Biomass Fuels from Hemp - Seven Ways Around the Gas Pump

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Historically Hemp (Cannabis Sativa L.) has been a very high yielding Plant (Haney 1975). Assuming that hemp produces up to 4 tons/acre seed plus 10 tons/acre stalks. Table 1 shows how many gallons of liquid fuel import could be saved by each of the following proven conversion routes.

Table 1: Conversion technologies for hemp stalks and hemp oil

Conversion technology	Conversion efficiency	Gasoline equivalent
	%	Gal/acre
STALKS @ 10 tons stalks/acre		
1. Ethanol fermentation of hydrolyzed cellulose	20	200
2. Digestion of whole stalks to methane	50	500
3. Producer gas from thermal Gasification of stalks	85	1000
4. Methanol from syngas from gasification of stalks	65	750
5. Wood oil from fast pyrolysis of stalks	3	30
OIL SEEDS @ 4 tons seed/acre		
6. Hemp Seed oil from Seeds, no conversion	100	300
7. Biodiesel premium diesel fuel from hemp seed oil combined with methanol	90	270

Recent hemp yield data is largely unavailable, due to restrictions on the growth of hemp. Cultivation of hemp currently requires permits under Drug Enforcement Agency (DEA) form 225. Patented hemp seed varieties are now available in the EC and Eastern Europe which are effectively denatured and drug free. The hemp plant is a promising high yield biomass fuel crop cultivar and both production and utilization should be included in the DOE/TVA and regional biomass screening programs. One would hope that DOE regional biomass program contractors should not have difficulty qualifying for the necessary permits. Most of the conversion technologies in Table 1 are well known. Biodiesel from hemp is the newest conversion technology. Recently the Biomass Conference of the Americas (Biomass, 1993) had nearly a dozen papers presented on Biodiesel fuel. It was recommended that farmers in the Northwest could achieve energy self sufficiency by planting ten percent of their acreage in the oilseed crops sunflower or safflower to provide enough fuel for tractors, irrigation and combines. Sunflower and safflower yield typically 60 gallons per acre of vegetable oil. Hemp-seed yields giving up to 300 gallons of oil per acre have been reported (Haney, 1975) yet there was not one single mention of this promising fuel oilseed crop anywhere in the conference. *The* cost of oilseed fuels is linearly related to yield and farming cost. The cost of farming and pressing sunflower oil yielding 116 gallons/acre is $2/gallon (Peterson, 1981). Assuming that hemp will cost the same as sunflower to grow, a hemp seed yield of 4 tons/acre (Haney, 1975) produces 300 gallons of hemp seed oil at a cost of_$0.77 /gallon. This may make domestic hempseed oil fuelseed crops economically viable today.

REFERENCES:

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