

Abstract

Traditional fermented foods are an undiscovered source of many microorganisms with valuable technological properties. Therefore, the aim of this study was to analyze the bacterial microbiota of two fermented products – sauerkraut and Bryndza Podhalańska cheese, including the isolation and identification of dominant strains of lactic acid bacteria, as well as the characteristics of individual cultures in terms of selected technological features.

The research covered sauerkrauts made in laboratory conditions from white cabbage of the Kamienna Głowa, Ramco F1, Manama F1 and Galaxy F1 varieties, as well as Bryndza Podhalańska cheeses, obtained from various certified producers from the Lesser Poland Voivodeship in September 2016 and in July, August and September 2017. Their analyzes were carried out using both classical methods (culture and fermentation tests) as well as modern methods of molecular biology (PCR-RAPD, Sanger sequencing, NGS) and chromatography (HPLC, HS-SPME-GS-MS).

The results of the conducted research showed that lactic acid bacteria belonging to the former genus *Lactobacillus* (*L. plantarum*, *L. brevis*, *L. paraplantarum*) and *Leuconostoc* (*L. mesenteroides*) are involved in the fermentation process of white cabbage. The variety of the vegetable had a significant impact on the quantitative and qualitative composition of the product. Bryndza Podhalańska cheeses, in turn, contains bacteria belonging to the genus *Lactococcus* (*L. lactis*) and *Streptococcus* (*S. macedonicus*, *S. thermophilus*), to a lesser extent also bacteria belonging to the former genus *Lactobacillus* (*L. paracasei*, *L. plantarum*, *L. brevis*, *L. fermentum*, *L. parabuchneri*), *Leuconostoc* (*L. mesenteroides*) and *Enterococcus* (*E. durans*).

The analysis of the technological suitability of 10 selected cultures of lactic acid bacteria showed that the tested strains are not able to effectively coagulate milk. However, all of them were capable of fermenting cabbage juice. Changes in pH and total acidity, content of organic acids, sugars and volatile compounds determined in these fermented samples showed that strains isolated from sauerkraut generally modified the environment better than strains isolated from Bryndza Podhalańska cheeses. Nevertheless, these features were strain-dependent. Among the tested cultures, the *L. plantarum* k7 strain isolated from sauerkraut has the greatest potential for use in the plant-based fermentation industry.

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