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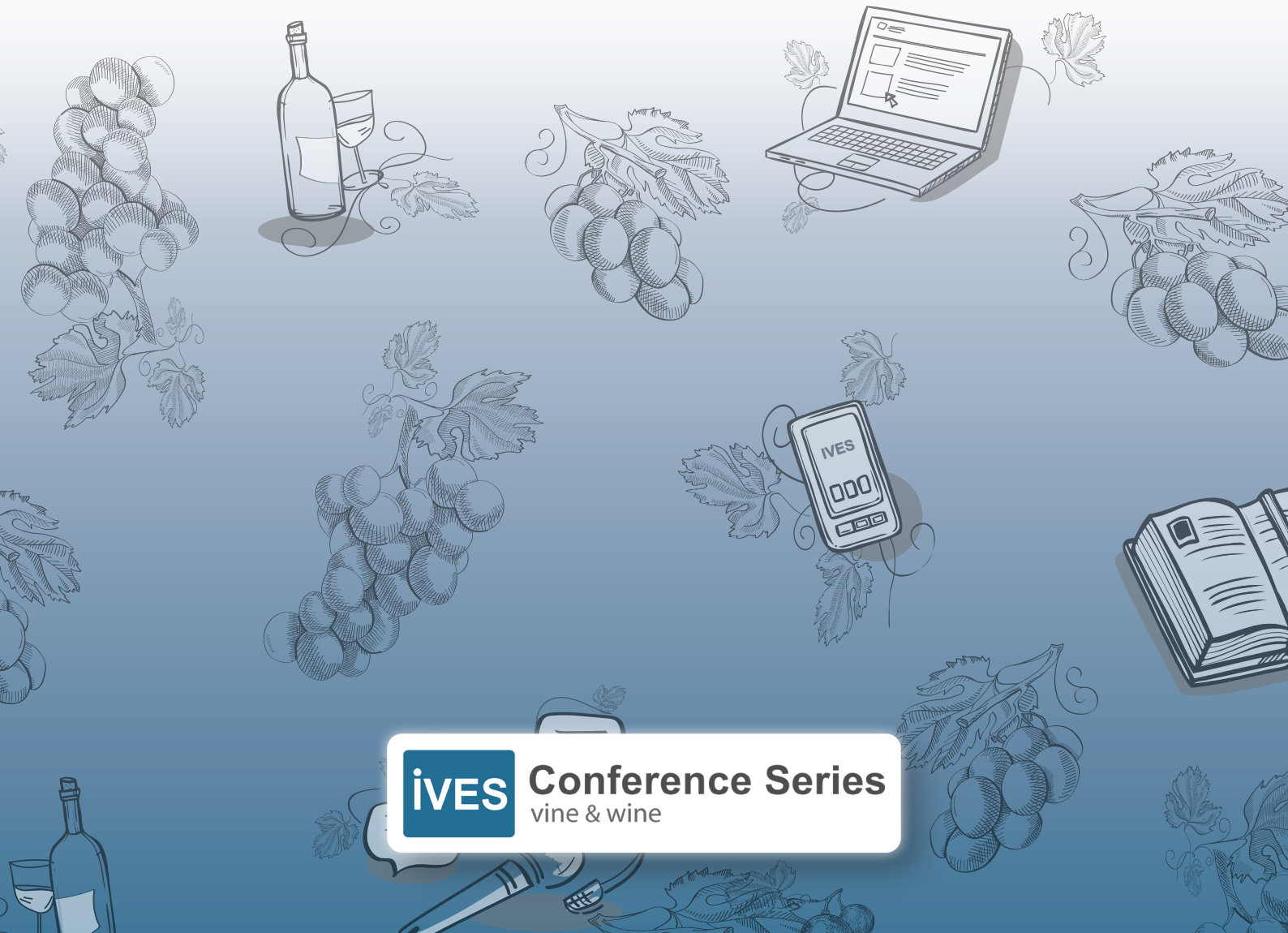
Book of Abstracts



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INFORMATIONS

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FLASH TALK

Effect of must temperature and aspergillopepsin-I supplementation on PR-protein derived peptides

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ABSTRACT

Protein instability in wines is challenging, and despite many efforts to find satisfactory alternatives to bentonite, both in terms of stability and quality, the solutions are limited in the wine industry. Among those proposed, aspergillopepsin-I supplementation (AP-I) completely stabilises wine when combined with the flash heating of musts, without compromising wine quality [1, 2]. However, the pasteurisation of must remains an arduous and economically disadvantaged process. Nevertheless, AP-I supplementation during fermentation has been reported to improve stability indices [3] through a mechanism that is still not fully explained.

This study investigates the effect of AP-I supplementation on the number and concentration of peptides resulting from the degradation of grape-derived proteins and the influence of temperature and reaction time. A Gewürztraminer grape must was heated at 20°C, 30°C, and 40°C in the presence or absence of AP-I (100 µg/L). The temperature was maintained for 1, 180, and 360 min, after which the musts samples were frozen, until analysis. The peptide composition of the samples was analysed using high-throughput ultra-high pressure liquid chromatography coupled to data-independent acquisition-based ion mobility separation-enabled high resolution mass spectrometry (UPLC-DIA-IMS-HRMS) and peptide mapping was conducted according to [4], [5].

AP-I supplementation significantly increased both the number of individual peptides (up to +51% at 40°C) and the abundance (up to +120% at 20°C) of grape-derived peptides. A statistically significant increase was observed regardless of temperature and was consistent across all analysed protein derivatives (Chitinases, PR-protein, Polyphenol oxidases, and Thaumatin-like proteins). Regarding reaction time, all treatment intervals increased both the number and concentration of grape-derived peptides with respect to the untreated control. However, extended treatment duration did not result in a further increase, potentially indicating an elevated rate of reaction with proteins suspected to be degraded.

The addition of AP-I to grape must, enlarged the peptides pool within the grape juice, also at temperature below 40°C. This new approach in the use of the enzyme is suggesting a proteolytic effect not only when AP-I is coupled with high temperature.

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