

3. Streszczenie w języku angielskim

Mead is a traditional alcoholic beverage made by fermenting a water solution of bee honey. Its organoleptic quality, including its characteristic aroma, is determined by several factors such as the type of raw material, the strain of yeast used for fermentation, and the aging time. The contemporary standard in the study of odor compounds in food is the sensomic approach, which provides detailed knowledge about the molecular basis of product aromas. Until now, this method had not been applied to the analysis of mead, limiting the full understanding of its sensory characteristics. Therefore, the main aim of the presented research was to apply the sensomic approach in the analysis of mead aroma, which examines odor-active compounds at the molecular level and allows for the identification of key odor compounds characterizing its aroma. Detailed analysis of the behavior of these compounds, combining both targeted and untargeted analyses at each stage of production, indicates the possibility of influencing the final aroma of mead through the type of raw material, wort heating, type of fermentation, or aging time. The research identified 9 key odor compounds responsible for the aroma of trójniak-type mead, determined its odor profile, and monitored changes in the concentrations of odor compounds throughout the entire production process. In the next stage, 12 model meads were prepared, differing in the variety of bee honey (acacia, buckwheat, linden), type of fermentation (spontaneous, yeast, inoculation with *Galactomyces geotrichum* molds), and the use of wort heating. In each sample, significant odor-active compounds and their aromatic profiles were determined, allowing for the assessment of the impact of individual production variables on the final character of mead. The variety of bee honey had the greatest impact on differences in the odor profile. It was shown that spontaneous fermentation led to increased production of compounds from the fruity and undesirable odor groups compared to yeast fermentation, while meads fermented with *Saccharomyces cerevisiae* yeast were characterized by greater consistency and predictability of aroma. Additionally, during the 12-month aging period, a significant decrease in the intensity of both groups of compounds was observed, highlighting the important role of this process in shaping the final aroma of mead.

Key words: odor-active compounds, gas chromatography, olfactometry, mead

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