Oxygen-Free White Wine Press Soon to Be Unveiled

New Italian-designed white wine press allows operation in oxygen-less conditions through use of inert gas.
By Franco Ziliani

April 15, 2005

There has been an extraordinary coup for Italian winemaking. Two of Italy's most well known winemakers have designed an innovative adaptation of their white-wine presses that allows the presses to operate in oxygen-less conditions through use of inert gas. Kudos were quick in coming from prestigious international research centers, ranging from Bordeaux to California's **University of California at Davis** and **Monash University** in Australia, all labeling the new technique ingenious.

The significant innovation, which will soon be available in the U.S., comes from the mountains of the Trentino, in Italy's northeast, and two of the area's most talented winemakers: **Marco Zanoni**, of the tiny **Maso Furli** winery in Pressano, and **Mario Pojer**, who along with **Fiorentino Sandri** directs the **Pojer & Sandri** winery in Faedo. Pojer & Sandri is most famous for their Müller-Thurgau, which is the best in Italy, and for Nosiola, an aromatic Traminer. They are also recognized for superb Pinot Noirs, classic method sparkling wines, and for Faye, a Bordeaux-style red.

In Pojer's opinion, this technology will be a boon not just to the wine industry in the production of "revolutionary" white wines, but for the fruit juice and food oils industry as well. In the production of all of these products, the controlled atmosphere will preserve the characteristics of the raw material. Cut open an apple, and in two minutes it oxidizes and changes color because the oxygen burns up everything. With the Pojer-Zanoni system, the pressed fruit continues to exhibit rich fragrances of fresh fruit, not stewed apple as before.

The two winemakers' idea actually has rather deep roots, ranging from Pojer's 30 years of winemaking experience to his travels in Australia, New Zealand and California. In his travels he witnessed an almost obsessive attention to reductive conditions, with the goal of avoiding oxygen contact during the various steps of wine production. On his return, Pojer decided to follow this direction in his own cellar as well, at first through application of potassium metabisulphite and ascorbic acid to the grapes, utilizing a volumetric method of protecting the fruit by adding one drop of SO_2 and one of ascorbic acid for each kilo of grapes. This protective environment led to a definite improvement in quality. Later he used CO_2 but faced enormously high production costs.

In 2002, Pojer worked out a different solution. He tried enclosing the press, attaching a kind of bladder at the must drain, and using two nitrogen generators plus two tanks inside the cellar connected to a small 35 kw press with a 4.5 m3 capacity. Every time the internal press membrane returned to position, instead of pulling in air, it now sucked in filtered nitrogen, produced on-site. The results were extraordinary, but with one big problem, a huge energy demand. The exorbitant costs of running a 35 kw press, two generators and two dedicated tanks were extremely prohibitive.

Making this process efficient was the contribution of Marco Zanoni, who proposed using a reserve tank that would recover the gas and recycle it into the press. In practice this turned into a kind of hot air balloon connected to the press, preserving and re-using the gas at a cost of only five euros ($6.70). Thus, the balloon was filled with gas as the first grapes came into the cellar, and at the end of the crushing period, unless mistakes were made, the amount of gas remained the same. Up to 40 pressing cycles were obtained, a remarkable achievement with respect to both costs and processing efficiency.

This system then underwent further perfection, thanks to the assistance of professor **Fulvio Mattivi** of the nearby **Istituto Agrario di San Michele Adige**.

Mario Pojer's contribution was to take to extreme limits the concept of "hyper-reduction," or the total protection against oxygen of the winemaking process, by blanketing with an inert gas such as nitrogen.

The research carried out by Pojer and Zanoni, with the help of the Istituto di San Michele Adige, has led to some very significant results. Pojer recalls that with this method "we obtained a must, that after a four-hour pressing

cycle, after breaking up and re-pressing the pomace 20 times, was green in color, with tropical fruit fragrances and not the faintest whiff of anything cooked or oxidized. The pomace, too, was extremely healthy-looking, a lively green, just what we wanted for our distillations." Pojer and Sandri are among the best producers in Italy of distilled sprits from grape pomace and fruit.

This innovation in fermentation methodology has led to the question of whether hyper-reduction might contribute to the problem of stuck fermentations since the yeasts might not even have a minimum of the oxygen necessary to their functioning. But the two winemakers, to preclude any possible threat to the completion of fermentation, perform microoxygenation on the second day after the start of fermentation, in order to encourage yeast development and multiplication.

