GENERATING BIOGASS – ENVIRONMENTAL PROFIT AND PERFORMANCE IN ANIMAL BREEDING HOUSEHOLDS IN ROMANIA

GENERAREA BIOGAZULUI - PROFIT ŞI PERFORMANŢĂ DE MEDIU ÎN FERME ANIMALIERE POLUATOARE DIN ROMÂNIA

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Abstract: *Biogas is one of energy sources still underused. Due to the new standards in matter of autoproduction, recognition of environmental value, of electricity from alternative sources and technology now approved, today it is possible to produce biogas to generate heat and electricity in advantageous conditions. Cogeneration of electricity and heat through biogas can give rise to obvious advantages, either in the energy field or in the ambient.*

Rezumat*: Biogazul este una dintre sursele energetice încă prea puţin utilizate. Datorită noilor norme în materie de autoproduţie, recunoaşterii valorii ambientale a energiei electrice din surse alternative si unei tehnologii de acum omologată, astăzi este posibil să se producă biogaz pentru generarea de caldură şi electricitate în condiţii avantajoase. Cogenerarea de energie electrică şi căldură prin biogaz poate da naştere a avantaje evidente, fie în câmpul energetic, fie în cel ambiental.*

Key words: ***Biogass, ecology, energetic potential***
Cuvinte cheie: ***Biogaz, ecologie, potenţial energetic***

INTRODUCTION

The main environmental issues in the firm refers to organic residues and waste water management. Addressing non-priority sector, we consider it a good step forward, only to have been targeted different groups of farms with another environmental impact and other investment priorities. In terms of biogas production, the most feasible is the product residue from farms of pigs. This means a greater quantity of biogas and a greater concentration of methane (fuel components) obtained. We intend to promote good environmental management practices-both as a way of greening farms and to generate profit but green.

MATHERIAL AND METHOD

Anaerobic digestion is a complex biological process, through which, in the absence of oxygen, organic matter is converted into biogas (gas or biological), consisting mainly of methane and carbon dioxide. The percentage of methane in biogas varies depending on the type of organic matter digested and process conditions, from a minimum of 50% to 80%.

As the process takes place, action is needed to different groups of microorganisms, able to convert organic matter into intermediate compounds, mainly acetic acid, carbon dioxide and hydrogen, used by microorganisms metanigene which concludes the process, producing methane. Anaerobic microorganisms have a low growth rate and a low response rate and therefore it is necessary to maintain optimal, if possible, environmental conditions of the reaction. Nevertheless shortening, are relatively long process times when compared with those of other biological processes, however the advantage that the process is complex organic matter is converted into methane and carbon dioxide and thus lead to the final production of alternative energy sources, as as a fuel gas of high calorific value. Environment response, usually defined digestive (or anaerobic reactor) to allow simultaneous growth of all

microorganisms involved, will have to result from a compromise between the demands of each group microbes. Optimum pH, for example, is around 7/7.5. Optimum temperature of the process is around 35 degrees C, when using mesophilic bacteria, or around 55 degrees C, when using thermophilic bacteria.

At the trial involved the following groups of bacteria:

• hydrolytic bacteria that break down macromolecules simple biodegradable substances;

• acidogene bacteria, which use simple organic compounds as substrates released by hydrolytic bacteria and produce short chain organic acids, which in turn is the substrate for the following groups of bacteria;

• acetogene bacteria, producing hydrogen bound (OPHA: ObbligateHydrogen Producing Acetogens), using as substrate acidogene bacterial products leading to acetate, hydrogen and carbon dioxide;

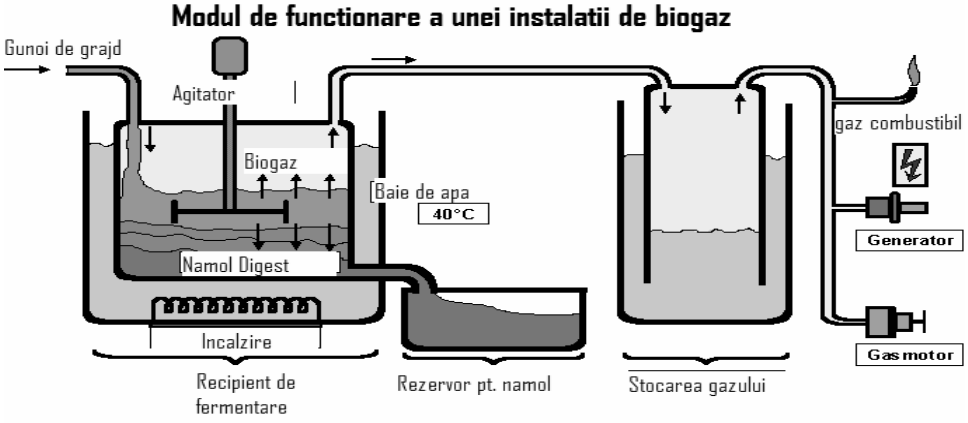
• omoacetogene bacteria that synthesizes acetate starting from carbon dioxide and hydrogen;

