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Conference Paper

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Provided in Cooperation with:

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

Suggested Citation: Bădan, Daniela Nicoleta; Şurcă, Daniela-Elena (2016) : Culture of rapeseed in the manufacture of biodiesel, In: Agrarian Economy and Rural Development - Realities and Perspectives for Romania. 7th Edition of the International Symposium, November 2016, Bucharest, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 249-254

This Version is available at:

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CULTURE OF RAPESEED IN THE MANUFACTURE OF BIODIESEL

BĂDAN DANIELA NICOLETA¹, ȘURCĂ DANIELA-ELENA²

Abstract: *In this paper we highlight one of alternative solutions in the manufacture of biofuel, which will replace the classical fuels who are being exhausted with harmful effects on the environment and human health. There are solutions to reduce net emissions of carbon dioxide by 70% compared to petroleum-based fuels classics, and these solutions are found in vegetable oils / biofuels. Therefore we chose to analyze the evolution of culture rapeseed crop productions which will be studied in both Romania and the European Union, pursuing the the same time and productions of oil rapeseed constituting raw material for biofuels - biodiesel, fuel considerati bioetanol- future.*

Keywords: *biodiesel, rapeseed oil, production*

JEL Classification: *Q16 -R&D; Agricultural technology; Biofuels; Agricultural Extension Services*

INTRODUCTION

The high level of pollution of Earth is observed through the changes and the catastrophic weather events, which leads us increasingly to renewable energy resources that does not affect any environment and health / lifestyle human.

Because these non renewable resources fossil fuels - coal, oil, natural gas - have begun to be depleted, according to data from the World Energy Council (MIC) in the last two generations have been consumed about 80% of the oil resources of the planet and it is estimated that by 2030 demand for oil will increase by about 46% and coal mining by nearly 50%, their price on the world market and knowing a fast growing.

Considering the role of energy in society and all economic sectors dependent on this resource, its development is performed under the direct supervision of the state been set-up strategies.

For elaborating strategic objectives are chasing them to accommodate the changes and developments taking place at national and European level (European Union Energy Policy).

In the context of rising oil prices therefore presents an environmentally friendly alternative to replace fossil fuels with biofuels would have a major social impact.

Biofuel also called green fuel can be used as an alternative fuel made from petroleum diesel, which is completely renewable affording animal fats, vegetable oils used or new.

Through processes of trans-esterification and esterificare it stabilizes fatty acids obtained by purifying glycerol and thus through reversible reaction that occurs between an acid and an alcohol (methanol), with removal of water and formation of ester methyl ester is obtained as a result of which the bio-molecule reprizinta a fatty acid methyl ester.

In the manufacture of biodiesel feedstock choice plays a very important, because usually it costs represent 60-80% of total cost of production.

You also need to take into account the the influence that has on the biodiesel market growth future costs and availability of raw materials on a long term as this.

Rapeseed oil is one of the oils used as raw material in obtaining biodiesel, this plant is represented worldwide as one of the most important species of oilseeds, with large food and industrial applications, through its processing it offers certain advantages to both the grower as and consumer.

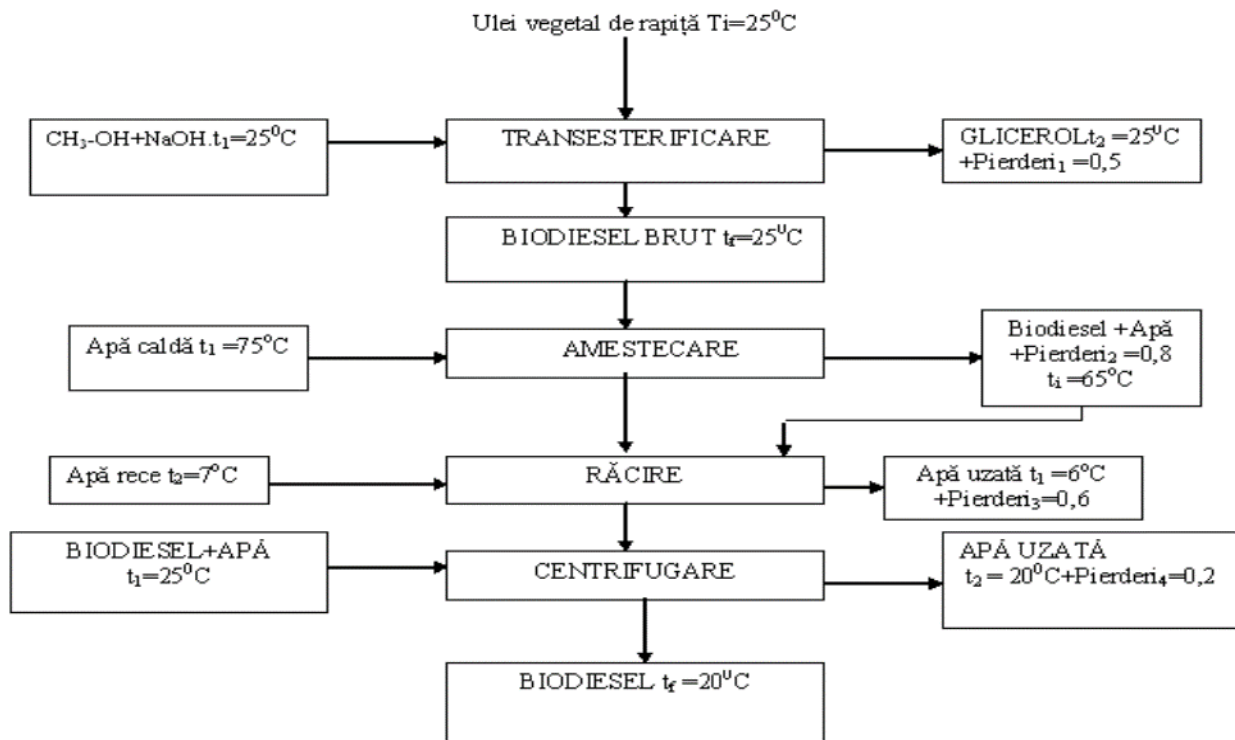
An advantage of rapeseed oil as raw material in obtaining biodiesel is given the costs per hectare with this culture that are lower than other oil crops, that this plant can grow and winter shows another advantage in choosing them as matters first.

