

ANALYSIS OF STATE IN BIODIESEL PRODUCTION IN SERBIA

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In this paper is presented production of sunflower, soy and rape in hectares, all being oil plants with excellent energy potential necessary in production of this eco-fuel. There are directions for development and the possibility that Serbia becomes a potential leader in the production of biodiesel. Studies, which are made for biodiesel, show that the total energy balance is positive, and for this reason given the material and energy balance of biodiesel production, starting from the plant remains to biodiesel as the final product.

Key words: Biodiesel, energy balance, production, energy, fuel.

ANALIZA STANJA PROIZVODNJE BIODIZELA U SRBIJI

U radu je prikazana proizvodnja suncokreta, soje i uljane repice u hektarima uljane kulture, koje imaju izuzetan energetski potencijal neophodan za dobijanje ovog eko-goriva. Prikazani su pravci razvoja i mogućnosti da Srbija postane potencijalni lider u proizvodnji biodizela. Studije, koje su rađene za biodizel, pokazuju da je ukupni energetski bilans pozitivan, pa je iz tog razloga dat prikaz materijalnog i energetskog bilansa proizvodnje biodizela, počevši od biljnih ostataka do biodizela kao finalnog proizvoda.

Ključne reči: biodizel, energetski bilans, proizvodnja, energija, gorivo.

INTRODUCTION

Demand for energy is growing continuously, as well as dependence on imported energy, which contributes to the development of the renewable energy sector. It is well known that transport almost completely dependent on fossil fuels. All efforts were consecrated to find such a point that would be tailored to existing structures engines, and at the same time meets the additional criteria related to renewing and ecology, as well as reliability and privacy (Al-Widian et al., 2002; Mushrush et al., 2001; Haas et al., 2001; Djajic, 2008).

Advances in technology and scientific knowledge contributed to the development of renewable energy sector, and oil still remains the main source of energy, whose production and consumption is growing from day to day. However, oil reserves are not eternal, and the world industry deals with all the serious search for alternative types of fuel (Bagley et al., 1998; Encinar et al., 1999; Mittelbach et al., 2001).

One of the most important renewable energy sources biomass, as the amount of energy that is periodically renewed and the relatively small cost of production, and collection. The great advantage of biomass is reflected in obtaining ecological alternative fuels, as one of the possible solutions more imposing biodiesel, fuel

processing plant origins and waste oils. The problems of implementation and production of biodiesel was in the works of authors (Cardone et al., 2002; Encinar et al., 2002; Tolmac, et al., 2005, Todorovic, et al. 2008).

Perspectives of use of biodiesel in city vehicles for public transport are researched in the papers (Tica et al. 2006).

MATERIAL AND METHODS

Area, yield, production of oil crops and biodiesel

With production of biodiesel in the world and in Serbia, there is a significant replacement landed properti area, because only the production of alternative energy sources, it is necessary to sow more land to soybean, oilseed rape, sunflower and other oil crops necessary for obtaining the bio-fuels. Serbia has a rich and long tradition in agriculture, excellent geographical position, the quality of the land and all the conditions necessary for the production of biodiesel. In Serbia, has about 4,2 million hectares landed properti surface. The

most to represent culture is corn that year sown to 1.2 to 1.3 million hectares of wheat and then that the average sown to about 600.000 hectares. Next fodder to 460.000 hectares, with 290.000 hectares of vegetables, sunflower, with about 220.000, with 140.000 soybean, sugar beet with about 70.000, barley on 50.000 hectares around, and every year between 170.000 to 200.000 hectares remain unsown. To meet the European standard for the production of biodiesel, Serbia must foster oilseed rape to at least 80.000 hectares. It is possible to achieve a reduction area under other oil grains, (Brkic et al., 2005; Furman et al., 1994; Samardzija et al., 2007, Djurin et al., 2007). Serbia is highly energy-dependent country for fossil fuel and every contribution to reducing energy dependence of exceptional importance for the Serbian economy. Considering the importance of vegetable oils and their production profitably from the fat of animal origin, area under oil plants significantly increase. The Figure 1, displayed the production of sunflower, soybean and oilseed rape in hectares in Serbia.

