

From Mats to AI: The Evolution of Olive Mills

Dai fiscoli all'IA: l'evoluzione dei frantoi

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If extra virgin olive oil exists as we know it today, it is thanks to the whirlwind technological evolution that has characterized the sector of olive oil extraction. A few decades of relentless improvement now allow us not only to enjoy extraordinary products but also to design new professional roles and envision a future in which, thanks to the intelligence of operators and artificial intelligence, it will be “increasingly difficult to make mistakes.”

In his FoodSystem 5.0, Alex Giordano describes the cyclical movement that leads from collective intelligence to the creation or refinement of technologies, and thus to the generation of new skills that spread within communities, giving rise to new adaptive needs—ever more pressing in this era of multiple overlapping crises—which in turn generate new technological solutions..

The evolution of processing systems in olive oil production over the past 50 years is one of the clearest examples of the movement described by Giordano. We tried to reflect on this with Giorgio Mori, one of the protagonists of the changes that have affected olive mills—and therefore oil, and therefore agriculture, and therefore education and consumption.

Giorgio Mori is the owner of a company founded in 1974, when he had just finished high school. Together with his father Franco, he founded Toscana Enologica Mori in Tavarnelle Val di Pesa (FI). Until 2000, the company mainly produced machines for winemaking. Today, under the name Mori-Tem, its core business is machines for olive oil production, which are sold worldwide.

We talked about technology and product quality because the world of extra virgin olive oil, although strongly tied to tradition and manual labor, owes almost everything to the extraordinary technological advances in processing in recent decades.

When your company was founded, extra virgin olive oil existed almost only on paper. Considering the legal definition, it wasn't technically possible, in most cases, to obtain high-quality oil. Can we say that if extra virgin olive oil exists today, it's primarily thanks to the evolution of olive mills?

Certainly, but saying it's thanks to olive mills means first and foremost it's thanks to the people who not only invented new types of mills but, above all, linked these technological improvements to a new concept of olive processing. Today, with mills, we can decide many things: whether to raise or lower temperatures, whether and how much oxygen to allow in...

What do you mean by “raise” temperatures? Aren’t problems caused only when olives are too hot compared to the 27°C limit defined by law for declaring cold extraction?

The point is that climate change disrupts every prediction, so even a normal season, like the cool autumn we had this year in central Tuscany, becomes an unexpected event. In a “normal” autumn like this, there’s cold, rain, and never too much heat. But olives that are too cold are also a problem.

Ideal temperatures are between 22 and 27°C. In recent years, they were almost never present—we always hit around 30, so we had to cool them. This year it’s the opposite. If the olives arrive at the mill at 12–13°C, we must bring them up to 22–25°C to extract the oil. Working the oil at 25–26°C is ideal for various reasons, including better extraction of phenolic compounds that end up in the oil. Those who harvested olives at the end of October–early November in this area brought them to the mill too cold, while those who harvested in September brought them in over 30°C and needed to cool them.

Do you need an additional mill component to heat the olives?

No, it’s the same machine. That’s why I said at the beginning that being able to control temperature is fundamental for producing quality oil. The same machine used to cool can also be used to heat. Mills equipped with these technologies have made significant investments in recent years, even though the key issue—the one that requires the most up-to-date systems—is cooling, which allows lowering the temperature before processing and then controlling the temperature of the olive paste.

So thanks to this technology, producers can obtain good-quality oil regardless of the harvest day’s temperature?

No, be careful: in agriculture, when talking about food, nothing is inconsequential. This technology can correct a problem (olives too hot or too cold), but it’s not the same as having olives at the right temperature in their natural environment versus having to heat or cool them. Aside from the impact of climate change on agronomy, the technologies we can develop are still a plan B. But plan A fails so often now that there’s no alternative.

Looking at agriculture from the mill’s perspective, and how it’s changed to adapt to or make the most of the new mills’ potential, what changes have you seen in

the last 50 years?

A lot has changed. Olive groves have changed, agriculture has changed, and above all, an industrial production has emerged that didn't exist with such volumes and tonnages. Today, there are two completely different production methods with vastly different costs, but both reach the market under the same label: "extra virgin." It's genuinely difficult—for everyone. Hard for consumers to distinguish between industrial and artisanal production; hard for excellent artisans to communicate their quality, their care for olive groves, and their higher costs. They can't sell at industrial prices without operating at a loss.

The regulations seem designed to confuse consumers and favor large groups over artisans.

