

A horizontal banner image showing a microscopic view of wine. The left side is dark with many small, light-colored bubbles. The right side is lighter, showing larger, more distinct bubbles and some purple liquid. The text 'WINE FAULTS' is overlaid on the dark left side.

WINE FAULTS

CHAPTER TWO

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LEARNING OBJECTIVES

After studying this chapter, the candidate should be able to:

- Recall the main terminology associated with wine faults.
- Describe the source and effect of cork taint.
- Discuss the impact of sulfur compounds on wine.
- Recognize which odors are acceptable and under which conditions.

Much of the flavor and, hopefully, the enjoyment of wine is due to its unique aromas. A wine's distinct scent is derived from many possible sources, including the grapes themselves, fermentation processes, aging, oxidation, or contact with oak.

With careful winemaking, most of the aromas that occur in wine will be pleasant and desirable, but winemaking errors, improper storage, or, in some cases, simple bad luck can introduce unpleasant aromas into a wine. The ability to recognize these wine faults is a crucial element of wine appreciation.

This chapter lists some of the faulty aromas occasionally found in wine. In some cases, these aromas are acceptable or even welcome in low concentrations, but they are considered faults at higher concentrations.

FAULTS IN WINE

2,4,6-TRICHLOROANISOLE (TCA)

One of the biggest concerns in terms of wine quality control is the incidence of a musty, moldy odor—similar to that of a dank basement—occasionally found in wine. Wines showing this aroma are often referred to as being *corked* or as having *cork taint*, although it is now known that infected corks are not the only source of this fault.

The culprit is a mold that can grow on and in the bark of the cork oak tree, on the winemaking implements, or even in the winery itself. This mold readily interacts with other compounds to generate the chemical 2,4,6-trichloroanisole, also known as TCA. If the TCA leaches out of a cork and into the wine, or if it is present in the wine from other sources, the wine may display an overtly unpleasant odor. In milder cases, the wine will taste muted or seem less flavorful as a result of the spoilage, although it is not harmful to ingest.

TCA is highly persistent. If it saturates any part of a winery's environment (barrels, cardboard boxes, or even the winery's walls), it can even be transferred into wines that are sealed with screw caps or artificial corks. Thankfully, recent technological breakthroughs have shown promise, and some cork producers are predicting the eradication of cork taint in the next few years. In the meantime, while most industry experts agree that the incidence of cork taint has fallen in recent years, an exact figure has not been agreed upon. Current reports of cork taint vary widely, from a low of 1% to a high of 8% of the bottles produced each year.

TCA has an extremely low recognition threshold, meaning that it can be noticeable at relatively low concentrations. While some people cannot smell TCA at all, most can detect it at concentrations of 2 to 7 parts per trillion. Once identified, the aroma is unmistakable. However, many consumers have not been taught to identify the odor and simply find an infected wine to be somewhere between uninteresting and undrinkable, potentially dismissing the entire output of a producer, region, or grape variety as unpleasant.

ODORS RESULTING FROM SULFUR COMPOUNDS

As explained, sulfur is a common and often necessary preservative addition to wine. In excess, or combined with other chemicals, however, sulfur can produce some strong off-odors:

- ***Sulfur dioxide (SO₂)***

Wines with overly high concentrations of SO₂ will possess an acrid smell, similar to that of burnt matches. Sulfur dioxide may also cause an unpleasant “burning” sensation in the throat and nose. The sensory effects of SO₂ are directly related to pH. The more acidic the wine, the more pronounced the sulfur dioxide will be.

- ***Hydrogen sulfide (H₂S)***

When a sulfur-rich wine sits too long in the complete absence of oxygen, it may develop the odor of rotten eggs. This happens most often when a barrel or tank of wine rests for a long time with a large amount of yeast sediment in the bottom. It has also been reported as a potential problem for wines closed with screw caps, most of which, unlike corks, are impervious to oxygen.

- ***Mercaptan***

In some circumstances, *ethyl mercaptan* may form as a combination of sulfur and ethanol. This results in a very unpleasant odor, sometimes described as smelling like garlic or onions. Mercaptan is the odor added to odorless natural gas to help people detect a leak. Although it can be confused with hydrogen sulfide, this defect is very serious and is less remediable than are those encountered with the other two sulfur compounds.

