

Dedication

To my family

To my fiance

Acknowledgment

All thanks to Almighty Allah the Sustainer of the Universe. I would like to express my gratitude to my supervisor, Dr. Elfatih Ahmed Hassan for standing beside me during this study and providing me with scientific support to conduct this work.

I am ever so grateful to my dearest parents who have supported, encouraged and inspired me endlessly throughout my life.

Abstract

The aim of this work was to explore conversion of oil extracted from the seeds of *Balanites aegyptiaca* in to biodiesel. The sample of *Balanites aegyptiaca* fruits was collected from Khartoum state. Normal hexane was used to extract the oil and the oil content of seed was found to be 30% (w/w). Physicochemical studies were conducted on the extracted oil, such as free fatty acid, density, viscosity, color, moisture content, and refractive index. The results were found 1.53%, 0.945 g/cm³, 11cps, 3, 0.0%, 1.47 respectively. The oil was subjected to IR analysis where the active functional groups were determined. The extracted oil was converted into biodiesel using transesterification reaction. The product was subjected to IR and GC-MS analysis. The major components in the biodiesel were found to be: 9-octadecenoic acid amounting to 44.64%, Linolic acid amounting to 43.33%, Hexadecanoic acid amounting to 6.581%, Octadecanoic acid, methyl ester amounting to 5.451%. The results showed that the prepared biodiesel was of good quality.

مستخلص البحث

هدف هذه الدراسة بحث إمكانية تحويل الزيت المستخلص من بذور شجرة الهجليج إلى وقود حيوي. تم جمع عينات ثمرة شجرة الهجليج من ولاية الخرطوم. أستخدم الهكسان لإستخلاص الزيت منها ووجد أن محتوى الزيت في البذره 30%(وزن\وزن). أجريت الإختبارات الفيزيوكيميائية على الزيت المستخلص، مثل الأحماض الدهنيه الحرة، الكثافه، اللزوجه، اللون، محتوى الرطوبه، ومعامل الانكسار. وجدت النتائج 1.53%، 0.945(جرام\سم³)، 11، 3، 0، 1.47 على التوالي. تم تحليل الزيت بجهاز الأشعة تحت الحمراء. تم تحويل الزيت المستخلص إلى وقود حيوي عن طريق الأستره في وسط قاعدي وتم التحليل بتقنية الأشعه تحت الحمراء وكروماتوغرافيا الغاز\ومطيافية الكتله حيث تم تحديد المكونات الأساسية في الوقود الحيوي والتي كانت:

9-octadecenoic acid وبلغت نسبته 44.64%.

Linolic acid وبلغت نسبته 43.33%.

Hexadecanoic acid وبلغت نسبته 6.581%.

Octadecanoic acid, methyl وبلغت نسبته 5.451%.

أوضحت النتائج أنه وقود حيوي ذو خصائص جيدة.

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