

BIOGAS OBTAINED FROM CORN SILAGE AND/OR COW MANURE IN THE REPUBLIC OF SERBIA AS A ROAD TRANSPORT FUEL

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Key words: anaerobic digestion, biogas, corn silage, cow manure, motor vehicle.



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Abstract: Serbia has great potential for the production of the biogas, due to growing energy crops and livestock are the greatest potential of its agriculture. The use of biomass through anaerobic digestion to get the biogas, would reduce the need for the state to import energy, environmental protection should be raised to a higher level, the economy would be improved, unemployment in rural areas would be reduced and prevent migration of population from these regions. If we add to the fact that the European Union set itself the goal to 2020 year 20% of energy provided from renewable energy sources (at least 25% of bioenergy in the future can come from biogas produced from organic materials such as corn silage or animal manure), anaerobic digestion is imposed as a very acceptable technologies. In this paper, viewed as a potential production of biogas as a transportation fuel in the Republic of Serbia, which are the barriers that impede greater development of this branch of industry and suggestions on the experience of other countries to promote or encourage the same.

1. INTRODUCTION

It is a great dissonance between bombastic statement, of new or renewable fuels and their benefits, because under these are implying pure components. A typical replacement thesis is related to the natural gas that, and without it, will be a fuel of this century. Optimistic studies of natural gas in vehicles operate with pure methane. Unfortunately, pure methane has nowhere in nature. He is still in mixture with other admixtures in different percentages. The main point is that natural gas and biogas should be accepted as a technically superior quality raw material for motor fuel [1].

In order to biogas could be used as a transportation fuel, it has to percolate, so that the volume of the methane is at least 95%. Only then biogas can be used as fuel in vehicles that were originally modified to operate on natural gas.

The technology of biomass and utilization of animal manure by anaerobic digestion (AD) is a superb and safe technology for obtaining biogas. If we add the fact that Serbia has a large farming area with agriculture crops (corn soya, sunflower, rapeseed...) and great potential in livestock, we can say that this is a good basis for the production of such renewable transportation fuels.

2. BASIC PARAMETERS OF ANAEROBIC DIGESTION

Anaerobic digestion is the decomposition of organic material under the influence of microbial populations that exist in the environment without oxygen. During anaerobic digestion (fermentation) organic materials are decomposing under the influence of methane bacteria and occurs biogas is

composed mixture of methane CH₄ (40-75%), carbon dioxide CO₂ (25-60%), a small percentage of other gases such as hydrogen H₂, hydrogen sulphide H₂S (0-1%) and carbon monoxide CO (2%). Biogas is lighter than air, no smell and no colour. Ignition temperature is between 650 -750 °C and it burns with clean blue flame. Caloric value is about 20 [MJ/Nm³] [2].

Anaerobic digestion can treat a wide range of organic material originating from agriculture, industry or municipal wastewater. Basically any liquid or solid organic waste from food and agricultural industry (whey, waste from slaughterhouse, used oil, grease and food waste from restaurants, liquid manure or municipal water) can be treated by anaerobic digestion.

Animal manure is a potentially large biomass resource. Dehydrated manure has the same energy content as a wood, and when it used for heating, the efficiency is only 10%. About 150 million tons of dry manure is used as fuel throughout the world. The conversion efficiency of animal waste can be increased up to 60% if it's in the process that produces biogas through anaerobic digestion.

Production of biogas only from animal manure is unviable, but adding cosubstrate (e.g., corn silage) increased profitability. As a contribution that can be specified by the fact is that almost 85% farm scale plants for the production of biogas in Germany used cosubstrate in anaerobic digestion.

It is important that each biogas plant must to have a clear picture what kind of energy needed to produce and to see what type of energy to match potential customers as well as costs of delivery of such energy. In this sense, input of organic matter is an important operating parameter, which indicates how much corn silage or liquid cow manure can be entered depending on the volume of digester in unit time [2].

