

Sulfites in Wine

ALL WINES HAVE SULFITES IN THEM INCLUDING EUROPEAN WINES.

Sulfites or sulfur dioxide is a fruit preservative widely used in dried fruits as well as wine. It is also produced by the human body at the level of about **1 gram** per day.

The levels in wine average 80 mg/liter, or about 10 mg in a typical glass of wine. A number of studies show reactions by sensitive patients to drinking wine with sulfites, but it appears that their reactions are also caused by other components.

There are many erroneous ideas about sulfites, so to put the record straight:

- All wines contain sulfites. Yeast naturally produces sulfites during fermentation so there is only a rare wine which contains none.
- No other country requires a sulfite warning label (this may change soon), but nearly **all winemakers add sulfites**, including those in France, Italy, Spain, Australia, Chile, etc. So, the wine you drink in foreign countries contains sulfites, but you just are not being warned about it when purchased abroad. Survey studies show that European wines also contain an average of 80 mg/L sulfites. Europeans do not barrel wines marked for the USA. The same wine made for European consumption comes out of the same barrel that the USA receives.
- There are a few (very few) winemakers who make wines without adding sulfites. In the US, organic wine must be made without added sulfites. These are unusual because the wine is very perishable and often have unusual aromas from the aldehydes that are normally bound and rendered aroma-less by the sulfites. Look for these wines at natural food stores.
- **Sulfites do not cause headaches!!!** There is something in red wine that causes headaches, but the cause has not yet been discovered. Refer to the Bakalinsky article above. (Many people seem to connect their headache with the sulfite warning label, but sorry there is no connection). To avoid headaches, try drinking less wine, and drink with food. If you think sulfites are causing your headache, try eating some orange-colored dried apricots, and let me know if that induces a headache. These bright colored dried fruits typically have 2000 mg/kg sulfites, so a two ounce serving (56 gm) should contain about 112 mg sulfites.
- In the US, the law states that
 - Wines cannot contain more than 350 mg/liter sulfites
 - Wines with more than 10 mg/liter must have a "Contains Sulfites" warning label
 - Producers must show levels below 10 mg/liter by analysis to omit the label
 - Wines must have less than 1 mg/liter to have a label that says "No Sulfites"
 - This level must be shown by analysis
 - All wines must carry the label whether made in the US or abroad
- Still want to get rid of sulfites? In theory, you can remove sulfites by adding hydrogen peroxide to your wine, but there is little specifically known about

this treatment. I don't recommend it but I mention it only because I keep getting asked how to do this. The correct amount to add will depend on the sulfite level in the wine, an amount you cannot deduce except by chemical analysis. I have no idea what will happen if you use too much. If you want to learn more, there is a study of the reaction between sulfite and hydrogen peroxide in simple water solutions: M.R. Hoffman and J.R. Edwards, Kinetics of the Oxidation of Sulfite by Hydrogen Peroxide in Acidic Solution, *J. Phys. Chem.* 79: 2096 (1975) [Link](#) Hydrogen peroxide has been used to remove sulfites from cucumbers and dried fruit. Ozkan, M; Cemeroglu, B. 2002. Desulfiting dried apricots by hydrogen peroxide. *JOURNAL OF FOOD SCIENCE* 67 (5): 1631-1635. McFeeters, RF. 1998. Use and removal of sulfite by conversion to sulfate in the preservation of salt-free cucumbers. *JOURNAL OF FOOD PROTECTION* 61 (7): 885-890.

- Every 5 years or so a M.D. asks me if I want to collaborate on wine headaches, but there is no funding for such research. So, if anyone wants to support a Master's student research project on the topic of wine headaches (\$30K) we can start to investigate, and we will even test how to remove sulfites.

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[Minor Wine Components](#)

Red Wine Headache vs. Sulfite allergy

Many people complain of getting headaches after drinking red wines. Although some of these people had one bad experience from drinking lousy wine or simply overindulging and now blame all red wines, there seems to be enough anecdotal evidence to suggest that others experience a real physiological reaction after drinking many red wines. As serious a problem as this is, it is impossible to get government funding to study how those who are sensitive to red wine could more safely enjoy it. In the next few months we will examine this issue from the perspective of several writers and researchers.

The Puzzling Red Wine Headache - By Marian Burros

For some people, a glass of red wine is an invitation to a roaring headache. After a few episodes of headache and queasiness, those who suffer them may banish wine from their tables for life. The symptoms are part of a syndrome known as Red Wine Headache, or RWH.

"The red wine headache is a real if poorly understood phenomenon," says an article in the June issue of the Harvard Health Letter. That is a masterpiece of understatement. There are many theories about what causes the syndrome, but few facts. Dr. Fred Freitag, associate director of the Diamond Headache Clinic in Chicago, said no one really knows what leads a patient to develop this type of headache.

It may be caused by "compounds found in grape skins. They are either naturally occurring or produced through fermentation," Dr. Freitag said. He would postulate no further. "It's not as if there are hundreds of thousands of dollars for funding" studies

to determine the cause, Dr. Freitag said. There is actually a stigma to studying the subject. "I've entertained the idea of looking for grants to study this and I've been told, 'Don't go there, it's bad P.R.,'" Dr. Freitag said. Bad publicity comes to those who would study drinking? Carry Nation is with us yet.

Sulfites used to take the blame for RWH. About 20 years ago the Food and Drug Administration determined that about 1 percent of the population is allergic to sulfites and required that wines containing certain levels of the compound be labeled "contains sulfites." Many people have assumed, incorrectly, that the labeling is designed to warn people who get a red wine headache. [In fact, sulfite sensitivity is a true allergy. Sufferers experience an allergic reaction, but not a headache. RWH is something else.]

