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Data Article

Experimental data of thermal cracking of soybean oil and blends with hydrogenated fat

R.F. Beims [a], V. Botton [a], L. Ender [a], D.R. Scharf [b], E.L. Simionatto [b], H.F. Meier [a], V.R. Wiggers [a,*]

[a] Chemical Engineering Department, University of Blumenau, Blumenau, SC, Brazil
[b] Chemistry Department, University of Blumenau, Blumenau, SC, Brazil

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ABSTRACT

This article presents the experimental data on the thermal cracking of soybean oil and blends with hydrogenated fat. Thermal cracking experiments were carried out in a plug flow reactor with pure soybean oil and two blends with hydrogenated fat to reduce the degree of unsaturation of the feedstock. The same operational conditions was considered. The data obtained showed a total aromatics content reduction by 14% with the lowest degree of unsaturation feedstock. Other physicochemical data is presented, such as iodine index, acid index, density, kinematic viscosity. A distillation curve was carried out and compared with the curve from a petroleum sample.

Specifications Table

Subject area	*Alternative fuels*
More specific subject area	*Thermal cracking (pyrolysis) of triglycerides*
Type of data	*Figures and tables*

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* Corresponding author.
E-mail address: vwiggers@furb.br (V.R. Wiggers).

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How data was acquired	*Experiments and physicochemical analysis*
Data format	*Raw and tabulated data collection*
Experimental factors	*Yield of thermal cracking fractions (coke, bio-oil and bio-gas) and physico-chemical properties of the products*
Experimental features	*Thermal cracking of triglycerides with different degrees of unsaturation (soybean oil and blends of soybean oil and hydrogenated fat)*
Data source location	
Data accessibility	*Data is with this article*
Related research article	*Beims et al., Effect of degree of triglyceride unsaturation on aromatics content in bio-oil* [1].

Value of the data

- This data provides a comparison between the thermal cracking of triglycerides with different degrees of unsaturation.
- Information regarding aromatics content due to different degrees of unsaturation in the triglycerides.
- The data presented details physicochemical properties of the bio-oil generated.

1. Data

Fig. 1 illustrates the main dimensions of the thermal cracking reactor. Table 1 presents the yields of bio-oil, bio-gas and coke, as well as the operational conditions of each experiment. Table 2 shows the physicochemical properties of the bio-oils produced. Table 3 describes the fatty acids distribution in soybean oil. Table 4 has the oxygen content of bio-oil and bio-gas produced. Gas chromatography methods employed are described in Table 5. The bio-gas composition of each sample (Table 6) and the compounds distribution by carbon number (Table 7) were measured. The aromatic content in bio-oil is presented in Table 8 and the carboxylic acids in Table 9. Table 10 presents the distillation curve as well as the properties estimated through its data.

2. Experimental design, materials, and methods

2.1. Materials

Experiments were carried out with soybean oil and blends of commercial soybean oil with hydrogenated fat. The sample called SO 100 is composed entirely by soybean oil, while SH 90:10 and SH 80:20 are blends of soybean oil with hydrogenated fat (derived from soybean oil). The first blend has 10% (weight) of hydrogenated fat and the latter has 20% (weight).

2.2. Methods

All samples were fed in the reactor at 90 °C. Once hydrogenated fat is solid at room temperature, the preheat was necessary to maintain in the liquid state and avoid clogging in the reactor.

2.3. Thermal cracking reactor

Thermal cracking experiments were performed in a plug flow reactor, under isothermal and steady-state conditions (Table 1). It was considered similar operational conditions to all samples

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