



**GRAPE IDEA**  
Far Hills residents Vijay and Meera Singh's fermentation machine is based on a cell-cultivation process Vijay created while a VP at Schering-Plough.

and extracts color and flavor—but it's also where winemaking gets messy.

The GOfermentor automates that process. It contains a biodegradable bag with two compartments. One compartment holds up to a ton of crushed grapes. The other can be inflated to push against the grapes and force the juice through the cap. Because the bags are sealed, no water or chemicals are needed to clean the equipment, and no wastewater treatment is required, significantly cutting costs.

After fermentation, the wine is strained into another bag, and the skins and seeds are recycled as fertilizer. "There's no chemicals in it. It's just grape skins," Vijay says. "The bag you crumple up, and it's just household trash."

The Singhs use the same concept in their aging room, storing the wine in disposable liners inside steel barrels. As wine is removed for bottling or sampling, the liner collapses, preventing air exposure and evaporation.

The Singhs' solar-powered operation is housed in a converted stable on the 50-acre property where they live. Also on the property: Meera's glass studio.

Inside their home, laboratory beakers sit alongside wine glasses—reminders of Vijay's pharma roots.

Sky Acres opened a new chapter for the Singhs. Meera, 56, is a graphic designer; now she creates Sky Acres's wine labels and marketing materials. Vijay, 58, was a vice president of biotechnology process development at Schering-Plough in the late 1990s. While at the pharma giant, he created the Wave Bioreactor, a low-cost method of cell cultivation for making vaccines, antibodies and proteins using disposable bags. The method is now an industry standard.

When Schering-Plough waived their rights to the Wave Bioreactor, Vijay launched a company to sell his invention. Soon, he recalls, "I was back working 12 hours a day, and we had a 10-year-old son who needed our attention, I said, 'The hell with this.' We got a good offer from GE, sold the company, and decided to just sit here and watch the grass grow and do nothing. Fly airplanes." (Both Singhs are pilots—hence the name of the winery.)

The Singhs began to grow grapes on a

## It's in the Bag

A former pharma exec's invention aims to take the mess out of winemaking. *By Marlaina Cockcroft*

**V**ijay and Meera Singh want to clean up the winemaking business. "It's just a mess," says Vijay, a former pharmaceutical executive. "It's so dirty a job." His solution: a machine that ferments at the touch of a button.

"In a funny way, our wine is made kind of like a pharma process," says Singh. "Everything is clean, closed, sterile. No muck, no dirt."

At the heart of the process is GOfermentor, a machine he invented to automate winemaking. A number of wineries have given GOfermentor a spin, and wines produced using the machine at

Sky Acres, the Singhs' winery in Far Hills, have been honored in international competitions.

The boxy GOfermentor—it's about the size of a washing machine—is designed to save space, money and water, while eliminating the need for chemicals.

In traditional winemaking, the grape skins and seeds—known as the cap—are left in the tank to add color and flavor, but the gas produced by the yeast in the liquid causes the skins and seeds to float to the top. Periodically, the winemaker must punch down the cap to keep it immersed in liquid. That prevents contamination

# innovation

3-acre plot, and Meera became a WSET level-3 certified sommelier. They realized traditional fermenting and cleaning methods would be too taxing for the two of them, and the township wouldn't permit waste treatment on the site. "I got this idea that maybe I could use the same kind of background I had in pharma, and we could actually make wine in bags," says Vijay. They launched Sky Acres Winery in 2014, then adapted the GO-fermentor for commercial use in 2015; it sells for about \$2,000. The required base rents for a dollar a day; bags are extra.

Thirteen wineries tested the GO-fermentor in 2015; in 2016, wineries in Illinois, Texas, Colorado, Washington and California paid to use their own. "Slowly but surely, we're changing how things are done," Vijay says.

According to *Wines & Vines* magazine, early users of the GOfermentor say it reduces fruit flies and produces more intense wines.

The Singhs presented their method in February

2016 at Grape Expectations, the Rutgers Cooperative Extension's annual grape-growing and winemaking symposium. "It was received quite well, actually," says organizer Gary Pavlis, a Rutgers University professor and agricultural agent. "He has won some competitions with the wines he's made with that fermentation process. He's pretty well proved that it can work."

Most recently, three Sky Acres wines were honored in the 2017 *San Francisco Chronicle* Wine Competition, including the Cabernet Franc 2015, which won gold in the Up to \$24.99 class. Last April, Sky Acres's Petite Syrah 2014 and Black River Red won silver medals in the Finger Lakes International Wine Competition, which attracted 3,824 entries.

The Singhs say their wines taste fresher because they don't add sulfites. Normally, sulfites are added to wine to prevent air (with its oxygen) from seeping in and ruining it. But with the wine fermenting in sealed bags, "I don't have any air exposure," Vijay says.

Pavlis, noting that wines naturally contain some sulfites, says Sky Acres's wine

should be fine without sulfites during fermentation, but the lack of preservatives could affect the quality of the wine when stored. "Only time will tell," Pavlis says.

The Singhs have demonstrated their system in trials in Spain, Italy, Australia and the United States. In Spain, Meera was invited to take part in a female winemakers' symposium. "This," says Vijay, "is in Priorat, which is a pretty exclusive region of Spain. And she served our Petite Syrah from New Jersey. I think it's the first time anybody's served a New Jersey wine in a Spanish wine festival."

**Sky Acres produces** a limited amount of wine at the moment, supplementing its grapes with others from New Jersey or California. They sell wines through their

website and at their October open house, the only time the winery is open to the public. "Our, really, main goal is the technology," Vijay says. "So I try to make different kinds of wines and different experiments to really refine the technology."

This is more like an R&D winery."

At their October 2016 open house, about 200 visitors tasted the wines and watched the GOfermentor at work. Mike Esnes of Far Hills was impressed enough to purchase several bottles. His friend, Christian Kubick, says he reacts badly to sulfites; for him, the lack of added sulfites is a good selling point. (Sulfites in red wine are commonly blamed for headaches, though experts say other factors are more likely.)

"I was quite pleasantly surprised to find a winery in my backyard," said Gordon Thomas Ward, a WDVR-FM radio host. Ward had just gotten back from the Finger Lakes and called Sky Acres's wines "on par with those."

Still, the Singhs say they're not in the wine business to make money—yet. "The fact we sell wine is a side product," says Vijay. "What else can we do with it?"

After all, adds Meera: "How much can you drink?" 🍷

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Morris County-based freelancer **Marlaina Cockcroft** often writes about Jersey agriculture.

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