

## Cereal Bioproducts Conversion to Higher Value Feed by Using *Pediococcus* Strains Isolated from Spontaneous Fermented Cereal, and Its Influence on Milk Production of Dairy Cattle

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**Abstract :** The environmental impact of agricultural bioproducts from the processing of food crops is an increasing concern worldwide. Currently, cereal bran has been used as a low-value ingredient for both human consumption and animal feed. The most popular bioprocessing technologies for cereal bran nutritional and technological functionality increasing are enzymatic processing and fermentation, and the most popular starters in fermented feed production are lactic acid bacteria (LAB) including pediococci. However, the ruminant digestive system is unique, there are billions of microorganisms which help the cow to digest and utilize nutrients in the feed. To achieve efficient feed utilization and high milk yield, the microorganisms must have optimal conditions, and the disbalance of this system is highly undesirable. *Pediococcus* strains *Pediococcus acidilactici* BaltBio01 and *Pediococcus pentosaceus* BaltBio02 from spontaneous fermented rye were isolated (by rep - PCR method), identified, and characterized by their growth (by Thermo Bioscreen C automatic turbidometer), acidification rate (2 hours in 2.5 pH), gas production (Durham method), and carbohydrate metabolism (by API 50 CH test ). Antimicrobial activities of isolated pediococcus against variety of pathogenic and opportunistic bacterial strains previously isolated from diseased cattle, and their resistance to antibiotics were evaluated (EFSA-FEEDAP method). The isolated pediococcus strains were cultivated in barley/wheat bran (90 / 10, m / m) substrate, and developed supplements, with high content of valuable pediococcus, were used for Lithuanian black and white dairy cows feeding. In addition, the influence of supplements on milk production and composition was determined. Milk composition was evaluated by the LactoScope FTIR" FT1.0. 2001 (Delta Instruments, Holland). *P. acidilactici* BaltBio01 and *P. pentosaceus* BaltBio02 demonstrated versatile carbohydrate metabolism, grown at 30°C and 37°C temperatures, and acidic tolerance. Isolated pediococcus strains showed to be non resistant to antibiotics, and having antimicrobial activity against undesirable microorganisms. By barley/wheat bran utilisation using fermentation with selected pediococcus strains, it is possible to produce safer (reduced Enterobacteriaceae, total aerobic bacteria, yeast and mold count) feed stock with high content of pediococcus. Significantly higher milk yield (after 33 days) by using pediococcus supplements mix for dairy cows feeding could be obtained, while similar effect by using separate strains after 66 days of feeding could be achieved. It can be stated that barley/wheat bran could be used for higher value feed production in order to increase milk production. Therefore, further research is needed to identify what is the main mechanism of the positive action.

**Keywords :** barley/wheat bran, dairy cattle, fermented feed, milk, pediococcus

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