metanigene bacteria, differentiated into two groups:

a) those that produce methane and carbon dioxide from acetic acid, called acetoclastici;

b) those that produce methane from carbon dioxide and leaving hydrogen called hidrogenotrofe.

While methane is released almost completely in the gas phase is seen, low solubility in water, carbon dioxide participates in the balance of carbonates present in the biomass located in the side. Interactions between different species of bacteria are very close and metabolic products of certain species can be used by other species as substrates or growth factors.



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RESULTS AND DISCUSSION

Biodegradability complex effluents considered in the basin sewerage collection may vary between 60 and 80% depending on age or type of food or manure. A further classification of biodegradable fractions, within the soluble fraction distinguish between part readily biodegradable (about 20% of the SSV) and a more easily biodegradable, and within the party suspended the first suspended slightly slower hydrolysis and a hydrolyzable.

Data collected from long-term laboratory tests in normal anaerobic reactor, with the stroke of hydraulic stability limitaşi, reach levels of organic substance in the gas processing biological variables between 70 and 90% of maximum biodegradability according to the state droppings. Low levels of conversion into biogas may be attributable to the low temperature, hydraulic retention time too short (or too high organic loads) in the temperature of the process, the bad behavior of the reactor hydrodynamics with dead zones formation and flows by -pass between the entry and exit or in the presence of inhibiting substances or antibiotics in high concentrations.

Estimated quantities of biogas production by anaerobic fermentation starting from different organic waste materials

Type of material	Content of substances. dry (%)	Subst. organic (% subst.dry)	Yield of biogas m3 / t subst. organic
Producers			
Liquid cattle manure	6-11	68-85	200-260
Solid cattle manure	11-25	65-85	200-300
Liquid swine manure	2.5-9.7	60-85	260-450
Solid swine manure	20-25	75-90	450
Liquid poultry manure	10-29	75-77	200-400
Solid poultry manure	32.0-32.5	70-80	400
Sheep manure solids	25-30	80	240-500
Horse manure solids	28	75	200-400
AGRICULTURE			
Corn silage	34	86	350-390
Grass silage	26-82	67-98	300-500
Fan	86-93	83-93	500
Clover	20	80	300-500
Straw	85-90	85-89	180-600
Corn cobs	86	72	300-700
AGRO-INDUSTRY			
Scrap distillate Apples	2.0-3.7	94-95	330
Molasses	80	95	300
Whey	4.3-6.5	80-92	330
Plant scrap	5-20	76-90	350

A further reduction of about 12.5% of organic substance convertible into biogas resulting from the operations necessary for pretreatment of effluents remişcarea May crude solids that can cause problems with surface crusting in unmixed reactors. Finally biogas yield is calculated by an analysis stoechiometrică, which is obtained per g of CO2 that destroyed 0.35 l of methane are produced under standard conditions (volume calculated at 0 º C and pressure of 1 atmosphere absolute).

CONCLUSIONS

In a context of extreme and continuous energy requirement and an increased environmental risk anaerobic treatment with biogas recovery product today proves to be a great interest, able to offer many advantages:

1) Production of Energy: Anaerobic treatment under controlled conditions results in degradation of organic substance and to produce biogas. Cogeneration of electricity and heat by burning biogas proves to be economically advantageous either for own business or for a transfer to third parties, increased by recent acts on energy production from alternative sources.

2) Remove odors and contaminated issue (NH3 and CH4): malodorous substances which may be formed during the process (hydrogen sulphide, mercaptans, ammonia) are set in motion by the burning biogas.

3) Stabilization of droppings: remove organic carbon load produced from anaerobic digestion effluents gives a sufficient stability even in the later periods of storage, there is a slow and degrading fermentative processes with consequences of reduced production of odoriferous compounds.

4) Reducing pathogen load: anaerobic digestion to reduce part mezofilie possible pathogenic load present in the liquid slurry. Operating in thermophilic possible, however, to obtain the complete list cleaning droppings destruction of pathogens.

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