RELEVANCE OF AN IMMUNOASSAY TEST FOR RAPID DETECTION OF *BOTRYTIS CINEREA* IN 'UGNI BLANC' MUSTS AND WINES•

Louise URRUTY, Janine AUDEBERT, Guillaume SNAKKERS, Gérald FERRARI, Luc LURTON
Station Viticole du Bureau National Interprofessionnel de Cognac, 69 rue de Bellefonds, 16100 Cognac, F.
E-mail : gferrari@bnic.fr

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1. INTRODUCTION

The development of *Botrytis cinerea* on grapes may have negative consequences on the quality of wines and spirits (Galy *et al*., 1992). It is thus useful to have *Botrytis* indicators that may be easily and rapidly analysed, at the different stages of the process (Urruty *et al*., 2008). Different analytical markers (glycerol, gluconic acid, laccase activity, sugars,…) can be used on musts (Bertrand *et al*., 1976; Blouin, 1987; Galy *et al*., 1992) but their analyses are often time-consuming. Moreover, some of them, like glycerol or laccase activity, are less relevant in wines.

A new immunoassay test, called the *Botrytis* Lateral Flow Device (B-LFD), has appeared on the market over the last few years. It consists of detecting, by immunochromatography, the presence of a glycoprotein of *Botrytis* in the must (Dewey *et al.*, 2008). This test, rapid and very simple to use, is carried out on a strip which is dipped for 10 minutes in a diluted sample. The result is read immediately. The interpretation is done visually for a qualitative result. For semi-quantitative results, a specific reader can be used.

2. MATERIALS AND METHODS

This innovative tool has been tested on 'Ugni Blanc' musts and wines, using the specific reader. The signal intensity given by the reader is referred to as the "B-LFD result" in this document.

For 2 years, 140 wines have been collected before distillation, from operators in the Cognac area. These wines have been analysed and the B-LFD result has been compared with two other types of *Botrytis* markers:

- gluconic acid, measured by an enzymatic method, in all the samples;
- sugars and polyols, measured by gas chromatography after silylation, in 70 wines in 2008 and 40 wines in 2009.

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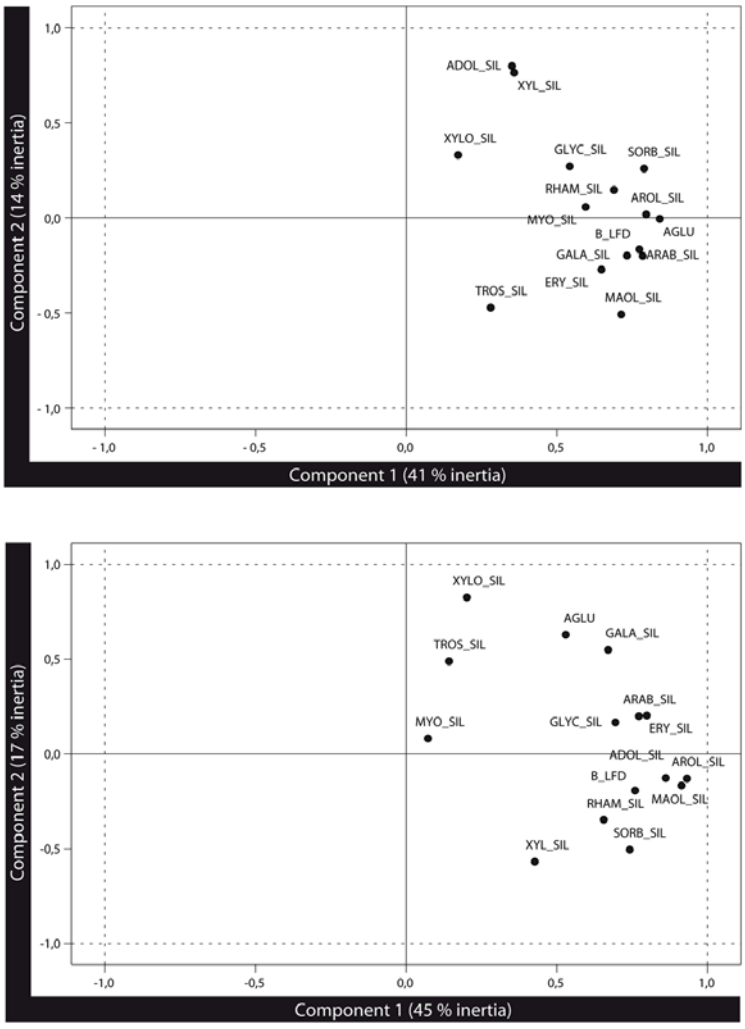
In addition, tests were carried out on musts in 2009. The B-LFD result and the gluconic acid concentration were determined on a selection of 50 musts. These musts were obtained by crushing 20 grape samples collected in different vineyards of the Cognac area, at different dates near harvest time. The percentage of *Botrytis* infection was estimated before crushing, by visual counting of infected berries.

3. RESULTS

3.1. Results in wines

Principal Component Analysis (PCA) shows that all the compounds tested correlate with each others for the wines of the 2008 and 2009 harvests (fig. 1).



