UDC 662.763.3.2

IMPROVE PRODUCTION EFFICIENCY THROUGH THE USE BIOHAZUZA WASTE VODVYNOROBNYH ENTERPRISES

VA Dubrovin, PhD
VM Polishchuk, MN Lobodko, Ph.D.
National University of Life and Environmental Sciences of Ukraine
GV Krusir, PhD
IF Sokolov, a graduate student *
Odessa National Academy of Food Technologies

Ways sewage treatment plants wineries. A use as component substrate for biogas production. Investigated biogas yield from substrate-based wastewater wine production.

Wastewater wine production, biogas substrate, cattle.

Problem. At the beginning of 2013 wine production in Ukraine amounted to 22.6 million. DKB [1]. This 1 CST produced wines produced 0.05 m3 industrial effluent, ie a year wineries produce 1.13 million. m3 of industrial wastewater containing pollutants as stems, leaves residues, small particles of damaged fruit. In addition, industrial effluents are a large number of grape pomace (in press), and washing of filter cloth in water is a percentage of grape must. When tannin-gelatin improvement wort formed colloids containing protein in the form of sludge [2]. Consequently, industrial effluents wine production is a complex physical-chemical system, which together with dissolved substances contained particles of varying degrees of dispersion, the amount of which varies widely (from 0,001 m to 10mm). In suspended solids effluent wineries contain significant amounts of solutes removal is possible only by chemical or biochemical pathways [3].

Consequently, industrial wastewater wineries must submit to mandatory clearing.

*** Supervisor - PhD GV Krusir**

Analysis of recent research. Wastewater is treated wine industry enterprises in municipal wastewater treatment plants (municipal wastewater wineries) and own treatment facilities (sewage enterprises located in towns or rural areas) [2]. If large solid suspended particles are separated from industrial wastewater by settling (for piskolovkah and landfill) or filter, then a decrease in their size separation effluent fractions is much more complicated. To do this, use, for example, Flotation plants [3]. Physico-chemical methods of sewage treatment also includes the

use of coagulants in the form of lime in combination with salts of iron or aluminum, that allow to reduce the content of suspended particles by 70-80%.

Biological wastewater treatment wineries can be performed in vivo, in the fields of filtration, irrigation, in biological ponds, storage, and then use wastewater for irrigation, and in artificial conditions - on filters, aeration.

High performance buildings are already wastewater treatment plants are biological rates that reduce BSK5 rate (oxygen spent on aerobic biochemical oxidation under the action of micro-organisms and decomposition of volatile organic compounds contained in the examined water for 5 days) at 76-89% .

Aerobic wastewater treatment is a long time and equipment to ensure it covers a large area. Another way is anaerobic wastewater treatment, which in digesters metanoutvoryuyuchi bacteria carry effluent from passing biogas production. Due to artificial heating decreases cleaning time. However, low specific metabolic activity of methane biocenosis need for intensive process of wastewater treatment reactor in the presence of high concentrations of biomass, which is absent in wastewater wineries [4]. In addition, the low concentration of biomass leads to a slight release of biogas, which significantly increases the cost of the cleaning process. Therefore, the process of anaerobic wastewater treatment wineries significantly complicated by low concentration of biomass.

The purpose of our research is to determine how the use of wastewater wineries they are cleared.

Results. If near wineries located farm or cattle breeding complex industrial wastewater wineries can be used to dilute manure at the stage of its preparation for methane fermentation. In this case there is no need effluent before discharge of the water, as formed bioshlam used as an organic fertilizer.

Relative humidity of material that is loaded into the digesters WH2 must be at least 92% in the summer season. Relative humidity cattle manure (a mixture of feces and urine) is 86-87%.

Thus, to prove hnoyivky cattle coming from the farm to a condition suitable for methane fermentation, it is necessary to add water that is at least 0.43 weight hnoyivky. Part of this water can be replaced by industrial wastewater wine production.

We conducted study of the effect of sewage wine production in the event of partial replacement of them with dilution water hnoyivky on biogas yield. The study took place at the biogas plant in educational and scientific laboratories in Bioconversion AIC National University of Life and Environmental Sciences of Ukraine.

Methane fermentation was carried out at periodic load substrate. Digesters volume 29 m3 substrate was loaded half (load factor – 0.5). When you add a new portion of the substrate rebirth substrate changed half (discharge rate - 0.5). That is, when you download a new digesters were added 7.5 kg substrate. The substrate used cattle manure (solid fraction) collected in the pasture. With its relative humidity of 80% mass of water to dilute manure 1.5 times the mass of pus. That is digesters loaded 3 kg manure diluted 4.5 kg water. During studies of the water was replaced by sewage wine production, listed in Table. 1.

1. The composition of the substrate in the study of the impact of wastewater wine production in biogas yield methanogenic fermentation of cattle manure.

Indicator	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Cattle manure, kg	3	3	3	3
Moisture kg, including:	4.5	4.5	4.5	4.5
Water, kg	4.5	4.35	4	3.5
Runoff wine production, kg	0	0.15	0.5	1
%	0	3	11	22

The research results are presented in Fig. 1. Studies have shown that in all cases the use of sewage diauksiya wine production was observed, corresponding to the use of two-component substrate. Thus there are two maxima output of biogas. This fermentation substrate produced with the addition of clean water diauksiyi observed.

