

## Bio-Methane Production from Dairy Wastewater Applying *Lactobacillus Delbrueckii* Spp. *Bulgaricus* in the Acidification Stage

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The concept of renewable energy and waste recycling has recently received a lot of attention. Dairy wastewater and by-products, if not handled properly, are huge pollutants and at the same time, they are suitable materials for producing renewable energy – bio methane. The aim of this study was to assess the potential of utilizing *Lactobacillus delbrueckii* spp. *bulgaricus* in the acidification stage in order to increase the yield of bio-methane. Using the nuclear magnetic resonance was determined that dairy wastewater is a good source of important bio-refinery relevant compounds such as lactose, lactic, acetic and citric acid, amino acids, alcohols, organic acids and others, therefore wastewater has a potential to be utilized during fermentation as nutrients source. The efficiency of the methanogenesis process and the biogas yield is significantly affected by the fermentation protocol and the wastewaters sample utilized. During the one-stage biogas production, lactic acid bacteria were not added to the wastewater. During the two-stage biogas production, acetogenesis and methanogenesis occurred separately with the addition of *L. delbrueckii* during the acetogenesis stage. The separation of acetogenesis and methanogenesis in a two-stage process is preferable, as it increases methane content. The highest yield of methane was obtained from wastewater upon two-stage fermentation (76% two-stages compared to 38% one-stage). Therefore, *L. delbrueckii* have the potential to be utilized to ferment dairy wastewaters and produce methane. Such treatment of wastewater not only produces methane, but also decreases the polluting effect of the waste streams, by reducing the chemical oxygen demand and biological oxygen demand to 0.199 and 0.031 g/l, respectively. The content of H<sub>2</sub>S in biogas from the wastewater samples varied from 0 to 252.5 ppm and is dependent on the fermentation protocol and the wastewater sample utilized.

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### Biography:

Dalia Cizeikiene was carried out PhD study at Kaunas University of Technology, Faculty of Chemical Technology, Department of Food Science and Technology during the years 2010-2014. The PhD thesis "Bioproducts of bacteriocins producing lactic acid bacteria, their antimicrobial and phytase activities, and applications" was defended in 2015. From 2015 year a lecturer at Kaunas University of Technology. Research area: Food Science and Technology, Biotechnology, Lactic acid bacteria application for food technology and biotechnology, Lignocellulose material bioconversion in to valuable compounds, Biogas production from dairy waste water.