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The country's economy can be improved if cultivation of rapeseed will aim to produce biodiesel.

Figure 1. Obtaining biodiesel from rapeseed



Rapeseed culture is used in food industry in Romania reglementata by order no.22 / 2002 on the content, production, origin, preservation and quality of vegetable oils obtained from this culture.

MATERIAL AND METHOD

Using information provided by sites INS, Eurostat, FAOSTAT, Ministry of Agriculture and Rural Development and EBB (European biodiesel board) we will analyze productions of rape and default of rapeseed oil required in biofuel production using as research methods analysis quantitative, comparative analysis method and results.

With the help of comparative analysis we will present the strongest European countries producing biodiesel in parallel with Romania.

The research methods and literature will highlight the potential rape culture. The research results are expressed in the form of indicators (averages, percentages, graphs and tables).

RESULTS AND DISCUSSIONS

Romania's agricultural area is 13.3 million hectares of which 62.5% is arable land, oilseeds and cereals occupying 80%. Rapeseed acreage in 2015 is 383 thousand hectares representing 0.41% of the arable area of Romania.

Watching the evolution of total of rape production an increase of 12% in 2014 compared to 2010.

Table 1. Evolution and production areas in Romania during 2010-2014

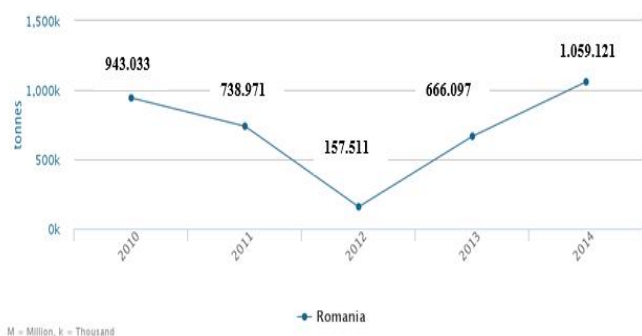
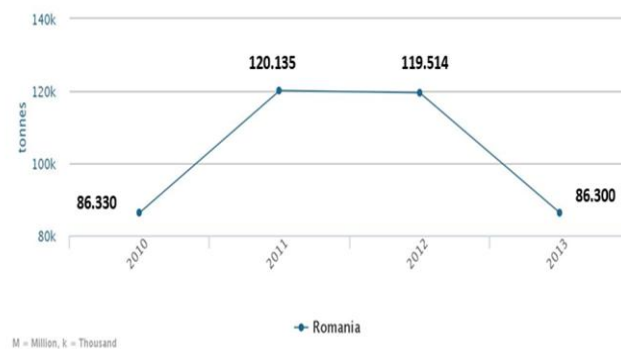
Specification	UM	2010	2011	2012	2013	2014	2015
Surface	thousand ha	537,3	392,7	105,3	276,6	406,7	383
Average production	Kg/ha	1755	1882	1496	2408	2604	2530
	%	100	107.23	85.24	137.20	148.37	144.15
Total production	thousand tons	943,0	739,0	157,5	666,1	1059,1	959
	%	100	78.36	16.70	70.63	112.31	101.69

Source: 2007-2015 – Date INS – Crop production for main crops

Average production per ha in the country has known outstanding increases, from 1755 kg / ha in 2010 to 2604 kg / ha in 2014, with a steady increase in production around the average of 2029 kg / ha.

