Soybean oil could be a jet fuel

'Biodiesel Jet Fuels', a news written by Linda McGraw in Agricultural Research says that cleaner, greener jet fuels made from formulas that contain part soybean oil could clean up the air and give added profits to soybean growers in USA. With winterization processing, biodiesel fuel can be safely blended with jet-fuel used in commercial and military aircraft. Small amounts of methyl soyate (SME) — esters from fatty acids of soybean oil could be blended with jet fuel (JP-8) with little or no effect on aircraft operation.

A three-step winterization process for biodiesel fuel that involves mixing in additives, chilling the fuel and filtering out solids has been developed by ARS chemical engineer Robert O. Dunn. Researchers have produced biodiesel fuels capable of starting engines at temperature as low as 5°F, making them comparable to petroleum-based diesel fuels. Unwinterized biodiesel fuel blends limit the ability of aircraft to fly at high altitudes, where cold temperature can cause crystal formation which blocks fuel filters and plugs fuel lines. According to Dunn, "The most promising aspect of this work was finding that winterized SME did not form solid particles when exposed to a range of slightly below zero to –11°C in the laboratory". Other plus points of biodiesel fuel are: it reduces harmful exhaust emissions and is nonflammable, making it relatively safe to store and handle. It is also biodegradable [McGraw, *Agric Res*, 2001, **49**(7), 22].

Biodiesel from Sunflower oil

The high energy demand in the industrial world and the domestic sector, transport and industry, and the associated problems of widespread use of fossil fuels, makes it increasingly necessary to develop renewable energy sources.

Biodiesel obtained from energy crops has favourable effects on the environment, such as a decrease in acid rain and in the green house effect. Due to these factors and its biodegradability, the production of biodiesel is desirable. In addition, biodiesel decreases the emission of CO_2, SO_2 and unburned hydrocarbons during the combustion process.

Energy crops have been considered as one of the best alternatives in the agricultural sector. This work done by Antolin and others from Spain hopes to prove the feasibility of biodiesel production, from the point of view of the process technology and the use in diesel engines, as well as raw material availability, thus contributing to the development of this renewable energy source.

In this work the transformation process of sunflower oil to obtain biodiesel by transesterification was studied. Taguchi's methodology was chosen for the optimisation of the most important variables (temperature conditions, reactants proportion and methods of purification), with the purpose of obtaining high quality biodiesel that fulfills the European prelegislation with the maximum process yield. Finally, sunflower methyl esters were characterised to test their properties as fuels in diesel engines, such as viscosity, flash point, cold filter plugging point and acid value. Results showed that biodiesel obtained under the optimum conditions is an excellent substitute for fossil fuels [Antolin *et al*, *Bioresource Technol*, 2002, **83**(2), 111-114].

Sunflower