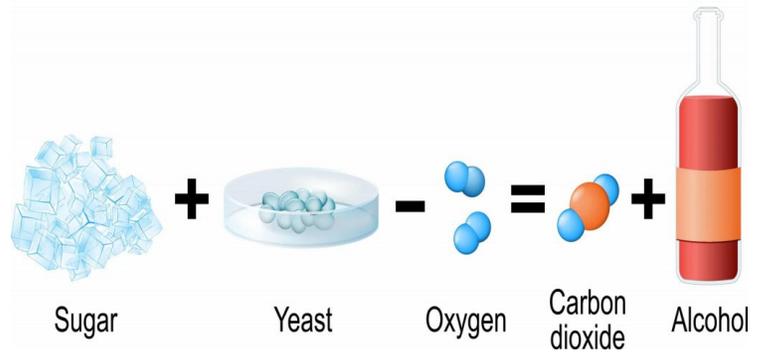


# Wild Yeast, Natural Fermentation and Organic Yeast – The Many Forms of Yeast in Wine Production



Organic and Biodynamic winemakers practice a variety of fermentation methods, some allowing wild yeast to take over, others adding a cultivated yeast to jump-start the fermentation process. We asked our winemakers to give us an inside look at their fermentation practices and their yeast decisions.

## The Role of Yeast in Wine Production

Yeast is the crucial element for wine production. Yeast cells attack the natural sugar molecules in the pressed juice, and break them apart to release energy. Some of this energy is given off as heat. The smaller molecules that remain after the yeast cells have split apart are ethyl alcohol and carbon dioxide as well as other elements including glycerin and natural sulfites. After the yeast cells have worked their magic in the tank of grape must, nearly all of the fermentable sugar has been replaced by alcohol and carbon dioxide (CO<sub>2</sub>), the later of which dissipates into the air. When this process is complete, the grape must has become wine. The longer the fermentation process, the drier the wine.

## Initiating Fermentation

Yeast cells and spores are found in all wineries. These include yeast that was brought in on the harvested grapes, and those that remain in the winery from previous fermentations. It is therefore more difficult to prevent fermentation from starting naturally than it is to make it begin. As soon as the rich, sugar-laden juice is pressed from the grapes, the yeast cells dive in to begin their glorious work, feasting on the sugar and multiplying as they go. If a winemaker wants to stop this process from happening, a bit of sulfur is added or the grape must is cooled.

## Natural Fermentation Using Wild Yeast

Natural fermentation using only indigenous yeast found on the grapes or in the winery is called “wild fermentation,” “spontaneous fermentation” or “indigenous yeast fermentation” and is often used in organic and Biodynamic production. This works especially well in regions and wineries that have been in production for a long time, having created outstanding natural yeast that creates a true sense of place in the fermentation process. This technique does not work in all regions and all wineries, and many winemakers don’t trust the native yeast population. For those who do the wild yeast can be an outstanding and unique choice in the winery.



## Addition of Selected Yeast Strains

The alternative to wild yeast fermentation is the addition of cultivated yeast. Most of the yeasts used in the winemaking process are strains of *Saccharomyces cerevisiae*. This can be yeast that has been carefully cultured within the winery, or purchased yeast, that for all of our wines in our portfolio must be certified organic. The yeast is then added to the grape must, which quickly kicks off the fermentation, and allows the cultured yeast to take over any unwanted wild yeast that may be present in the must. The cultured yeast rapidly dominates the yeast population.

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This is desirable especially if there is not valid wild yeast within the vineyard, or a specific flavor profile is desired within the wine. Yeast can also be used to speed up or slow down the fermentation process, and it will effect the overall style of the finished wine.

## Role of Yeast During Fermentation

Once the yeast starts to multiply, it begins to bubble and foam, and grows warm as the resulting CO<sub>2</sub> escapes. The temperature is critical. Cooler temperatures are desired to maintain the floral and citrus flavors of white wines. As the temperatures increase the yeast cells become more active, converting sugar into alcohol at a faster pace. The winemaker's most important role is temperature control, in order to avoid a "stuck fermentation" where the fermentation process stops prematurely after the temperature gets too high. Temperature is regulated with the use of refrigeration jackets, coils or panels on the tanks. Smaller wineries still use historic techniques including underground fermentation tanks that allow for overall cooler .



## End of Fermentation – Yeast Has Done Its Job

With proper temperature control and healthy yeast, the fermentation continues until the sugar is depleted and there is nothing left for the yeast to consume. This takes anywhere from several days to weeks. Fermentation will also stop if the alcohol level reaches above 14%, at which point the yeast can no longer survive. Winemakers may choose to stop fermentation early, for wines in which a higher amount of residual sugar is desired, such as in off dry wines or dolce wines. At this point, the liquid is officially wine.



Saccharomyces cerevisiae yeast

## Wild Yeast Tales from Our Winery Partners

From wild fermentation to yeast cultivation, we asked our winemakers to tell us about their yeast preferences and what they mean for the resulting organic and Biodynamic wines.

