STUDY ON ENERGY PLANTS CULTURE IN ROMANIA

STUDIU PRIVIND CULTURA PLANTELOR ENERGETICE IN ROMANIA

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Abstract: *The energy plants began to arouse interest the business market of Romania, representing even a successful alternative to the traditional crops. These crops are more efficient and renewable fuels market is just getting started on a background of increasing demand due to EU requirements covering the needs of electricity / heat, from renewable sources, sector ranked on the second place in the top of the sectors that attracts investment in Europe. In Romania there is no yet a high level of investment in this area, although there was interest from producers.*
In this paper the authors have attempted to identify the new energy sources used in our country as much as possible non-polluting and renewable.

Key words*: plants, culture, energy, agriculture*

INTRODUCTION

In Romania there are currently about 20 companies or individuals, who have the large willow plantations established in general on several hectares, which are in many cases the experiments. The concern for finding new energy sources, renewable, still exist since the '70s, from the first oil crisis (the Gulf War). That was the moment when the researchers began to be aware, that the traditional energy resources will be a problem for future generations.

In this context started the research for finding new energy sources, renewable and non-polluting as possible. The attention turned to more different areas, started with the solar energy, the wind energy, heat pumps,

biomass. In the last five years, the concern for the production of renewable energy in agriculture, has increased.

MATERIALS AND METHODS

In order to be able to achieve the goals of the present paper, we used as research methods: data collection, data analysis, data processing, and data synthesis.

RESULTS AND DISCUSSIONS

The energy crops (according to Regulation (EC) 1782/2003, art. 88): are crops used to obtain the following products:

- **Biofuels ;**
- Electricity and heat produced from **biomass**.

Biomass: the biodegradable fraction of products, waste and agricultural residues, forestry and related industries.

Crops for the biodiesel production**:**

• Colza (the best crop);
• Soybeans;
• Sunflower;

Crops for the bioethanol production:

• Cereals (corn, wheat, rye);
• Sugar beet);
• sorghum, kale.

Other crops who emphasize the degraded lands unsuitable for agricultural use are:

• energy willow: **there are 49 locations in Romania for testing in different climatic zones;**
• Cynara
• Miscanthus. *[8]*

The green plants are those that can also provide the energy that we need in the same extent as that gives us food. These bodies are only able to perform the photosynthesis, photochemical process in which pigments are designed to capture light energy, witch the plant can transform it the chemical energy. Given the global trend towards the production and use of biofuels, the necessity of establishment of appropriate technologies for cultivation of plants needed to achieve them.

The plants that are suitable for energy crops are: colza, sunflower, soybean and corn. In the EU the use of energy crops for production to obtein the biofuels has become a common practice. To obtain electricity and heat, are used less, for the present. Countries like: Austria, Germany, France using the biodiesel for tractors and agricultural machinery supply and there are many gas stations for this purpose.

The climatic conditions allow our country the cultivation of a very wide range of energy crops (annual or perennial):

- cereals (wheat, corn, barley, oats, etc.);
- sugar crops (sugar beet, sorghum, etc.);
- legumin (alfaalfa etc.);
- herbs (miscanrthus, panicum virgatum etc.);
- seed crops (colza, sunflower, soybeans, etc.);
- fiber crops (aruno donax, cynara, etc.).*[9]*

The resource potential of the Romanian raw material for biofuels production, includes both resources to agricultural and forestry resources offered.

