

ЕВРОПЕЙСКИ СЪЮЗ



ЕВРОПЕЙСКИ ФОНД ЗА
РЕГИОНАЛНО РАЗВИТИЕ



РУМЪНСКО ПРАВИТЕЛСТВО



БЪЛГАРСКО ПРАВИТЕЛСТВО

Possibilities of biodiesel production and its use as automotive fuel in small and medium-sized farms



Общи граници. Общи решения.

Why we need alternative fuel for agricultural machinery?



Possibilities of using vegetable oils as source of energy

- Compatibility of alternative diesel fuel with conventional diesel engines;
- Selection of appropriate oilseeds suitable for production of this fuel and opportunities to use a wide range sources;
- Production organization and ensure the necessary amounts of plant oils;
- Efficient production facilities and technologies for the production of fuels based on vegetable oils;
- Opportunities for various period of time fuel storage without change fuel properties

Problems with the direct use of vegetable oils as fuel for diesel engines

- High viscosity of vegetable oils;
- Low volatility;
- Poor low temperature properties;
- Oxidative instability.





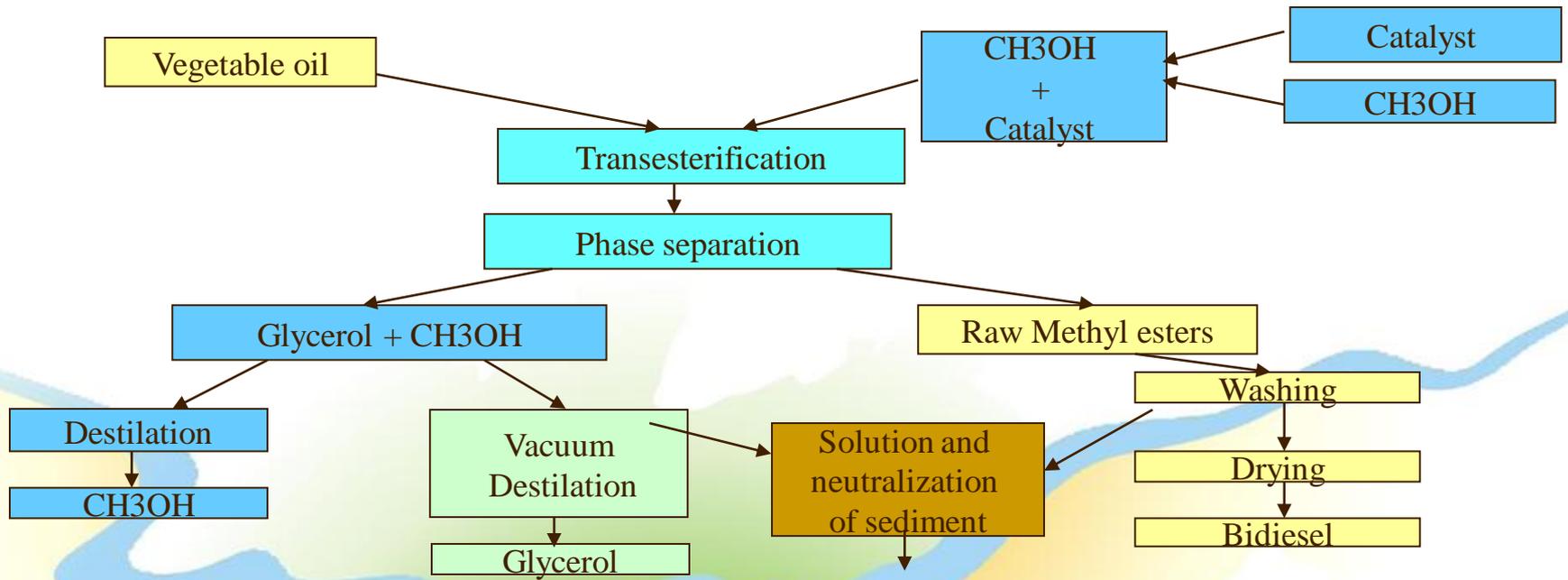
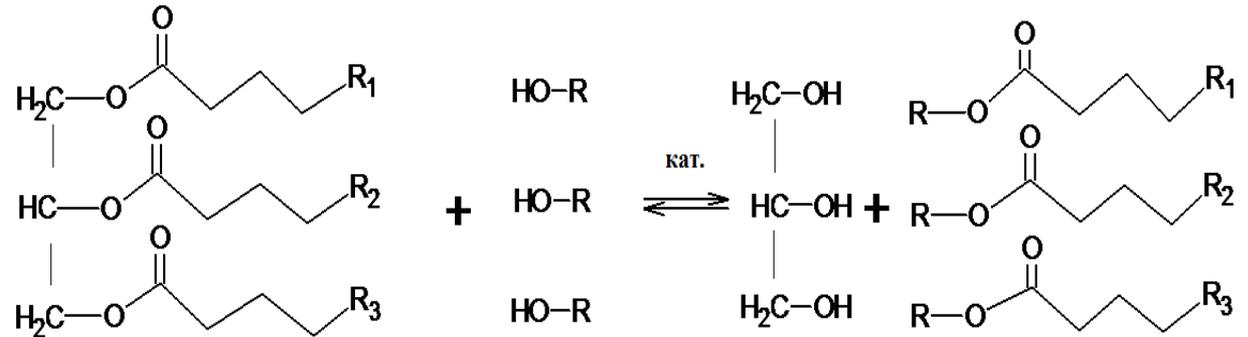
Vegetable oils used for biodiesel

