**Impact of Exopolysaccharide Producing Starter Culture of Industrial Importance on the Volatolomic Profile of Fermented Milk Products**

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**Introduction :** Exopolysaccharide (EPS)-producing lactic acid bacteria have received increasing interest in the dairy industry because of their capability to improve flavor characteristics, produced with either individual or mixed strains of Lactobacillus delbrueckii subsp. bulgaricus (LB) and Streptococcus thermophilus (ST). This study aims to go deeper to the volatolomic profile of fermented milk produced by individual or mixed strains of EPS producing LB and ST to understand the influence of these strains and EPS on the main flavor pathways.

**Materials :** Four different fermented milk using specific single strain (ST or LB) as well as four different combinations of combined strains (ST + LB) fermented milk were prepared by selecting the two different EPS producers of each yogurt starter species. Partially skimmed UHT milk was used for the preparation of combined and single strain fermented milk and the fermentation was carried out at 43 °C or 37 °C respectively until the pH reach 4.55-4.65. Samples were stored at 4 °C for 14 days. The headspace solid-phase microextraction (DVB/Carboxen/PDMS fiber) coupled to gas chromatography-quadripolar mass spectrometry was used to analyze the volatolomic profile of the 8 fermented milk (n=3). Complementary GC-MS analysis was performed using a Time-Of-Flight mass spectrometer to confirm identification of volatiles compounds. Unfermented milk was used as control.

**Results :** The different fermented milk exhibited different qualitative and/or quantitative volatolomic profiles. More than 60 different volatile metabolites were identified depending on the samples. Aldehydes, ketones, acids, alcohols, alcohol esters and aromatic compounds were among them. Fermented milk prepared from LB strains demonstrated the production of Acetaldehyde (green apple-like) while it was absent in the ST fermented milk. On the other hand, ST strains fermented milk produced more Acetic (vinegar like) and Hexanoic (pungent) acids than LB fermented milk. Additionally, the characteristics metabolic compounds related to fermented milk such as Diacetyl (buttery), 2,3-Pentanedione (sweet) and Acetoin (creamy) were higher in ST fermented milk whereas 2-Nonanol (musty) was only found in LB fermented milk. Moreover, one specific strain of ST was able to produce ethanol when used alone but when combined with other LB strains, the ethanol production was suppressed. Finally, fermented milk prepared with selected mix strains exhibited interesting volatolomic profiles in terms of Acetaldehyde, Diacetyl, 2,3-Pentanedione, 2-Nonanone and Acetoin contents depending on the strains combination.

**Conclusion:** The identification of several LB and ST strains in fermented milk products has increased interest to the growing demand for flavor in numerous industrial applications. Results suggest that fluctuation in the concentrations of specific volatile compounds as well as EPS may affect the difference in fermented milk odor perception. Indeed, differences in flavor perception can be explained by volatolomic profiles depending of the strains. Our results also show that the final profile of volatolomics and the general flavor of fermented milk products can be determined by choosing the proper combinations of LB and ST for the starter culture.

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