owing to their potential in countering higher feedstock costs. A low-value by-product of palm oil refining, the palm fatty acid distillate (PFAD), was utilized as a feedstock for biodiesel preparation with the aid of a solid acid catalyst,  $\text{SO}_4^{2-}/\text{TiO}_2\text{--SiO}_2$ . A central composite design is applied to optimize the major influential manipulate variables. The analysis of variance identifies the methanol/PFAD molar ratio as having a dominant effect on methyl ester conversion, followed by catalyst amount and reaction time respectively. The utilization of PFAD with the aid of a solid acid catalyst results in  $93.3 \pm 1.02\%$  conversion at the most optimized reaction conditions of  $2.97 \pm 0.04$  wt% for the catalyst amount,  $5.85 \pm 0.14$  methanol/PFAD molar ratio and  $3.12 \pm 0.14$  h of reaction time.

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