ENERGY CONSERVATION THROUGH EXTRACTION AND CHARACTERIZATION OF OIL FROM THE SEED OF GLYCCINE MAX L. MERILL (SOYA HE AN)

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Abstract

The combustibility oh soya bean oil was investigated as a possible replacement tor gasoline. The Demethyl ether extract of the soya bean in extractor gave as high as 45% \v/\v yield. Measurement of the acid content, saponification value, iodine valve, viscosity, specific gravity and refraction under were investigated. The flash point of 535"C, ignition temperature of 612”C. and smoke density of 1.65 luxg"^{1} were obtained.

Introduction

Renewable energy resources which are cost effective, available in adequate amount tint! do not degrade the environment are primarily requisites for the stable use of planet earth by man (Alonja. 1972). Increasing levels of air pollution caused by automobile exhaust, the inexorable rise in carbon dioxide from the burning of fossil [fuel] anti major economic dislocations which have resulted from dramatic rises in the cost of petroleum, all call for major and worldwide remedies (Alonja, 1972).

Biomass conversion of soya bean oil effected by processes which can be carried out on a huge scale in the near future. It can protect, rehabilitate and develop hinds, anti produce significant amount of liquid fuel at production cost which makes them competitive with gasoline (Maishanu et al, 1990),

The production of fuel from soya bean oil can go a long way in reviving agricultural economics, creating new jolts and transforming the country from a condition of a economic dependency to one which creates new wealth (Debussy, 1995).

Bio mass derived soya bean fuel can be an ideal substitute for gasoline. It is an unusually dean anti non-polluting fuel, contributing none of the oxides of sulphur and little nitrogen (Akpabio et al, 1992).

A major portion of our energy need is liquid. This can be stored, transported and suitable for vehicular propulsion. Soya bean oil is the principal candidate for this situation.

Experimental Materials and Method

The soya bean seeds were bought from Gwagwalada market in the Gwagwalada Area Council in the Federal Capital Territory. 1kg cost N50.00 anti was used for this experiment. The seed was ground in mortar and pestle to ensure pulverization.

Extraction

50g. of the pulverized seed was extracted with 300m'' petroleum ether (40-60"C) extractor for 10 hours and the boiling point of the solvent. The extract was filtered and the oil was concentrated using rotatory vacuum distillatory at 50". The concentration of the oil was repeated until a constant weight was obtained.

Analysis

The viscosity of the oil was determined by standard technique (Aliyu. 2000) using ostward capillary viscometer. I he density of the oil was also determined using specific gravity bottle while refractive index was measured at 25"C using an Abbe

60/1T) Refractometer and sodium vapour lamp (Aliyu. 2000, Dutla. 1979; lUPAC, 1997), The colour of the oil was determined visually. Ail measurements were taken at the laboratory temperature.

The acid valve, saporification, iodine and acidity were determined by standard method (Pearson, 1996), The k, Na and Ca were determined by ‘lame photometry while Fe, Mn and Xn were determined by atomic absorption spectrometer.

Smoke densitv was measured using smoke density meter while ignition temperature was measured using electric immersion technique. The specific heat was determined using adiabatic ealometer with prop. The validity and; precision of the result were ensured lyv taking triplicate reading

of samples and of blank of each for parameter determined. The consistence of the result is compared with that obtained from colen metry method.

Results and Discussion

The result of the analysis of the oil content is given in the table below:

Table 1: Physical and Chemical Characteristics of Oil From Glycine Max L. Merill Seed

Characteristic	Mean
Oil content (%m/m)	42.5
Ash content (g)	0.15
Crude fibre (g)	0.20
Refracture under 3°c	0.20
Saponification value	175
Solubility in alcohol	Complete
Viscocity	7.2
Iodine valve	86
Density g/m/l	1.02
Nitrogen	0.01
Mg (mg/l)	$3x10^{-3}$
K (mg/l)	1.gm
Fe (mg/l)	Nil
Odour	Pleasant
Smoke density lukg^{-1}	1.65
Flash point	533
Fire point	612

The result revealed that the oil content of the seed is very high and about 42.5% comparable with the level in principal oil hearing seed. The smoke evolution from the oil and measurement noxious materials that goes into the atmosphere during combustion had earlier been studied. The smoke density in the work stand at 1.67 as compared to zero value of methyl alcohol.

The flash point and ignition temperature were under considerable degree hence processes can be carried out in a large industrial scale in the near future to protect, rehabilitate and develop lands.

Conclusion

The analysis of oil from soya beam showed a good result, which can preside cheaper and better fuel for running engines. The knowledge of research work if developed and adapted can c long way in reducing pollution, the unending green house effect and economic stabi1ity.

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