Given the climatic conditions of the country the most feasible generation biofuels crops for the biofuels production in Romania are:

- for the biodiesel production: colza, sunflower and soybean;
- for production of bioethanol: sugar beet, cereals (wheat, corn, barley).*[9]*

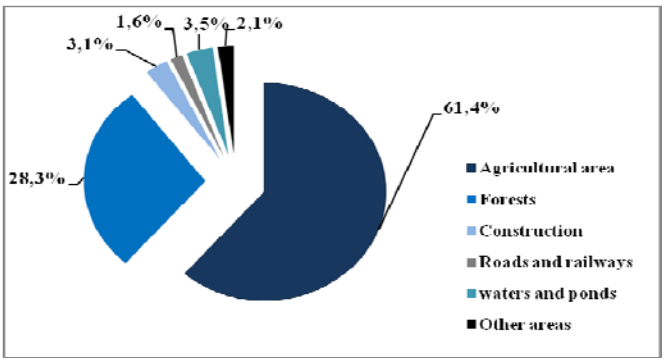


Fig. 1. The land fund structure in Romania, by use, in 2010 (end of year)

The biomass productivity depends essentially on the climate, soil quality, agricultural machinery and fertilizer use.

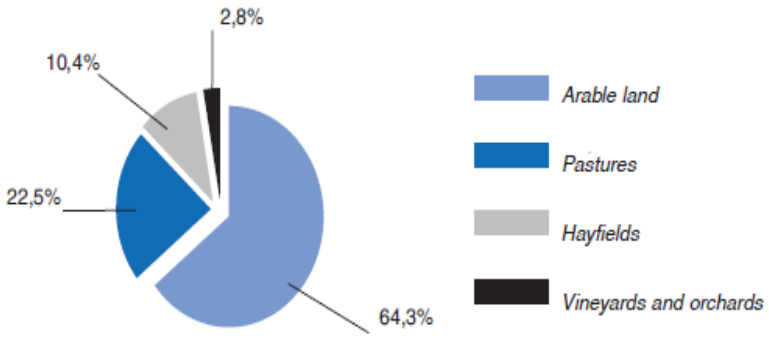


Fig. 2. The structure of agricultural area of Romania by category of use, in 2010 (end of year)

Table 1

Energy plant large cultivators countries in the European Union

Nr. crt.	Culture	Country
1	Colza	France, Germany, United Kingdom, Austria, Polond, Romania
2	Sunflower	France, Hungary, Spain, Romania
3	Soybean	Italy, Spain, Portugalia, Romania
4	Corn	France, Germany, Poland, Hungary, Romania
5	Sugar beet	Germany, France, Polond, Romania
6	Energy willow	Suedia, Polond Hungary, Slovakia, Romania

***Source*: *Own processing* according with CIBE (*International Confederation of European Beet Growers*)**

Table 2

The surfaces and the productions obtained of sugar beet culture

Specification	Surface ha	Average production tons/ha
Romania	210.000	50,0
EU	1.630.000	61,8
France	394.000	70,0
Germany	406.000	64,3

Source: Own processing according with CIBE

(International Confederation of European Beet Growers)

The countries in witch there are major **colza crops** in the European Union are: **France**, **Germany, United Kingdom, Austria, Poland, Ukraine, Italy and Czech Republic**. The production in 2006/2007 of the European Union was 15.3 million tons. From 100 kg of rapeseed oil is obtained 30-35 kg and 50-55 kg product feed (which is uses for animals food). The colza ranks on the fifth place in terms of production of edible oil from oilseeds, in Romania.

Sunflower is grown in several European countries, but the top producers are in **France, Hungary** and **Spain**. Sunflower seed production for EU-25 has stagnated in the regions of France and Spain in recent years due to drought. Therefore in 2005 there have been massive imports of seeds coming from Romania and Bulgaria. Of 4.1 million tons of sunflower seeds are produced 1.8 million tons of oil.

Soybean is grown in several European countries. Production increased in 2005/06 and 2007 due to reforms in agriculture, where farmers are encouraged to pass to the soybean crops from the beetroot crops. In Italy, Spain and Portugal are expected to rise the imports, because of the investments who are made in the cultivation of plants used for biodiesel. *[*10]

Table 3

The bioethanol quantities that can be obtained from the different raw materials

Culture	Production t/ha	Production of bioethanol mc/ha
Wheat	7,2	2,76
Potato	43,0	3,55
Sugar beet	61,7	6,62

Source: Own processing according with CIBE

Table 4

The cost of producing bioethanol in the EU

Raw material	Price lei/liter	Bioethanol quantity liters/ha
Sugar beet	5,32	5.400
Cereals	4,51-4,87	3.000

Source: Own processing according with CIBE

The EU biodiesel production

The most important biodiesel producing countries in the European Union are: Germany, France, Italy, Poland and Czech Republic.

