

Comparison of Dip-it-DART-Orbitrap-MS With Nitrogen Plasma to HPLC/Orbitrap-MS in Profiling Aromatic Glycoconjugation in White Grapes

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Direct analysis of aromatic glycosidic precursors in plants has posed an analytical challenge for decades. Traditional techniques, such as SPE-GC/MS, primarily provided information on volatile aglycones released through hydrolysis. However, the application of high-resolution mass spectrometry combined with liquid chromatography has enabled the direct analysis of intact glycosides without the need for derivatization or hydrolysis. Advances in soft ionization methods, such as DART, offer a novel approach to exploring the hidden aromatic potential in grapes without chromatographic separation. In this work, we present a novel and rapid method for screening aromatic glycosidic precursors in white grapes using high-resolution mass spectrometry (Orbitrap) combined with the soft ionization DART method with nitrogen plasma. Optimization of N₂-DART ionization parameters, including grid voltage, gas temperature, and Dip-it sampler speed, performed on selected synthetic glycosidic precursors, allowed the establishment of characteristic ionization patterns and evaluation of 15 groups of glycosidic precursors. The results from the profiling analysis using the N₂-DART-Orbitrap-MS method are comparable to those obtained by HPLC/Orbitrap-MS method. This new analytical approach, N₂-DART-Orbitrap-MS, reduces drastically analysis time by eliminating the need for chromatographic separation when screening glycoside precursors, uses a convenient Dip-it tips for sampling. It also allows for deeper exploration of ionization using nitrogen plasma, applied for the first time in the analysis of glycoside precursors, demonstrating the applicability of this method for the rapid characterization and screening of glycosidically bound aroma compounds in plants.

Słowa kluczowe

DART, glycoside precursors, monoterpenes, Orbitrap, Penning ionization

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