Production of Biodiesel through Transesterification of Palm Oil Using Waste Eggshells Catalyst

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Abstract

The aim of this research was synthesized biodiesel from palm oil using transesterification calcium oxide from various eggshells catalyst. The chicken, duck, ostrich, quail, and crocodile eggshells were heated at 1300 °C for 4 h. The ratio of methanol, palm oil and calcium oxide from eggshells were 10 g, 3.0 ml and 0.8 g, respectively. The temperature of biodiesel synthesis was control at 65 °C for 3 h. The properties of biodiesel from eggshells catalyst and commercial were characterized by UV-vis spectroscopy, Fourier transform infrared spectroscopy (FTIR) and nuclear magnetic spectroscopy (NMR). The UV-vis and FTIR results show that the biodiesel synthesized from all eggshells catalyst were corresponding with commercial biodiesel. The NMR results show that the yield of biodiesel from CaO of Chicken eggshells catalyst had higher than other eggshells. This research shows that the CaO from waste eggshells catalyst can be used transesterification of biodiesel.

Introduction

Experiment

Results and Discussions

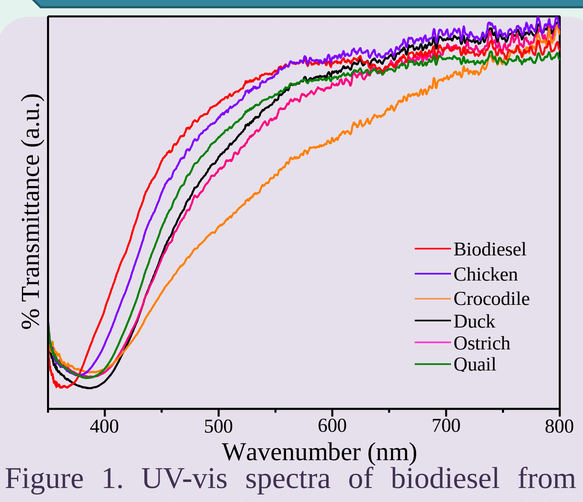

Figure 1. UV-vis spectra of biodiesel from palm oil using various eggshells catalyst and commercial.

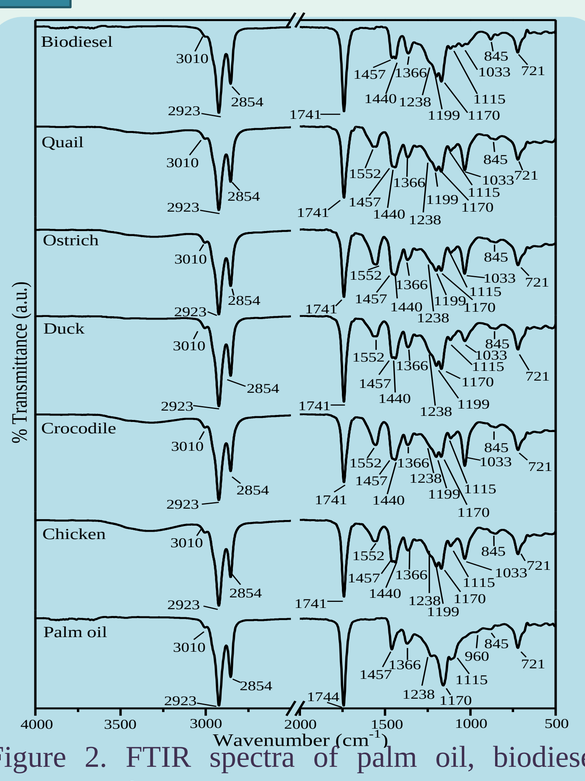

Figure 2. FTIR spectra of palm oil, biodiesel from palm oil using various eggshells catalyst and commercial.

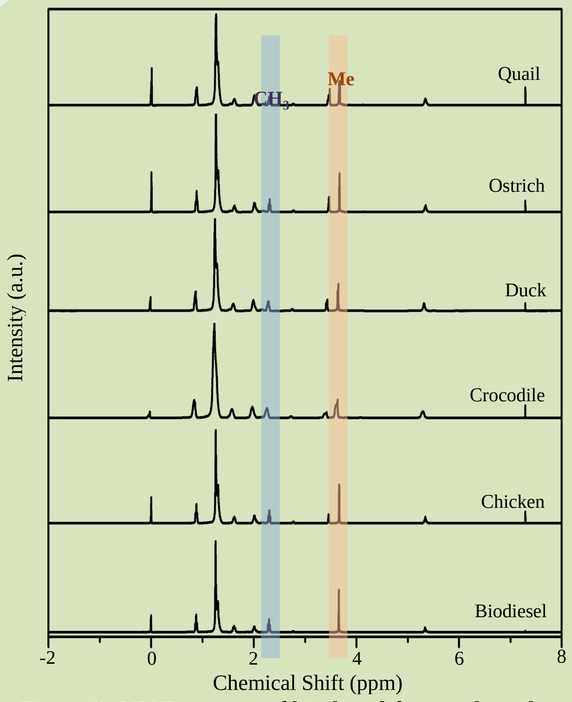

Figure 3. NMR spectra of biodiesel from palm oil using various eggshells catalyst and commercial

% yield of biodiesel

Area of methoxy group

$$C = 100 \times \frac{2A_{Me}}{3A_{CH_3}}$$

Area of methelene group

Table 1 show that the yield of biodiesel

Types of Biodiesel	The yield of Biodiesel(%)
Commercial Biodiesel	97.97
Chicken egg shell	99.77
Crocodile egg shell	99.03
Duck egg shell	98.72
Ostrich egg shell	98.47
Quail egg shell	98.43

Conclusion

In the present studied various waste eggshells have been prepared and used catalyst for the transesterification of palm oil. The yields of biodiesel from all eggshells were higher than commercial biodiesel. The chicken eggshells could be catalyzed for transesterification of palm oil was more than 99% and highest than others. The experiment shows that the waste eggshells can be used to a catalyst for the transesterification of industrial palm oil.

Acknowledgements

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