## Wild Yeast – Spontaneous Fermentation



### Vina Koyle – Chile

"In our view and technique about the wines we make, we deeply believe in the unique expression of each terroir. To that end, we practice Biodynamic viticulture to avoid as much as we can any inputs that will change the character of a specific place. Even with organic products, the ability to keep the vineyard as much isolated from external influence, will give for those grapes the entire expression of the place where they came.

**When we already have these unique grapes with all their expression, we bring them to the cellar and maintain the same view, so no addition of yeast to the fermentation process.** We ferment all our wines with the yeast that naturally comes in on the grapes (native yeast or wild yeast). Each grape lot will be different, even if coming

from the same estate. We want to keep this, as a reflection of that place, the vintage and climatic conditions of every harvest." Koyle Winemaker Cristobal Undurraga

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### Inkarri by Proviva – Argentina

All Inkarri wines are 100% fermented with wild yeasts. For their Brut Inkarri Sparkling, the indigenous yeast technique is more elaborate. **“As we don’t “inoculate” the wine with any added yeast to start the fermentation, winemaker Gabriel Bloise uses a traditional and manual method to work with the native “wild” yeast: he prepares a “Pied de Cuve.”** This method is a way to encourage a clean and safe fermentation without external inputs. The Pied de Cuve is a kicker for the transformation of the must in wine, allowing fermentation to start with ambient, rather than inoculated, yeast. It’s a technique which is more laborious and risky than simply adding selected yeasts to the must, but gives much more authentic and pure results. A small batch of grapes is separated from the others, then crushed by hand in a small container, covered but not sealed and stored at medium

temperature. These conditions encourage the yeasts present on the skins and in the pulp to ferment in a controlled environment.” Gabriel Bloise, Winemaker



### Biokult – Austria

**Biokult utilizes spontaneous fermentation from indigenous yeast in all wines.** All of the wines of Biokult are fermented using the wild, natural yeast from the vineyards, as brought in on the grapes themselves. All of Biokult’s wines are fermented in steel tanks, and feature long, fine yeast content before bottling. Biokult’s orange wine Naken, has a small content of CO2 remaining after fermentation that keeps the wine fresh and adds a slight natural effervescence to the wine.



### Domaine Gioulis-Sofos – Greece

**“At Domaine Gioulis we use only wild yeast.** About 20 years ago we tried what we call spontaneous fermentation for the first time on our Cabernet Sauvignon and it had surprisingly good results. Since then we have been using this method more and more and for almost a decade now we use almost exclusively the yeasts that naturally live on our grapes. It is true that using only wild strains of yeast involves some risk but we have discovered that when you take care of your fermentation process you can minimize it. Our high-altitude climate where we produce relatively low alcohol wines and cool temperatures during the harvest also help the weak indigenous yeasts to thrive during the vinification process. The big advantage is that you let your varieties, microclimate and local nature really express themselves adding complexity to the wine and differentiating the results from the boring “normality.” Furthermore using the natural yeasts allows and even dictates minimizing the

use of sulfites which is something that we are always after. Generally using indigenous yeasts is a matter of choice for the winemaker and apart from being the natural way it is always more interesting, challenging and creative!!” Winemaker Dimitris Gioulis



### Quinta da Plansel – Capella Santa Margarida – Portugal

**“Indigenous yeasts are used to ferment Capella Santa Margarida.** The yeasts have always an important roll in the wine quality and in the aromatic and flavor compounds, I use indigenous yeasts to try to obtain the maximum expression of “my” terroir, in the Capela I have no doubt that the mint aroma that the wine reveals is given by the natural yeast.” Winemaker Dorina Lindemann

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### Puianello-Broletto Lambrusco – Italy

The Broletto wine from Cantina di Puianello is obtained with a mixed technique as being a sweet wine that still contains a fair amount of sugar, during its conservation to prevent fermentation from continuing and transforming all the sugars, it is kept cold, close to 0 ° C. Under these conditions, the development of indigenous (wild) yeasts begins, which ferment very slowly due to low temperatures. These yeasts most likely belong to the *Uvarum* species, which is particularly tolerant to low temperatures. During the secondary fermentation, a selected organic *Saccharomyces Cerevisiae* is inoculated. This is done because the fermentation conditions for the indigenous yeast become too difficult due to low temperatures, alcohol and high pressure (being a sparkling wine), sometimes can be blocked, with the wine unable to continue fermentation. Furthermore, there is a risk

that it may produce off-flavor and other unsolicited metabolic components that would jeopardize the quality of the product. The use of a mixed technique in these particular technological conditions, allows us to obtain a product with a wide aromatic set, a strong fruit component and a good complexity. Oenologist Alberto Grasselli

## Combination of Wild Yeast and Cultivated Yeast



### Granza Wines by Bodegas Matarromera – Spain

“Wild yeast from the winery is cultivated then the wine is inoculated. Our position is closer to inoculating with yeast, but with native yeast. Wild fermentation could take too much time since the quantity of yeast is really low sometimes. However, inoculating with native yeast is not an easy task and requires time to select the best native yeast, after this selection we can produce the wine. One of our more successful yeast is the one we got in our winery in Rueda “S.cerevisiae Emina,” that is registered in the Spanish Type Culture Collection. This yeast is used in the production of Granza Verdejo and makes a difference in comparison with other verdejos in the market.” Winemaker Ivan de Domingo