ADOL_SIL : Adonitol
AGLU : Gluconic acid
ARAB_SIL : Arabinose
AROL_SIL : Arabitol
ERY_SIL : Erythritol
GALA_SIL : Galactose
GLYC_SIL : Glycerol
MAOL_SIL : Mannitol
MYO_SIL : Myoinositol
RHAM_SIL : Rhamnose
SORB_SIL : Sorbitol
TROS_SIL : Trehalose
XYL_SIL : Xylitol
XYLO_SIL : Xylose

Fig. 1 - PCA of 2008 (top) and 2009 (bottom) harvest wines.

While gluconic acid and B-LFD show similar behaviours in 2008, the immunoassay response reveals to be a better global indicator than gluconic acid for the wines of the year 2009.

In order to assess the relevance of this test, the correlation between the B-FLD result and the other markers has been checked: not only is the B-FLD at least as effective as the analysis of specific compounds, moreover, it can be used directly on site.

3.2. Results in musts

The correlation between the gluconic acid content and the B-FLD result (fig. 2) appears to be good (R^2=0.66) for lower gluconic acid contents (<150 mg L^{-1}). It is not as good when considering all the values, because of six samples presenting high concentrations of gluconic acid but normal B-FLD results. Most of those six samples come from the same vineyard. These high levels of gluconic acid may be linked with the development of second invaders on these grapes.

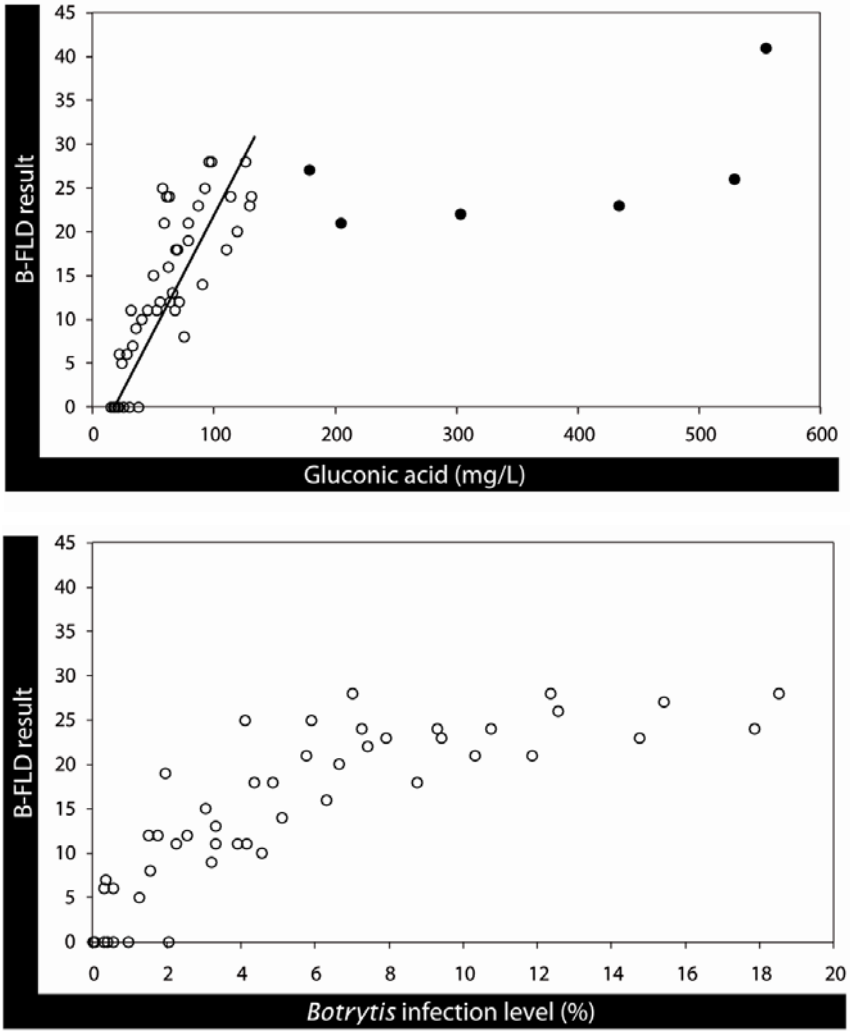


Fig. 2 - Relationship, in musts, between the B-LFD result and the gluconic acid content (top) and the *Botrytis* infection level (bottom).

A relationship between B-FLD results and *Botrytis* infection levels exists but appears not to be linear (fig. 2). This result suggests that the immunoassay result correlates more with the level of *Botrytis* infection than with gluconic acid concentration.

4. CONCLUSION

These first results show the relevance of the immunoassay test as a *Botrytis* indicator in musts and moreover in wines. Nevertheless, the average levels of *Botrytis* infection were not important in 2008 and 2009 (around 3.5 % at the beginning of the harvest). These observations have now to be confirmed on other vintages, with wider ranges of *Botrytis* levels.

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Abstract
A new immunoassay kit, called *Botrytis* Lateral Flow Device has been tested to detect *Botrytis cinerea* on musts and wines. The comparison of the immunoassay result with the quantitative analysis of usual markers (gluconic acid, sugars and polyols) showed the relevance of this innovative tool.

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