This fermentation regime favors the production of very youthful and refreshing wines, with pronounced fragrance and a bit sweet in character. The classic example is New Zealand, where 20 years of practicing this method has yielded herbaceous, fruit-driven Sauvignon Blancs that are among the world's most respected. In Trentino, the practice is applied in particular to aromatic varieties, such as Müller-Thurgau, Traminer and Sauvignon Blanc, varieties that in Pojer's opinion need this production regime to ensure a wine with varietal fidelity.

Another significant advantage of this technology is that it gives an exceptional balance between free and total SO_2. Pojer observes that with its use "we can reduce the addition of SO_2 by 30 percent and yet maintain a higher level of free SO_2 than we do with constant dosing and traditional methods. With regard to the various steps on the way to bottling, careful attention must be paid to these wines because of potential oxidation. It's almost like a time bomb."

One cannot neglect even one racking, one filtration or one centrifuging--every operation must be accompanied by an analysis of the oxidative process, by inspections of pumps and seals, and every movement of the wine must be done by inert gas, either CO_2, nitrogen or argon. These are fairly simple procedures: While fermenting, the must is blanketed by the yeasts' anti-oxidizing action, which uses up all available oxygen; from then on, all procedures must be done under inert gas.

According to professor Mattivi, this method has the advantage of adding to the wine components contained in the grape skin, in part because they are protected from oxidation, in part because of press fractions, once of poor quality, that are now high quality. This gives the wine an increased typicity although at times this may not be perceived.

"We are preserving substances present in the grape but which are lost in traditional processing," said Mattivi. "And by reducing the amount of sulfites necessary for wine stability, we make possible very significant health benefits. This technology allows the production of white wines, in reduction, with a far lower SO_2 content. And 10-20 percent of the press fractions, instead of being downgraded because of low quality, can now be used for good quality wine, resulting in new possibilities for enology."

The researchers were initially concerned about the drawbacks with the procedure. One fear was an altered evolution of the wine since the scientific literature links cinnamic acid frequently to maderization. Other worries were a possible increase in color instability, huge expenses, the need for painstaking procedures and, finally, the need to research its adaptation to each grape variety since cinnamic acid content varies significantly (from 20 to 400 mg) and could in some cases lead to wines with excessive polyphenol content. These fears, thankfully, all proved unfounded.

Competing producers have claimed that Pojer & Sandri's Müller-Thurgau is as good as it is because a big dollop (40 percent) of Sauvignon Blanc--which Pojer does grow--is blended into the wine. There is, of course, not a drop of Sauvignon Blanc in the bottle. Pojer, though, can see how critics might come to this conclusion. "To turn out a Müller-Thurgau, a rather characterless variety, with a richness that conjures up a Sauvignon Blanc, well, that's just more evidence of the value of our method," he said.

It must be further pointed out that the principal compounds involved in oxidative reactions, namely cinnamic acids, quite apart from their role in the technology, possess very probable health benefits since they are antioxidant compounds in white wines. Healthy amounts of cinnamic acids are present in both red and white wines, but in white wines they also represent the main phenolic compounds since they are the only family of phenolic compounds present to any significant degree in the pulp. Thus, in white wine production, a high

proportion can pass into the must, in contrast to substances found primarily in solid particles, in the skin and in the seeds, which are transferred in far lower quantity into the white wine must. With the system designed by Pojer, the cinnamic acids, which are natural antioxidants, become three to four times more active and result in the same beneficial qualities for white wines that resveratrol--a natural compound that may protect against cancer and cardiovascular disease by acting as an antioxidant-- serves in red wines.

Pojer & Sandri and Maso Furli sold the patent to the large Franco-Swiss company **Vaslin-Bucher**, which built a special press with the characteristics of the innovative system. Many Trentino-Alto Adige producers have quickly ordered their own, including **Cantina di Lavis**, **Cantina Produttori di Terlano**, **Erste und Neue di Caldaro** and **Maso Poli** of **Cantina di Toblino**. **wbm**

Franco Ziliani is an Italian wine writer who has specialized in Italian wines since 1985. He is a regular contributor to Harpers Wine and Decanter as well as the Italian weekly magazine Il Corriere Vinicolo.