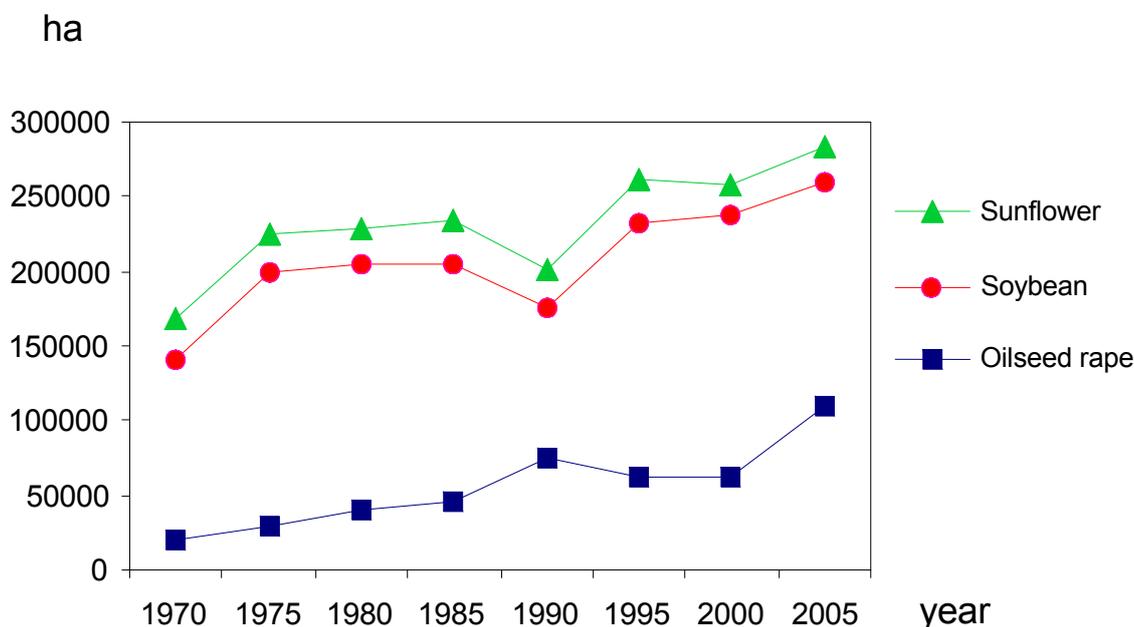


Figure 1. Production of sunflower, soybean and oilseed rape in Serbia

Key barriers to greater penetration of bio-fuels on the market are mostly large costs of production. Relationship between the producer price compared with fossil fuel currently ranges from 1.5 to 3 times more, and depending on the type of bio-fuels and the current price of crude oil. Wider use of bio-fuels (specifically biodiesel) is only possible if the implementation of

regulations and introduce certain economic measures. In this context, a key condition the market feasibility of biodiesel is an exception to the tax. Production of oilseed rape should be treated the same way as other oil-plant production.

In the year processing about 4 million tons of oil, of which 645.000 tons of domestic

production. To increase domestic production it is necessary to invest funds in new equipment and new technology for obtaining alternative sources. How is not yet used their opportunities for growing oilseed rape and the production of biodiesel, Serbia has excellent conditions (geographical position, land quality, highly educated professionals, and affordable prices of inputs) for the development of the business and great opportunities that they create export products.

The assessment was to be in Serbia for a period of five to seven years can produce raw materials that will be used for 30 biodiesel plant up to 10.000 tons of using 200.000 hectares of free land (Brkic et al., 2005; Prvulovic et al., 2008; Samardzija et al., 2007). Tools, by estimation, is huge:

- 300.000 tons of biodiesel,
- 450.000 tons bean seed,

- 36.000 tons of glycerin,
- 180 tons of lecitin which is important in the production of drugs.

RESULTS AND DISCUSSION

Energy balance

Complete assessment of the energy balance of fuel cycle includes not only the energy content of biodiesel and energy is spent in the production, but also energy that is absorbed / welcome by all the necessary process to reach the final product. Studies, which are made for biodiesel, show that the total energy balance (including extraction, rafinaciju and esterifikaciju) positive. In Figure 2 is a material and energy balance, which includes full valorization in the production of biodiesel, beginning of herb remains to biodiesel as the final product (Monyem et al., 2001; Rinaldi et al., 2007).