Germany accounted for more than half the EU biodiesel production in 2005 (52.4%) producing 1.669 million tonnes of biodiesel. France produced 1,334,000 tons.

In 2008, the EU has achieved over 50% of world production of biodiesel, while Brazil and the U.S. supplied 80% of ethanol production. In the year 2009 the EU has delivered over 75% of world production of biodiesel.

Table 5

Biofuels production in EU and at worldwide level

Specification	Etanol*		Biodiesel		Total	
	Quantity - million liters-	Modification 2008/2005 %	Quantity - million liters-	Modificare 2008/2005 %	Quantity -million liters-	Modification 2008/2005 %
UE	5022	71	8064	123	13086	100
Brazil	22239	46	1089	155471	23328	53
Canada	1083	167	205	388	1288	188
China	3964	15	114	-	3964	15
India	1725	54	200	900	1925	69
Indonesia	194	10	356	-	550	211
Malaysia	64	-19	536	-	600	659
USA	34463	125	2709	266	37172	131
Other	1882	78	1867	1029	3749	206
Whole world	70636	78	15140	230	85776	93

Note: *includeetanolulutilizatiînaltescopuridecâtcabiocombustibil

Source: AGLINK–COSIMO database

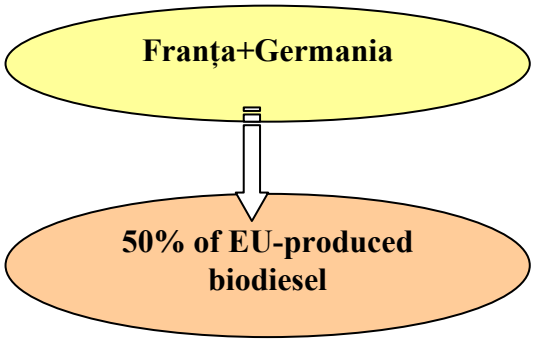


Fig. 3.Volume of biodiesel produced in the EU

The surfaces that can be planted with oil, in Romania, in a crop year observing the technologies and crop rotation are 1.6 million hectares of which 950,000 ha of sunflower, 500,000 hectares with colza and 150,000 hectares.

Taking into account the average yields to be obtained during a normal year (no drought, frost and other disasters) result an annual production of over 2.2 million tons of sunflower seeds, colza and soybean. By processing of these amounts, depending on the extraction yields can be achieved a total production of over one million tons of oil. [11]

In Romania, the large areas are cultivated with corn, over 2.5 million hectares per year, and some of the production obtained can be used to obtain bioethanol.

CONCLUSIONS

- In the EU the use of energy crops for production to obtein the biofuels has become a common practice. To obtain the electricity and heat, are used less, for the present. The countries like: Austria, Germany, France using biodiesel for the tractors and the agricultural machinery supply and there are many gas stations for this purpose. In time, the trend is that the quantity of fuels used primarily in the EU, must come from bioenergy crops.
- Among some of energy crops - colza – the colza oil produce the best biofuel. One advantage of colza cultivation is on the establishment cost per hectare for this type of culture that are lower than for the wheat and barley.
- The promotion of energy crops and the introduction of bio fuels require the following advantages:

- reduction of environmental pollution by reducing greenhouse gas emissions.
- ensure the provision of fuel energy crops safe and environmental protection and promoting renewable energy.
- given that global oil fields decrease progressively and quickly, it took finding alternative fuel production for tractors and agricultural machinery.

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