In 2010 suitable FAOSTAT, Romania registered 86.330 thousand tons of rapeseed oil

In the chart below you can see a steep drop in of rape production so it the exit of winter, 350,000 hectares of crops were destroyed by frost, rape being affected by surface producing only 77% of 157 511 tons in 2012.

Fig. 1. Rapeseed production in Romania thousand tons**Fig. 2. Production of rapeseed oil in the Romania thousand liters**

In 2013 was an increase rapeseed production of 4.3 times compared to 2012 due to increased planted area by 2.7 times and conditions favorable for plant development.

According to data submitted by MARD, rapeseed market in 2014 was estimated at EUR 350 million, around 80% of production being exported.

The main markets of Romania, in 2015 were: the Netherlands, Germany, France and Romania's main competitors on export markets were:

➤ In the Netherlands: in this market there is a net supplier dominant because the market is very diverse, Germany has the highest percentage in terms of imports of rapeseed Netherlands (36.8%) followed by France (9.6%) and Romania (6.8%);

➤ In Germany: Romania's presence in the German market of rape is very low with a share of only 2.3%, with France being the largest supplier of this market with a share of 35.4% in imports;

➤ In France: In the top suppliers rapeseed of this country Romania ranks 3rd with a share of 12%, Romania's main competitors on the French market is Bulgaria and Ukraine.

In most Member States of U.E. rapeseed production is very good, Germany is the largest producer of the 28 Member States followed closely by France, our country ranking among the last places with an average production 712 600 tons over the last 5 years.

The largest producer of rapeseed oil in Europe is Germany with a percentage of production 64% higher than the second country France.

Fig. 3. European rapeseed production at Germany, France

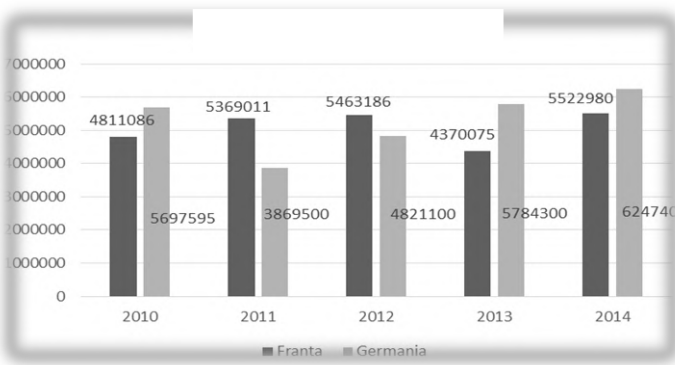
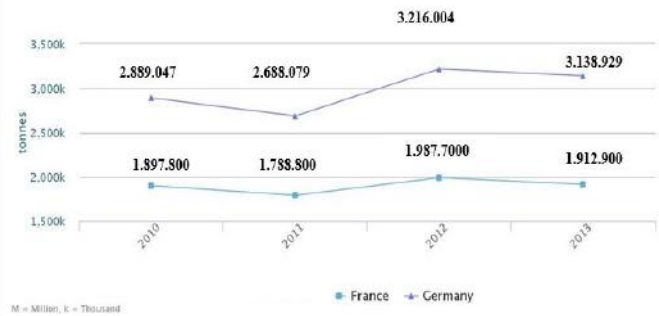


Fig. 4. Rapeseed oil production at European level in Germany, France thousand liters

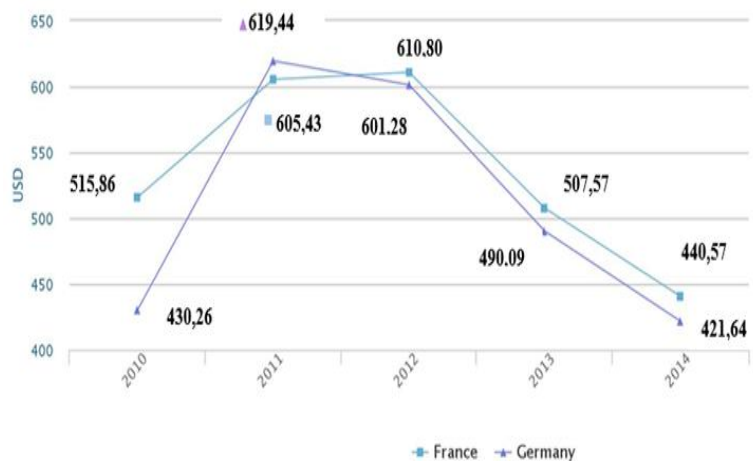


Because of unfavorable conditions in 2012, the production of rapeseed greatly decreased so the price has increased significantly reaching 406.7 euro / ton, the difference of 200 euros / tonne from the main European producing countries. Due to of large productions in the next two years the price of rapeseed decreased by 35%.

