

## Residues of mancozeb, glyphosate, copper and manganese in Isabella grape juice and wine made from grapevines cultivated under conventional and organic systems

Alberto Miele<sup>1</sup>, Luiz Antenor Rizzon<sup>1</sup> and Sônia C. do N. de Queiroz<sup>2</sup>

<sup>1</sup>Embrapa Uva e Vinho, Caixa Postal 130, 95700-000 - Bento Gonçalves, RS, Brazil

<sup>2</sup>Embrapa Meio Ambiente, Caixa Postal 69, 13820-000 - Jaguariúna, SP, Brazil

E-mail: miele@cnpuv.embrapa.br

Considering the perspective to have an increase in number of growers and area of grapes cultivated under organic system in the State of Rio Grande do Sul, Brazil, this research had the objective to evaluate the transformation of an 35 year-old Isabella (*Vitis vinifera* L.) vineyard cultivated under an conventional system to an organic one. The vineyard was divided in two blocks, each block in four parcels. The experiment was conducted during the 2004, 2005 and 2006 vintages.

Grapevines under conventional system were pulverized with the fungicides Bordeaux mixture and mancozeb and weeds were controlled by glyphosate. Those under organic system only received Bordeaux mixture and weeds were machine controlled. Variables evaluated were related to many aspects of the vineyard, grape juice and wine produced. This work, however, only refers to residues of mancozeb, glyphosate, copper and manganese in Isabella grape juice and wine.

Residues of mancozeb were determined as carbon disulfide evolved during acid digestion, and expressed as carbon disulfide; those of glyphosate, by cation-exchange chromatography with postcolumn derivatization and fluorescence detection; and those of Cu and Mn, by atomic absorption spectrophotometry.

Results show that residues of the fungicide mancozeb and the herbicide glyphosate were not detected in grape juice and wine at the level of 0.03 mg kg<sup>-1</sup>.

Regarding metal residues related to fungicides, Cu concentrations (in mg L<sup>-1</sup>) of conventional grape juices were 0.81 in 2004, 0.81 in 2005 and 1.05 in 2006 (average of 0.89 mg L<sup>-1</sup>); those of organic ones were 0.66 in 2004, 0.87 in 2005 and 0.73 in 2006 (average of 0.75 mg L<sup>-1</sup>). Mn concentrations (in mg L<sup>-1</sup>) of conventional grape juices were 0.96 in 2004, 0.69 in 2005 and 0.77 in 2006 (average of 0.81 mg L<sup>-1</sup>); those of organic ones were 0.55 in 2004, 0.84 in 2005 and 0.01 in 2006 (average of 0.47 mg L<sup>-1</sup>).

Isabella wines had equal Cu concentrations (in mg L<sup>-1</sup>) for both conventional and organic wines, i.e., 0.06 in 2004, 0.06 in 2005 and 0.08 in 2006 (average of 0.07 mg L<sup>-1</sup> for both wines). Mn concentrations (in mg L<sup>-1</sup>) of conventional wines were 1.87 in 2004, 2.42 in 2005 and 1.37 in 2006 (average of 1.89 mg L<sup>-1</sup>); those of organic ones were 1.26 in 2004, 1.59 in 2005 and 1.00 in 2006 (average of 1.28 mg L<sup>-1</sup>).

These results show that there were no striking differences in Cu and Mn concentration in the conventional and organic Isabella grape juice and wine. They also show that no residues of mancozeb and glyphosate were found in these products. This means that it is possible to cultivate Isabella grapevines adopting a "minimal cultivation" without causing considerable negative impacts to the environment.

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