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Fungal flora in the wine regions of Vinho Verde (Portugal) and Alvariño (Spain): Incidence of *Botrytis cinerea* and *Penicillium expansum* and subsequent production of off-odours in grape juice

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Abstract

Vintage in the wine region of Vinho Verde (North of Portugal) is carried out during the last week of September or even during early October. In the homologue wine region of Alvariño (South of Galicia, Spain), harvesting is carried out earlier. The *Gray mould* - caused by the development of *Botrytis cinerea* - is the most frequent grape disease in these regions and it may be associated to some species of *Penicillium*. This may lead to the production of volatile compounds which may persist during the vinification process.

The purpose of this assay was to assess whether significant differences in the incidence of *B. cinerea* and *Penicillium* spp. (mainly *P. expansum*) exist in the vineyards of both countries. In a second phase, the isolates of *B. cinerea* obtained were tested for their capacity to induce the production volatile compounds.

Grape samples were incubated until fungi were observed and then transferred to new plates for genera identification. Those isolates identified as *Penicillium* spp. were further identified to species level. Each one of the *B. cinerea* isolates were inoculated in grape juice and re-inoculated with *P. expansum*. The samples were analyzed for volatile compounds by Solid Phase Micro-Extraction (SPME) coupled with GC/MS (Boutou *et al.*, 2007). The compounds analyzed were geosmin (GEO); methylisoborneol (MIB); fenchone; fenchol and chloroanisoles.

The vineyards in Portugal registered higher incidence of *Penicillium* spp and specifically of *P. expansum*. About 20% of samples presented peaks at the retention time of GEO. However, although the characteristic ion of GEO was detected (m/z 112), this was not the main ion in the spectrum. All the samples accumulated MIB; 50% accumulated 1-octen-3-ol; 44% accumulated fenchone and 78% accumulated fenchol. One or more trichloroanisols were detected only in 1 to 5 % of the samples. The higher incidence of *P. expansum* in Portuguese vineyards may be due to a later harvesting, when rainfalls are more common. Proper agricultural management which may include the use of weaker rootstocks to advance the ripeness of grape should be considered. There seems to be higher incidence of other fungal metabolites different from GEO that cause off-odours. Actually, MIB was detected in all the samples. Accumulation of GEO may occur in very specific incubation conditions of the fungi responsible.

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