ODORS RESULTING FROM THE ACTION OF BACTERIA

Although most bacteria cannot survive in the highly acidic environment that is wine, the major exceptions are lactic bacteria and acetobacter. These bacteria can wreak havoc in wine if allowed to flourish. Lactic bacteria are responsible for malolactic

fermentation, intentional or otherwise, and acetobacter can convert alcohol into acetic acid. Such bacteria attack various chemical compounds in the wine—changing the composition of the wine and sometimes producing carbon dioxide or some other gas (a potentially disastrous situation in a sealed bottle)—and frequently produce unpleasant odors.

Typical bacteria-related off-odors include the following:

- *Acetic acid*: The odor of vinegar. The term “volatile acidity” may be used in reference to a wine with a decided aroma of white vinegar caused by acetic acid. The term *ascensence* may be used to refer to a fault evidenced in a wine with discernible volatile acidity accompanied by a high level of ethyl acetate (discussed below).
- *Butyric acid*: The odor of rancid butter or spoiled cheese.
- *Lactic acid*: A smell described as being like sauerkraut or a goat.
- *Ethyl acetate*: The odor of fingernail polish remover or model airplane glue. This common ester is formed through a reaction of ethanol and acetic acid.
- *Geranium fault*: An odor resembling crushed geranium leaves (which can be overwhelming); normally caused by the metabolism of sorbic acid (derived from potassium sorbate, a preservative) via lactic acid bacteria (as used for malolactic fermentation)

ODORS RESULTING FROM OTHER CAUSES

Additional off-odors are described as the following:

- *Brett*: Short for *Brettanomyces*, “Brett” is a member of the yeast family and can infect a winery and some or all of the wines made there. Brett causes a “sweaty” or “horsy” odor, or it may simply deaden the primary flavors in a wine. Other common descriptors for Brett include “Band-Aid-like” or “medicinal.” Some people find Brett in small quantities to be acceptable, while others consider its presence to be a fault at any level.

- *Green*: The odor of leaves, usually resulting from the use of immature (underripe) grapes.
- *Oxidized*: Oxygen from the air will physically dissolve in wine that has been exposed to air. This oxygen then reacts with some of the phenolic compounds in the wine. The resulting chemical oxidative reaction may create acetaldehyde. While the nutty, caramelized character of oxidation is an aroma classically associated with fino Sherry, when it is present in wines that are not intentionally oxidized, those wines have a pronounced lack of fruit character. Browning may also occur.
- *Maderized*: A cooked or baked odor, resulting from excessive heating or oxidization. This is generally considered to be a fault; however, it is an acceptable characteristic in wines such as Madeira that are deliberately heated.
- *Moldy*: The odor of mold resulting from the use of moldy grapes or moldy barrels.
- *Rubbery*: The odor of rubber, sometimes associated with very low-acid wines or excess sulfur.
- *Stagnant*: A stale water odor.
- *Stemmy*: The bitter, green odor of grape stems.
- *Wet cardboard*: A papery chemical odor, frequently associated with cork taint or the misuse of filter pads or filtering materials.
- *Yeasty or leesy*: A pronounced odor of yeast that may develop if dead yeast cells remain in contact with the wine too long, although this is normal and acceptable in sparkling wines and some other wines that are intentionally aged "on the lees."
- *Reduction or reductive*: A term that refers to a smell of rotten eggs, garlic, struck matches, cabbage, or burnt rubber. It is not an accurate term to describe the actual chemical process that creates these odors, but it is commonly used. These odors occur in what is known as reductive conditions: conditions that lack oxygen.

Depending on the source of the odor, it may be limited to a specific bottle, or it may be rampant through an entire batch of wine. Modern winemaking techniques permit many of these issues to be

addressed if they are identified at the winery, but many of the problems may not be detected right away. Regardless of the cause, it is important for wine professionals to be able to recognize these odors in order to appropriately evaluate a given glass of wine.