	C16:0	C16:1	C18:0	C18:1	C18:2	C18:3
Sunflower oil	6,4	0,1	2,9	17,7	72,9	---
Soybean oil	13,9	0,3	2,1	23,2	56,2	4,3
Rapeseed oil	3,5	---	0,9	64,1	22,3	8,2
Palm oil	42,6	0,3	4,4	40,5	10,1	0,2
Cottonseed oil	28,7	---	0,9	13,0	57,4	---





Biodiesel





Compatibility between diesel fuel and biodiesel

Properties	Мерни единици	Дизелово гориво	Бидизел	Тест метод
Density at 15°C	kg/m ³	820-845	860-900	EN ISO 3675
Viscosity at 40°C	mm ² /s	2 - 4,5	3,5-5,0	EN ISO 3104
Flash point	°C	> 55	> 101	EN ISO 2719
Sulfur content	mg/kg	<10	< 10	EN ISO 20846
Carbon residue (at 10% distillation remnant)	% (m/m)	< 0,3	< 0,3	EN ISO 10370
Cetane number	-	>51	> 51	EN ISO 5165
Water content	mg/kg	< 200	< 500	EN ISO 12937
Total contamination	mg/kg	<24	< 24	EN ISO 12662
Copper band corrosion	Level	Клас 1	Клас 1	EN ISO 2160



Ecological effects of biodiesel usage as automotive fuel

Emissions kg/kg fuel	Diesel	B20	B100
CO ₂	8,529	7,50	3,423
Pollution emission	15,27 x10 ⁻³	14,21 x10 ⁻³	9,931 x10 ⁻³
SO ₂	3 x10 ⁻²	2,4 x10 ⁻²	---
NO _x	4 x10 ⁻²	4,04 x10 ⁻²	4,2 x10 ⁻²
Total	3,161	2,689	0,71



Economical impact of biodiesel

For processing of 1 ha (10 000 m²) of agricultural land are used on average 70-100 liters of diesel per year. The most common oilseeds in our country are sunflower seed and rapeseed. Average seed yields have been respectively 2500 to 2800 kg / ha of sunflower and 3000 to 4000 kg / ha of rapeseed. Obtained oils are 40-42 m/m %, and it is around 1000-1200 kg sunflower oil per ha and 1200-1600 kg rapeseed oil. If you keep spending norms using vegetable oil as an alternative fuel, this means that 1 ha of oil oilseeds would be sufficient to process 12 to 22 ha of farmland.

The current prices of biodiesel are in the range 1000 - 1150 € /t if rapeseed oil used, and in range 1200 - 1300 €/t for sunflower oil biodiesel. Methyl alcohol which is mostly used in transesterification have a price 400 to 450 € /t. Rough biodiesel price calculation is in the range of 1,100 to 1,150 € / t for rapeseed biodiesel and 1250 - 1300 €/t for sunflower biodiesel. When it is current excise duty on biodiesel in Bulgaria (290 € /t) added price reaches 1400 to 1450 €/t and 1550 to 1600 €/t for the two types of oils, respectively. These rates compared to current diesel prices in Bulgaria (1700 - 1750 €/t) show that the price of biodiesel is 10-20% lower than that of diesel. In practice, the price depends on the price of oil used and fuel prices could be adjusted when a wide variety of feedstock.



Conclusions

1. Biodiesel is a fully viable as alternative diesel fuel in pure form (in 100 %) or a mixture of biodiesel /diesel (B20, B50). This kind of fuel has a significant effect on emissions of greenhouse gases and pollution. Moreover, its complete degradation reduces the risk of contamination of soil and agricultural production.
2. On the other hand there is a possibility to use a wide range of vegetable oils for biodiesel and the price of this fuel is lower than that of diesel fuel, which would help to reduce costs of agricultural production.
3. Small and medium-sized farms could use part of its production of oil seeds for fuel obtaining, but it is necessary to build capacity for processing the seeds into biodiesel. This could happen in two ways:
 - Associations of several farms and construction of small plants that would provide "flexibility" in terms of raw materials;
 - Establishment of regional centers (plants) for processing of vegetable oils. They could buy oil seed production on the one hand and ensuring manufacturers fuel supply on the other.

The first case would be more effective in areas with fewer farms, while the second would contribute to the development of rural areas.

4. It's also important government policy on excise duties on biofuels. Low levels on excise duty or its abolition would have a positive effect on the production and use of this fuel, and hence the development of sustainable organic agriculture.

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