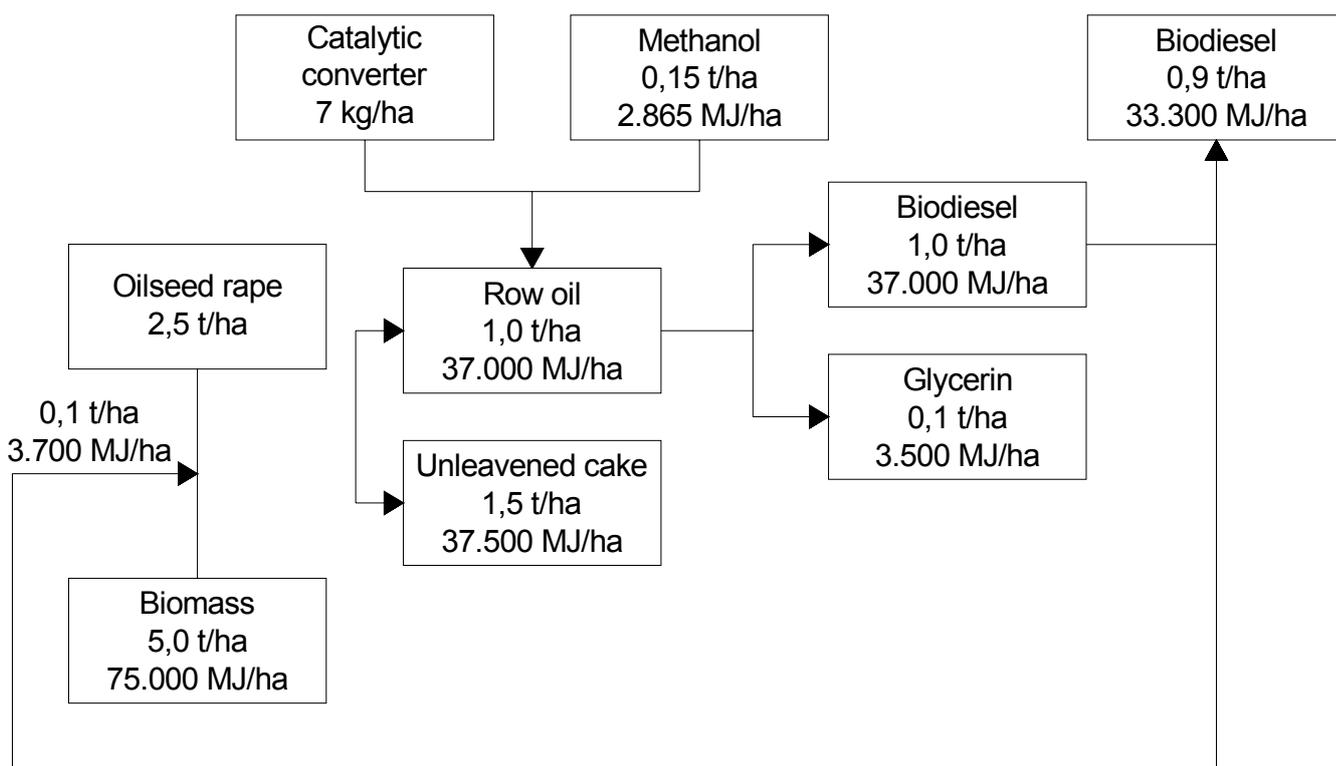


Figure 2. Material and energy balance of biodiesel production

Energy balance of oilseed rape is shown in Table 1, where the total energetsi entry includes (processing of land, fertilizer, agrochemical, seed, storage, transportation, processing-production), and the total energy output includes (biofuel, unleavened cake, stalks).

However, on one hectare of sunflower biodiesel receives less than oilseed rape, in which receives approximately one ton of biodiesel, but on the other hand using sunflower get more stalk, and used less fertilizer and agrochemistry (Duun, 2002; Gupta et al., 2007).

Table 1 - Energy balance for biodiesel made of rape in MJ / ha

The parameters	Values
Grain yield (t/ha)	2,5
The total energy input (MJ/ha)	-35.045
Total energy output (MJ/ha)	87.900
Net energy balance (MJ/ha)	52.855

The Figure 3, the blueprint obtained amount prikazana biodiesel from oilseed rape, which is sowing to one hectare area (Luiz Fernando, 2007; Schuchardt et al., 1998; Urioste Daniele et al., 2008). From the attached see that separates the cake as the rest, as a final product of biodiesel and glycerin.

CONCLUSOIN

Production and use of biodiesel is that the trend in Europe aiu world very present. Using biodiesel is very important that in the energy and ecology. Investment in research and exploitation of new oil sites from year to year

increasing, and therefore price, and liquid fossil fuels grows. A special problem is to provide a safe supply oil from the region with rich deposits. The alternative is biodiesel, which has the possibility to be mixed with fossil diesel in all segments. Can be used in engines without special intervention on the engine. In addition to the fact that biodiesel made from renewable raw materials (plant oils), as well as minor differences in the energy potential of fuel, it is clear that this is the right solution for a transitional period until operations other forms of energy and adequately adapt to the new engine design.