### Lorenz Riesling – Germany

“For our Riesling we use a combination of indigenous and added selected local German certified organic yeast in a proportion of approximately 5:1. The indigenous yeast are responsible for the wine’s body, the added yeast for the fruit. Lorenz Riesling is fermented for 6 months or more, seeing two weeks of contact with yeast before bottling. The wine continues to develop in the bottle and holds up longer than a typical Riesling. This imparts unique flavor profiles and vibrancy to the wine and allows it to age longer in the bottle.” Winemaker Johannes Lorenz



### Bodegas Iranzo/Tarantas Wines – Spain

“In the red wines we use only wild yeast from the grapes. When we like how a particular must from one particular wine is fermenting, we let it start the fermentation spontaneously and afterwards we inoculate a bit of that fermenting must into other tanks to start fermentation.

Wild yeast has many characteristics:

- Less human intervention, you use what your vineyards produces
- Better representation of the terroir, you can achieve a better representation of your terroir and personality of your vineyard and the viticulture you make
- Not so stable over the years, as the wild yeast depends on each year’s climate profile, every year will be different
- Risk of unwanted aromas or flavors, as you don’t know which yeast exactly is fermenting, you may get undesirable yeasts doing the job

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- Wild yeast is greatly affected by the viticulture you're practicing, if you did a lot of treatments, pesticides, etc, you're killing the wild yeast too, or you're killing the good wild yeast you desire to take control of the fermentation. **With healthy, organic and Biodynamic viticulture like ours, good quality wild yeast is enhanced and risks are minimized**
- Grapes treatment and transport is important too (like for our NSA wines, hand-harvested), because if grapes are broken undesired microorganisms may enter the must and compete with your wild yeast

However, in our rosé wines we use selected organic yeast strains to maintain the fruity, fresh aromas. Using cultivated yeast also has advantages here:

- Better control of which microorganism (yeast) is fermenting, as the selected yeast will take control of the fermentation
- Better control of the fermentation kinetics, speed and temperature
- You get a known aromatic profile of the resulting wine and that wine profile should be more stable over the years than with wild yeast. That's especially interesting for whites and rosés, where you often want fruit and floral aromas, like strawberries, pineapple, green apple and so forth." Winemaker Alfonso Iranzo Jr.



### Pizzolato Winery – Italy

**Organic wines with selected yeasts, low sulfur dioxide and indigenous yeast**

"Yeasts are selected directly from the grape after careful analysis and tests. Of course, they have to meet quality requirements such as good fermentation activity, specific organoleptic characteristics and, for wines without added sulfites, low level of sulfites production.

Therefore, the excellent selection and choice of suitable yeasts leads to positive characteristics in the final product and different properties for each wine type: it is not assured that an excellent yeast for sparkling wines is also suitable for red wines and vice versa.

In the winemaking process, Pizzolato Winery uses selected and organic certified yeasts. Each wine fermentation is kicked-off with different yeasts, carefully chosen to contribute specific and typical characteristics of the grape variety.

In our no added sulfites red wine line, the main feature of the selected yeast is the low production of sulfites. These organic and vegan wines have a minimum quantity of sulfites, under 10ppm. The consumer could then enjoy a healthy wine with a renowned added value.

Commonly, during the winemaking process, the white berried grapes (such as Glera for Prosecco) must fermentation is instigated with selected yeasts, after a soft grapes pressing and a night must soaking.

**In our new Pizzolato Pet Nat/Col Fondo PIWI "Ho'opa," the fermentation is kicked-off on its native yeasts.** Compared to cultured yeasts, the indigenous yeasts are clear expression of the natural territory characteristics. Incredibly unique and peculiar, but at the same time synonymous of uncertain fermentation results. On the other hand, selected yeasts fermentation is more regulated with definite results.

In our Organic Chianti DOCG production (as well as Chianti Naturale), low sulfate producing yeasts are selected for the alcoholic fermentation. During the winemaking procedure, yeasts are added in the fermentation tank to a small mass of must and marcs ("Pied de Cuve"). Once the fermentation take place the tank is then filled with the remaining pressed must and juice. Malolactic fermentation naturally occurs during maturation. Red wines commonly ferment until all (or nearly all) the sugar is consumed. This makes red wines "dry" (as in, not sweet)." Winemaker Settimo Pizzolato

## Cultivated Organic Yeast



### Maison Raymond – France

"In our experience in Bordeaux, we find that the indigenous yeast can ferment, but very slowly and the higher the alcohol degree, the more difficulty they have to finish the fermentation which has been the case due to climate change and higher temperatures.

This can quickly cause a deviation problem since the yeast cannot colonize the environment. This can result in the development of Brettanomyces (Brett), a yeast commonly associated with red wine spoilage.

In order to manage more precisely, we add selected organic yeasts directly to the must to rapidly protect the environment and avoid deviations, optimizing the organoleptique quality of the raisin. With this, we obtain regular fermentations by lowering the residual sugar and avoid any trouble in the vat, or in the bottle during ageing.

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