REDUCING THE NEGATIVE ENVIRONMENTAL IMPACT OF POST-ALCOHOL BARD PROCESSING

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Production of ethanol from grain feedstock is accompanied by the generation of a large-tonnage waste product - post-alcohol bard, the amount of which is many times higher than the product yield and reaches 135-150 m^3 per 1000 dl of ethanol. The main raw material for the production of high-quality ethanol is cereal grain. Due to the presence of protein and biologically active substances, the grain post-alcohol bard has an independent feed value, and therefore the main method of its utilization is the sale of natural bard as a feed additive

However, barda cannot be stored for long periods of time (putrefactive processes develop), there is seasonality in demand for barda, and significant costs for its delivery to the consumer. In addition, the digestibility of raw barda protein is low and amounts to about 52%.

This indicator can be increased to 85-89% by enriching the bard with protein as a result of aerobic cultivation of yeast of the genus Candida on the bard. At the same time, the industrial implementation of the technology has subsequently shown its disadvantages: high energy consumption for aeration of the bard in yeast apparatus and for further dehydration of yeast biomass with low product yield. In practice, the sale of the final product can only cover the costs of its production.

Bard waste is often a burdensome waste at the enterprises of the industry, which poses a threat to the environmental situation around the enterprise. Despite the fact that quite a bit of global experience has been gained in bard processing, the main obstacle to the implementation of existing technologies is the high energy costs for the production of dry products due to the high moisture content of bard.

Modern technologies are based on four fundamentally different processing methods: dry bard production; aerobic microbiological processing of the bard liquid phase to produce a protein feed product; anaerobic bard processing to produce biogas; and combined schemes that include mechanical separation of bard, microbiological processing of fugate, and purification of the spent culture liquid.

The cost of bard processing products using the technologies discussed above is strictly dependent on energy prices. In this respect, anaerobic bard processing technologies have clear advantages, as their product is biogas containing 70-80% methane.

The biogas yield per 1 ton of bard is 40-100 m^3 with a methane content of up to 65-70%. The analysis of the low-waste technology of grain bard processing shows that the method of bard processing into biogas is more energy-efficient than other technologies. By using biogas energy for own technological needs, it is possible to drastically reduce the cost of the associated feed product and guarantee the profitability of post-alcohol bard processing even in the presence of energy-consuming technological operations.