

## **The winemaking protocol affects the residual phosphonate content in wine.**

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The main reason to measure phosphonates in grape and wine is linked to the Fosetyl-Al (Fos-Al) residues and their legal definition and chemical determination since phosphonates are the main degradation product of that chemical. Regulations and definitions differ in EU, USA, China and India, and recently some misinterpretations caused some concern to wine exporters. The EU Maximum Residue Level for Fos-Al in wine-grape is 100 ppm and refers to the sum of fosetyl, phosphonic acid ( $H_3PO_3$ ) and their salts, expressed as fosetyl. This limit is not a problem for the European wines since it also takes into account the contribute of the phosphonic acid-based products used in vineyard for leaf-fertilization and fungicide treatments, mainly against *Plasmopara*. The USA limit for Fos-Al in wine grape is 10 ppm and does not include phosphonic acid and salts that, being considered fertilizers, are not classified "pesticides". Recently, some passages in the US EPA 180.415: Aluminium tris (O-ethylphosphonate) regarding the degradation compounds of Fos-Al caused a misunderstanding of the actual limit and problems - finally solved - to the wine-trade towards USA. But, attention has still to be payed to China and India, where the 10 ppm limit includes phosphonic acid and salts. For these reasons we focused on phosphonates and the effects of different winemaking protocols on their content.

10 grape batches were processed using 2 yeast strains (Montrachet and VIN13) to produce 20 white and 20 red wines. Each batch was spiked with varied doses (max 100 mg/L) of  $H_3PO_3$  (CAS-13598-36-2). White wine protocol accurately avoided oxidation, using argon blanketing and ascorbic acid, while red wine protocol was more "oxidative", including manual movement of skin cap twice a day, higher fermentation temperature and absence of argon and ascorbic acid. No differences were observed between phosphonate content in juice and in white wines, while phosphonates was roughly halved in red wines. No differences were found between the 2 yeast strains used.

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