

T06. Predictive power of LDA to discriminate abnormal wine fermentations

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Wine fermentation is a critical step of winemaking. Abnormal behaviors can affect seriously the quality of the final product. However it is difficult to know this information with anticipation. In this study, the predictive power of Linear Discriminant Analysis (LDA) was evaluated in order to discriminate the behavior of wine fermentation. Different chemical concentrations were estimated from MIR spectroscopy yielding temporal profiles of concentrations from eighteen industrial wine fermentations of *Cabernet Sauvignon*. The statistical procedure consisted in a pre-treatment with an exponential curve fitting, then the parameters of these curves were used to feed LDA and finally the evolution of the prediction error as a function of the time was calculated, giving an idea of the predictive power of the method. The methodology was applied to different times between the beginning and the end of fermentation (72, 100, 150, 250 and 400 hours). The results were similar in all the times studied; they revealed that seven of twenty-eight variables minimized the Standard Error of Cross Validation (SECV) for the different times. The slopes of the ethanol and density profiles had high influence in the performance of the model. Before 100 hours, it is possible to predict if the fermentation will have problems or not. The objective was to predict as soon as possible the behaviour of fermentation, thus the enologist could correct the problems in time and the process would finish optimally.

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