

Alternative Renewable Bio-Fuel Sources: Camelina Sativa and Switchgrass

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Image: BozemanChronicle/Eitel

INEOS Enterprises of the UK has entered into a partnership agreement with Great Plains-The Camelina Company for the purpose of expanding their bio-diesel enterprises world-wide. Great Plains-The Camelina Company is located in Montana and their achievements include establishing Camelina (oil seed) crushing machines and production facilities for creating bio-fuels. Switchgrass test plots at Auburn University have produced a five-year average of 11.5 tons of bio-mass equivalent to 1,150 gallons of ethanol per acre per year.

Camelina and Switchgrass are making news in the bio-fuel industry. Camelina is a seed crop whose history goes back some 3500 years in Europe. Camelina is rich in Omega-3 fatty acids and is currently undergoing various stages of research and development as a bio-fuel in the Pacific Northwest. Switchgrass has been used for years in many Western states farmers for livestock forage or for use as deterrence for soil erosion.

Camelina and Switchgrass have the advantage of being able to grow in arid conditions unsuitable for most food crops. It isn't an exaggeration to say that both crops grow like weeds almost anywhere and under the most harsh weather conditions. This is particularly true of Camelina which seems to have a high tolerance for cold weather.

According to the Department of Energy, Switchgrass has a distinct advantage due to its fast growing, low maintenance propensities and ability to absorb carbon dioxide as it grows. It has the ability to seek out water sources far beneath the soil surface and adds organic material to the soil as opposed to depleting it. Research is continuing in various labs including Auburn University to increase the yield and improve gasification technology. The goal is to create direct methods to produce alternative fuels like synthetic gasoline, diesel fuel, hydrogen and fertilizer, solvents and plastics. Additionally, Switchgrass is a suitable and stable feed crop.

According to Dr. Stephen Guy of the University of Idaho, Moscow the study of Camelina is relatively new. The University of Idaho has various test plots and the process of establishing yield and oil levels is on-going. During the first three years of study, Camelina has shown great potential. The current year conditions were extremely poor for Camelina. However, the test plots were still able to produce 1200 pounds per acre.

He states, " Camelina generally produces 35-percent oil content and I use

30-percent extractable to produce about 80-gallons per acre of oil. When converted to bio-diesel (90-percent), the yield is about 72-gallons per acre for a 2000 pound an acre yield. Research to improve yield and growth rates are on-going at various universities in the Pacific Northwest.

A European Union study entitled *Camelina Oil As A Fuel For Diesel Transport Engines* (doi:10.1016/S0926-6690(02)00098-5, 2003 Elsevier Science B.V.) demonstrated that Camelina seed oil produced a maximum power at the road wheels of 43.25kW and returned 12.57km/l compared to 38.50kW and 14.03km/l for mineral oil. At an engine speed of 2000 rpm and high loading, Camelina seed oil was found to produce 50-percent less CO₂ and smoke opacity than mineral oil emissions.

Testing is continuing along these lines in the United States. Another important aspect is the need to standardize all bio-fuel sources for use as gasoline or as an additive. Work in this area is currently underway. In June, 2008 Propel opened a Clean Fuel Point in downtown Seattle Washington. According to Green Car Congress, the Propel stations offers B5 and B20 diesel blends which include Camelina Sativa as well as other clean energy sources.

The State of Montana is sponsoring a series of workshops on Bio-Diesel Production on January 28-29, 2009 with keynote speakers from the University of Idaho, Montana State University and the National Bio-Diesel Education Program. A list of various events and symposiums on the subject may be found at Green Car Congress.

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