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# Development, validation and application of a fast UHPLC-HRMS method for the analysis of amino acids and biogenic amines in wines and musts.

The amino acids in grape juice are an important nitrogen source for yeast during alcoholic fermentation. Additionally, certain AAs are precursors to some of the volatile compounds found in wine and overall, they have an important role in the aromatic complexity of wines. Biogenic amines are produced during the fermentation process by microbial decarboxylation of the corresponding amino acid precursors. Yet, their fate is not only determined by the presence of microorganisms as they are also produced by the grape berries in response to abiotic factors. The presence of biogenic amines affect the sensory attributes of wines by reducing the varietal character and giving rise to meaty and metallic aromas in wines having higher pH values. Moreover, they also have a detrimental impact on consumer health. Due to the importance of those compounds, several detection and quantification methods have been designed and published. However, to the best of our knowledge, none of them entailed the use of ultra-high performance liquid chromatography (UHPLC) coupled to a high-resolution mass spectrometry (HRMS). In this study, an innovative UHPLC-HRMS method useful for fast quantification of a broad range of amino acids and amines was developed. Twenty-five amino acids, twelve biogenic amines as well as glutathione and S-methylmethionine were identified and quantified in a single chromatographic run taking only 12 minutes. Additionally, a second run of the same length involving the use of o-phthalaldehyde derivatisation reagent was developed to quantify two more amines and ammonium. Validation of the method was performed in relation to the limit of detection, limit of quantification, linearity range, repeatability, reproducibility, and recovery. Once validated, the method was successfully tested on commercial oenological samples and grape musts, demonstrating its applicability to fast routine analysis of musts and wines.

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