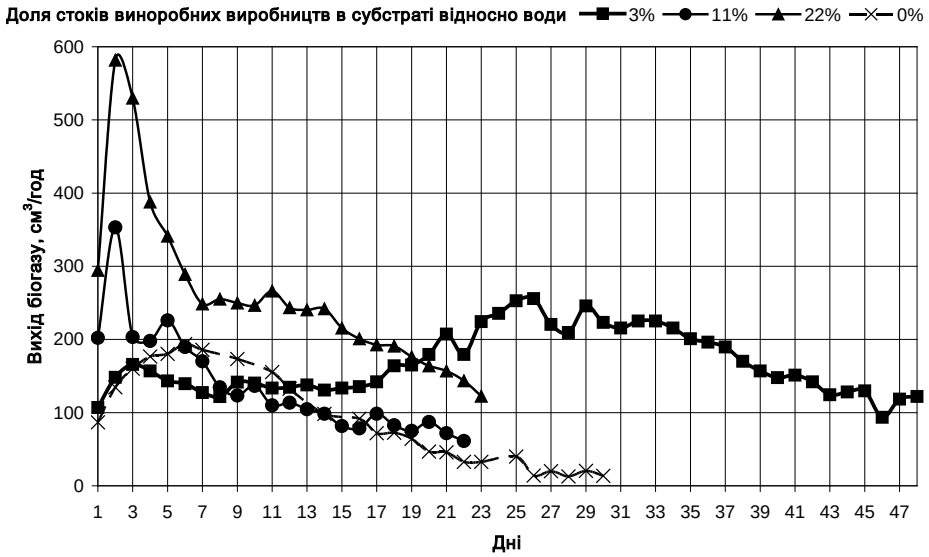

Fig. 1. Exit biogas methanogenic origin cattle manure depending on the fate of sewage water wine production relative to the substrate.

When you add 3% effluent water to wine production in the preparation of the substrate first peak output of biogas is observed on the third day of fermentation. Biogas yield is low and is just over 150 cm3 / h. After a long pryvykannya bacteria to the second component of the substrate during the second phase ekspotentsiynoyi accounts for 24-30 days of fermentation. At this time, the maximum output of biogas slightly exceed 250 cm3 / h. After 30 days of fermentation begins dying bacterial colonies by nutrient depletion and accumulation of metabolic products of anaerobic microorganisms, resulting biogas yield gradually decreases. Full time sufficiently long fermentation, the fermentation period can reach up to two months.

With increasing concentration of effluent wineries intensity ekspotentsiynoyi first phase significantly increases and time – decreases. The maximum biogas yield by adding 11% to the substrate sewage wineries is 350 cm3 / hr., 22% – about 600 cm3 / h. Maximum output of biogas is observed on the second day of fermentation. The second phase ekspotentsiyna not expressed so clearly and with addition of substrate to 11% of wastewater wineries observed in 5 days of fermentation at 22% – 11 days.

Conclusions

1. Wastewater wine production can be used to partially replace water in the preparation of substrates for biogas production.

2. Addition of sewage water to wine production in the preparation of the substrate through cattle manure in the amount of 11% increases the maximum biogas yield by 1.5 times, in the amount of 22% - 3 times. Smaller content of wastewater wine production in the substrate does not significantly improve biogas yield than by using a substrate for the preparation of plain water.

References

1. Marketplace alcohol in Ukraine – Production and Consumption (beer, vodka, cognac, wine) / [Эlektponnыy pesupsy] / Z-Ukraine. 2014 / Daily admission for Zh .: http://zet.in.ua/news/rynok-alkogolya-v-ukraine-proizvodstvo-i-potreblenie-pivovodkakonyakvino/. Date of admission: 05/14/2014.

2. Lorenz VI Clean water stochnыh enterprises pyschevoy industry / VI Lorenz. – By: Budyvelnык, 1972. – 188 pp.

3. Clean stochnыh water industry enterprises pyschevoy / [Эlektponnыy pesupsy] / Z-Ukraine. 2014 / Daily admission for Zh .: http://zet.in.ua/news/rynok-alkogolya-v-ukraine-proizvodstvo-i-potreblenie-pivovodkakonyakvino/. Date of admission: 05/14/2014.

4. Fundamentals of biodegradation process stochnыh water in anaerobnyh

byoreaktorah / [Эlektponnыy pesupsy] / PNP-MEDYANA ECO / 2014 / Daily admission for the journal .: http://www.mediana-eco.ru/information/stoki_biological/a_bioreactor. Date of admission: 05/15/2014.

Rassmotrenы Methods stochnыh water purification vynodelcheskyh industries. Using s proposals in kachestve component substrate for biogas production. Out of research IZ biogas substrate based on stochnыh vynodelcheskyh water industries.

Stochnыe water vynodelcheskyh productions, biogas substrate, cattle manure.

The methods of wastewater treatment plants wineries. Proposed to be used as a component of a substrate for biogas production. Investigated biogas production from substrate based wastewater wine production.

Sewage wine production, biogas, substrate, cattle manure.