

Winemaker Trial

Comparison of Phenolic Extraction in a GOfermentor Versus a Tank

After five years developing the GOfermentor, Dr. Vijay Singh sent the new machine to Enzo Cagnasso of the University of Torino, Italy to compare the high-tech fermentation technique to the more traditional pump-over method.

Stacy Briscoe

VIJAY SINGH PH.D., is a biotech scientist who specializes in fermentation. He has an M.S. from the **University of Pennsylvania** and a Ph.D. in biochemical engineering from **Rutgers**. He was with **Schering-Plough** from 1982 to 1997 and developed one of the first recombinant drugs—interferon alpha. In 1999, he founded **Wave Biotech** (sold to **GE** in 2007), inventing, manufacturing and marketing a disposable cell culture device known as the **Wave Bioreactor**. In 2012, he applied his knowledge of fermentation and disposable device design to improve winemaking technology, creating **GOfermentor**. In 2014, he and his wife set up a commercial winery—**Sky Acres Winery** to test and demonstrate the GOfermentor. The winery has won numerous awards over the last five years.



Why were you interested in working with the GOfermentor and comparing that technology to traditional winemaking methods? What were the traditional winemaking methods you used in comparison?

Singh: We have been developing the GOfermentor since 2014 and found that the unique punching mechanism extracts more color and tannins. It is similar to old-school foot stomping in that the must is gently crushed many times a day. This is done by inflating a flexible chamber that squeezes the grapes during the fermentation. This is done automatically every two to four hours.

We wanted to compare this technique versus the traditional tank pump-over method used in most commercial wineries. Detailed assays were performed on the same lot of grapes run side-by-side in our system versus a conventional tank. Sensory analysis was performed at six months post-fermentation and 18 months by a trained panel.

Stacy Briscoe is the assistant editor of *Wine Business Monthly*. She has been writing about wine professionally since 2015, freelancing for multiple publications including *The San Francisco Chronicle*, *Edible Communities* and *Napa Sonoma Magazine*, among others. She also maintains her own website, *BriscoeBites.com*, dedicated to wine reviews and tasting notes. Outside of wine writing, she also contributes as a freelance editor for the independent publisher She Writes Press. Stacy has a Bachelor of Arts degree in English-language literature from the University of California, Santa Cruz.



Why did you choose to use Barbera and Nebbiolo specifically for this experiment?

Singh: We engaged professor **Enzo Cagnasso** of the **University of Torino** to lead the trial as he is a world-renowned expert in phenolic extraction. His lab is well equipped to run the complex assays to quantify phenolic extraction. We chose to do the trial in Italy so that he and his staff could closely monitor the fermentation. They used Barbera and Nebbiolo because these varieties present different problems in terms of extraction of tannins and color.

Were there any winemaking issues or problems you were looking to solve or specific goals you were hoping to achieve in conducting this experiment?

Singh: We were hoping to show that we can make a better wine in terms of color and mouthfeel using our unique GOfermentor equipment than wine made in the conventional way.

Can you briefly describe how you set up this trial?

Singh: The **Castello di Neive** in Piedmont, Italy agreed to perform the trials and provide the grapes and tanks for side-by-side comparison. In return, they would use the wine (if satisfactory) in their commercial wine production. We agreed to ship two GOfermentors and associated disposables from the U.S. to Italy. Professor Cagnasso and his staff were given a contract by us to conduct the actual trials and analyze the results.

I developed the punch schedules and other operating protocols for the GOfermentor. The head winemaker at Castello de Neive chose a proprietary yeast and fermentation parameters.

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Did you come across any complications or difficulties during the course of the trial? If so, how did you overcome those issues?

Singh: We expected difficulty in setting up the equipment due to the remote location and language issues, but the local winery workers set everything up without assistance. The only problem was an issue with temperature control due to higher than expected environmental and coolant temperatures. In retrospect, we should have used two coolers per GOfermentor rather than the usual single one used.

Did your team or colleagues have any input or opinions about this trial?

Singh: We were involved in the experimental design of the trial. Measurements were sent to us by email during the runs, and any changes to the design were discussed. An interim report was published six months after the fermentations and then a final report 18 months after the runs. These also studied the effects of typical bottle aging prior to release.

What was the conclusion of your trial? Were the results as you predicted or did something unexpected occur?

Singh: The results of the trial exceeded our expectations. We would have been quite happy to make a wine of equal quality to the control which, after all, has been optimized by decades of experience. The GOfermentor is a new and unique method with only four to five years of operational experience. In all cases, the wines in the GOfermentor during this trial were, in the judgment of the sensory panel, as good as the control, but some characteristics (such as color and mouthfeel) were judged to be better. This is the result that we had hoped for based on our work in Australia, Spain and the U.S.

What were some of the winemaking lessons you learned after conducting the trial? Do you plan to adjust your current winemaking methods as a result?

Singh: As mentioned, we need to add additional cooling capabilities for full loads (>700Kg), especially in hot environments.

What were some of the comments from your team or colleagues? Did they have a preference between the wines tested?

Singh: The tasting at six months and 18 months by the sensory panel showed that the wine made in the GOfermentor had better color stability, smoother mouthfeel and fresher, fruitier notes than the controls. Samples of the wine and controls were shipped to us, and our findings were similar. The samples of GOfermentor wine and the corresponding controls were also presented to the public for tasting at the IQ trial 2019.

Do you plan to conduct a follow-up trial to re-test these results? Would you or will you conduct the same experiment with different grape varieties?

Singh: We plan to conduct a similar experiment in France with typical, local varieties. **WBM**

INSTANT WINERY



NO INSTALLATION

One ton maximum grape capacity. 4'x4' space. 110VAC.

NO WASTE WATER

Single-use liner, no cleaning. No wash or waste water, no environmental permits.

NO CLEANING

Medical grade BPA-free biodegradable single-use liner. No contamination. No off-odors.

AUTOMATED PUNCH

Unattended punch. Set schedule on smart phone.

NO PRESS REQUIRED

Built-in press. Machine presses out the wine.

\$71/month

Complete system \$1700, 0% financing 24 months.
Temperature control option extra.
Single-use liners \$100 each.

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US patent 9,260,682 9,611,452 9,802,805
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