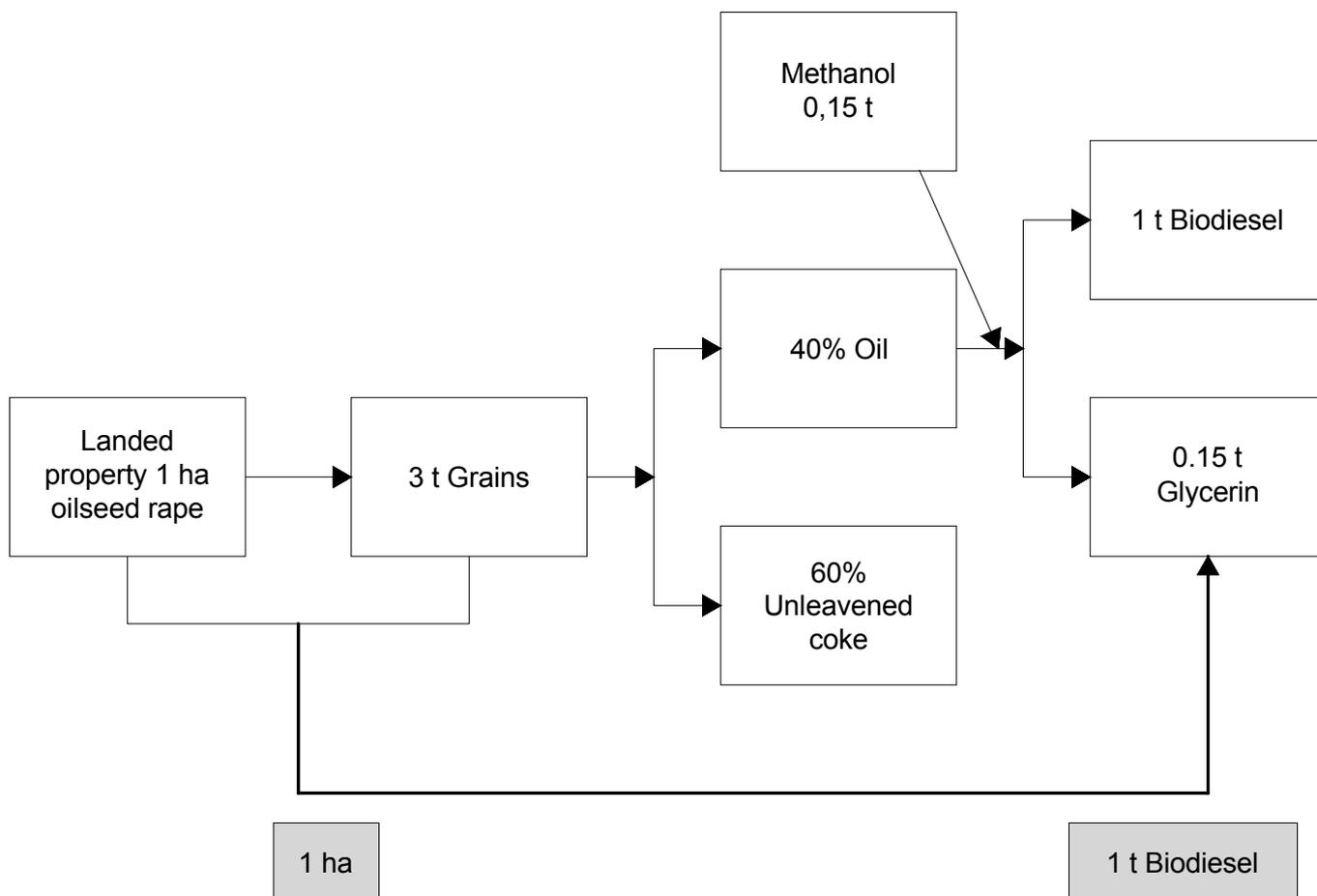


Figure 3. The amount of biodiesel in 1 ha and oilseed rape

It is generally known fact that the use of liquid fossil fuels contributes to carbon dioxide accumulating in the atmosphere, which is the cause of the occurrence of greenhouse effect. This is one of the most important negative effects of the use of fossil fuels.

Biodiesel in the economic sense has significant advantages. Degradability in water and soil is relatively fast and complete. In car exhaust gases is much less harmful substances. From the standpoint of CO₂ biodiesel is neutral, because all that overhangs the amount of biodiesel combustion engines in the atmosphere is photosynthesis in plants again absorptions of re-products of biodiesel.

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