In my opinion, a small change would be enough: keep calling Extra Virgin the product made with industrial methods and super-intensive systems, but call Premium Extra Virgin the product from traditional agriculture. These two types of production also differ in terms of processing equipment. The industrial product is processed at different temperatures and times and costs a quarter of the other at the source.

Is that the only thing you'd change in current olive oil regulations?

That change would enable many others. For example, the current parameters are ridiculous. An oil with 0.3 acidity already indicates an issue with olive health, yet up to 0.8 is still considered extra virgin. Changing the parameters wouldn't be hard—it just takes a decision. But it won't happen because the world is run by the powerful. Today, everyone processes olives on the same day—many past issues with harvesting and storage have disappeared because people have learned how to manage harvesting and milling. But the parameters still serve the industry. It would be enough to call it virgin oil—and everything would be clearer, more understandable, and transparent.

Are the mills used by industry different from those used by small producers?

In terms of technology, no—but they differ in yield, control, and attention, which the industry can't match but artisans can. In mass production, you can't achieve high quality because even a 0.1% increase in yield becomes significant with large volumes—so you'll try to extract the maximum, at the expense of quality. But if you're producing 100 quintals of oil, you can pay attention to everything—including cleaning the mill, which isn't just about the

space, but the machines themselves, or temperature control, which is always borderline in industrial production. Someone with a cost of €20/liter who sells at €30/liter after adding bottle, cap, and label looks like a thief, while someone who produces at €5 and sells at €10 earns more and no one is shocked. It's no surprise that being an artisanal oil producer isn't an attractive profession today.

How has the job of the mill operator changed? It used to be seasonal, manual work. What's required today?

Today, working in a mill requires education or training in milling or mill technology. Unskilled labor isn't needed anymore—you need schooling. Artificial intelligence will increasingly enter the mill—and it will affect even industrial quality—but people are and will remain irreplaceable. AI will be very helpful because it will allow machines to be calibrated based on highly specific statistical data for each olive variety, each type of soil, climate, altitude, seasonal forecast. We'll be able to work on historical data trends to extrapolate the best solution—and minimize errors. It will take about ten more years to reach this optimization of processing, but then it will be possible to produce better quality, while saving water and energy.

There is a basic recipe for processing: grinder speed, temperature, and flow rate. With the data we're collecting through digital and satellite technologies in modern mills, soon we'll be able to tailor the processing for every cultivar in every vintage. That will be very useful.

And this will pose new challenges for training too, to return to the previous question...

Certainly. In recent years, training courses for mill operators have increased. Some schools offer a specialization, though few people currently arrive well trained. But EU-funded courses will become more frequent, and more trainers will become available. There's no more manual labor in the mill—you need to know how to use a computer, understand some chemistry. It's a completely different job now. The same happened in the wine world: 80 years ago, there were no enologists, now they are central in wineries. And although wine and oil are very different, mill operators are becoming a central figure in the olive oil world.

Are consumers following these developments? Do they understand the changes underway? Is anyone explaining it to them?

Consumer awareness is a weak spot, and here you really can't compare oil to wine. Oil is an ingredient—consumers never see it as a protagonist like wine. So they don't invest in it, don't think it's worth spending a bit more for higher quality. Even though, in reality, spending a little more on oil wouldn't affect a meal's cost much, since so little is used. In Italy, no one worked on promoting the idea of preferring extra virgin. In Spain, for example, there's no debate—consumers buy only extra virgin. Maybe it's flawed, but they're used to those flavors, which they associate with home. Here, we're not there yet—people don't really know how or what to buy.

That's why I stress the need to differentiate product categories. If labels say Extra Virgin or Premium Extra Virgin, and then list flavor profiles (mild, medium, bitter...), people will start to orient themselves.

Tasting courses are increasingly common. Don't they help?

They help a little, but it takes time for a critical mass of consumers to become more informed. Yes, there are many tasting courses—but maybe a thousand... and it will take a while before the whole population is educated. Also, these courses are getting shorter. In the past, students spent hours tasting, had to pass exams before calling themselves tasters. Now, I'm not saying today's tasters aren't good, but even the good ones could be better, and general skills would improve more quickly.

So the recipe for the oil of the future seems clear: technological development, use of historical data, and never stop learning. Anything else?

Never stop tasting, too—whether in courses or outside of them. You have to enjoy oil, and if you can recognize the good stuff, you'll enjoy it more.

Fonte: <https://www.ruralhack.org/en/from-mats-to-ai-the-evolution-of-olive-millsdai-fiscoli-allia-levoluzione-dei-frantoi/>