Table 2. The average price for rapeseed in Romania

Year	UM	Medium price	Price euro / ton
2010	Lei/kg	1,25	277,7
2011		1,62	360
2012		1,83	406,7
2013		1,57	348,9
2014		1,34	297,8

Fig. 5. Rapeseed prices per ton for the main producing countries in the European Union - Germany, France



Since 1992 the biodiesel was produced on an industrial scale in the European Union, productions were made as a response to the positive signals given by the EU institutions.

In order to ensure the quality and performance of the European Union has published strict guidelines in accordance with the European standard EN 14214 which describes implementing the requirements and test methods biofuels Biodiesel is the most common type.

The European Union is the largest biodiesel producer in the world producing annually about 6058.75 million liters biodiesel obtained only from rapeseed.

Rapeseed are the raw material dominant in the production of biodiesel in the European Union with a 58% of the total production in 2015, although rapeseed hold the highest percentage in the obtained biodiesel they have lost ground to oil palm it became the second raw material used in the manufacture of biodiesel.

Analyzing the European Commission report on renewable energy for transport in 2013 we find that the most used biofuel is bioethanol Biodiesel followed.

Table 3. The production of biodiesel from rapeseed in Europe - thousand liters

geo\time	2010	2011	2012	2013	2014
EU (28 countries)	8907.3	8486.5	9102.4	9781.1	11248.9
Belgium	285.4	257.4	269.1	265.1	339.6
Bulgaria	11	14.1	7.1	39.1	54.5
Czech Republic	175	185.7	152.6	160.6	193.8
Denmark	68.7	70.8	0	0	0
Germany	2736	2721.9	2492	2667.7	3042.6
Estonia	0	0	0	0	0
Ireland	63.4	24	23.9	21.8	24.2
Greece	112.5	98	124.3	137.9	141.6
Spain	754.7	609	444.6	646.2	1070.8
France	1774	1618.6	1944.7	1915.6	2074.5
Croatia	12.2	6.7	34.7	29.6	31.2
Italy	706.1	522.5	253.6	405.8	512.1
Cyprus	4.9	5.7	5.8	1.6	0
Latvia	38.6	53.2	80.4	58.7	66.6
Lithuania	78.8	70.6	94.3	103.7	105.8
Luxembourg	0	0	0	0	0
Hungary	126.6	127	128.9	125.4	119.2
Malta	0.5	0.7	1	1	1
Netherlands	337.6	433.9	1040.1	1215.1	1520
Austria	241.9	208.5	181.8	154.5	234.4
Poland	348.1	333.2	555.2	578.2	653
Portugal	279.7	323.1	268.8	264.6	286.5
Romania	10.8	94.1	88.7	120.8	96.9
Slovenia	16.5	0.3	0.9	1.5	0
Slovakia	111.7	114.6	99.3	94.8	92.8
Finland	297.1	200.9	253.9	315.8	354.2
Sweden	177.4	232.9	335.2	218.9	106.8
United Kingdom	138	158.9	221.3	237.2	126.8

Source: 2007-2015 - the Eurostat data - database - Production of biofuels in the EU

From the table it can be seen that large producing biodiesel in Europe are countries like Germany, France, Netherlands.

The smaller producers are: Malta, Bulgaria, Croatia; Romania is among the last being exploited enough biofuel concept.

Production of biodiesel in the EU is on the rise supported by strong demand / consumption of biodiesel in the largest European countries, above.

The competitiveness biodiesel in the market of compared to the fossil fuels depends largely on policy and tax rates on fuel. In general bio-fuels production fees are higher than those for manufacturing fuel classical therefore can not yet speak of a total replacement of fossil fuels

CONCLUSIONS

Global development of renewable energy is a response to high energy prices, offering energy security, but above all, increase awareness of climate change. It is known that the Earth's energy resources are exhaustible so we should seek replacements for fuels and energy. Agriculture and rural areas have the potential to provide a significant proportion of renewable energy production. Grains that can not be used in the food industry may be effective in producing biofuels thus avoiding wastage.

Thanks to high production costs and low per hectare, rape is considered one of the most important energy crops both in Romania and and European countries.

It has been shown that the oil extracted from rapeseed is a valuable substitute for obtaining good diesel technology is simple, and finished product meets European norms on environmental protection. Biodiesel is a biodegradable fuel four times more fuel than oil due to the natural properties of the data used oilseeds, Romania would need to take the example of powerful countries in U.E. and to turn increasingly toward the cultivation of this plant in order biodiesel producers

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