

## Pesticides in wine

"A stuck fermentation is a winemaker's worst nightmare" according to Ed Flaherty, chief winemaker at Errazuriz in Chile. Sluggish or delayed fermentations leave juice vulnerable to microbial attack, oxidation and irreversible damage to aroma and flavour. It is well known that pesticide residues in grape juice can cause problems during fermentation. Fungicides in particular can directly inhibit yeast activity and kill off yeast cells. For most grape growers, use of pesticides is an essential part of vineyard management. However, there are always concerns about health risks to humans, both through exposure of vineyard workers and in consumption of the product. Some pesticides have been linked to increased occurrences of various cancers, while some organochlorine pesticides can mimic female hormones. For producers interested in selling their products in the E.U., there are strict maximum limits specified by law.

Pesticide residues on grapes depend on various factors including concentration; number of applications; time between last spraying and harvest, and the weather. Different winemaking techniques such as skin contact; lees stirring; fining and filtration methods may affect the levels found in wine. Most winemakers would prefer to avoid contamination in the first place but may well find it useful to know how to remedy the situation should they have a problem.

Soleas and Goldberg, at the University of Toronto, have researched the potential for bentonite and kieselsol to remove pesticides (Journal of Wine Research, April 2000). They set up a fully replicated experimental vinification system to test pre- and post-fermentation treatments for their ability to remove fifteen pesticides added to two grape musts - a Cabernet Sauvignon and a Sauvignon Blanc.

The presence of pesticides slowed the rate of fermentation in both red and white musts, with some slow starts and even stuck fermentations requiring a second yeast inoculation. Addition of fining agents did not make any significant improvement - so fining is not a solution to the problem of sluggish fermentations. Pesticides at higher concentrations always resulted in chemical taints, indicating that contamination can damage wine quality.

For decreasing the concentration of most of the pesticides tested, treatment after fermentation with 0.25g/l of kieselsol was most effective or as good as any other procedure. The experiments clearly demonstrated that, when used before fermentation, kieselsol itself can damage aromas, with sulphurous taints that develop into vegetal and sauerkraut notes when pesticides are present. The authors don't recommend its use before fermentation. Fortunately, there was no loss of quality when kieselsol was used later.

Goldberg and his colleagues are continuing to study pesticides residues in wine with a forthcoming paper (unpublished) describing the occurrence of pesticides in more 3,000

unfinished wines and juices. Goldberg comments that his work is important because it “relates to the task of fixing safe and achievable limits for wine pesticide concentrations.”

As consumers become more aware of environmental and health issues, and for many wine is becoming an increasingly important part of their diet, it’s very much in the interest of the trade to take note and act on the results of research like this.

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