Scientists have pointed out, however, that many sweet white wines contain more sulfites than red wines — yet do not cause headaches in those who suffer from RWH. Additionally, dried fruits usually contain sulfites but you never hear of dried fruit headaches. Sulfites can cause an allergic reaction [breathing problems], Dr. Freitag said, but they give headaches only to asthmatics.

Other experts think tannins are at the root of the headaches. Tannins are the flavonoids in wine that set one's mouth to puckering. The Harvard Health Letter notes several well-controlled experiments showing that tannins cause the release of serotonin, a neurotransmitter. High levels of serotonin can cause headaches and that may happen in people who also suffer from migraine headaches. But that does not explain why people who do not get migraines get RWH. Dr. Marion Nestle, chairwoman of the Department of Nutrition and Food Studies at NYU, added that no one complains about tea, soy, or chocolate headaches — though all contain tannins.

A third school of thought blames histamines. Histamines are 20 - 200% higher in red wine than in white, and those who are allergic to them are deficient in a certain enzyme. Some experts believe that the combination of alcohol and that deficiency can cause the headaches. But a study of 16 people with an intolerance to wine, reported in the Journal of Allergy and Clinical Immunology (Feb 2001) found no difference in reactions to low- and high-histamine wines.

A fourth suggestion is that prostaglandins — substances that contribute to pain and swelling — may cause RWH. [More on this next month!] Yet for most people who suffer from RWH, the hypotheses are irrelevant. They want to know what to do about the problem. Some Web sites suggest prevention: for histamine sensitivity, pop a non-sedating antihistamine like Claritin or take an aspirin to stop production of prostaglandins.

Dr. Freitag frowns on this. To lick the problem, he advises a potentially long, painful, and costly experiment. A sufferer of the headaches himself, Dr. Freitag finds that he can drink some reds and not others. "Try different brands, different grapes, different countries of origin. That's the only way you are going to find out." Drink a half a glass of red wine; if it is going to give you a headache, it will do so within 15 minutes. If there is no reaction, stick with that wine for the evening, keeping your alcohol consumption to no more than two glasses. Keep a journal.

And don't confuse RWH with the headache that comes six hours after a full evening of drinking. That's called a hangover!

A Possible Solution

[We now look at an informal study suggesting that aspirin may be helpful if taken before drinking wine. Because RWH is frequently and incorrectly blamed on sulfites, we will start a brief discussion on sulfites.]

In 1981 Herbert Kaufman, M.D., reported that the prophylactic ingestion of aspirin prevented the red wine headache syndrome, RWH, (Lancet 1981; 1: 1263). He also noted that once RWH begins, aspirin has little or no effect in altering the headache. Five years later, in a non-controlled study, Kaufman reported that aspirin inhibited the immediate and late phases of RWH, and the proposed mechanism was through interruption of prostaglandin synthetase (Immunology and Allergy Practice; 7: 279-84). In a new controlled study, Kaufman and Dwight Starr, M.D., Mt. Zion Hospital and Medical Center, examined, through blind evaluation, various inhibitors of prostaglandin synthetase (IPS) drugs, aspirin, Acetaminophen, and Ibuprophen, to test if the RWH could be prevented by the prophylactic use of these specific medications.

During the first stage, twelve subjects (nine females and three males) with a history of RWH were challenged with red wine, and all experienced RWH. The subjects returned one week later, stage two, and were given inhibitors of prostaglandin synthetase or placebo one hour prior to wine ingestion. The two who received the placebo were not protected. Kaufman and Starr reported that ten of the subjects who were premedicated failed to develop the RWH; two given Acetaminophen developed a "second phase" RWH 6-10 hours after wine ingestion.

Kaufman and Starr conclude that RWH may be due to a metabolic defect and corrected by prostaglandin synthetase inhibitors. Mechanisms of correction remain unclear. Source: H. Kaufman and D. Starr, Prevention of the Red Wine Headache (RWH); A Blind Controlled Study. In New Advances in Headache Research, 2nd edition, ed. F. Clifford Rose. Smith-Gordon, 1991.

New Information on Headaches, Flushing, and Bloating

If you suffer from headaches and/or flushed skin when drinking wine, **try drinking a cup of black tea** before you drink the wine. If you will be drinking over the course of an evening, have another cup or two of black tea during the evening. Quercetin, a bioflavonoid found in black tea, significantly inhibits the headache/flush response (which is an inflammatory effect from histamines), according to Tareq Khan, M.D., a pain expert with St. Luke's Episcopal Hospital in Houston, Texas.

If the problem you suffer from is bloating due to alcohol's dehydrating and water retention effects, try munching on magnesium-rich snacks like **dark chocolate and unsalted nuts**, according to Carolyn Dean, M.D., N.D.

Wine Contains Sulfites? So what!

(Answers to some frequently asked questions about sulfites in wine - by William Bincoletto)

What are sulfites?

Sulfite is a word used to describe forms of sulphurous acid, including sulphur dioxide. Sulfites have been used since ancient times for many purposes, including the cleansing of wine receptacles by both Romans and Egyptians. As food additives, they have been used since the 17th century and approved for use in the United States as long ago as the early 1800s. They are currently used for their preservative ability, which includes controlling microbial growth, blanching certain foods, and preventing spoilage of certain perishable foods, beverages and pharmaceuticals. It is their antioxidant and anti-microbial properties that have gained them an important role in wine making. The sulfites either inhibit or kill bacteria or wild yeast, thus encouraging rapid and clean fermentation of wine grapes. Sulfites are also a natural and minor by-product of yeast fermentation and thus are produced during the wine fermentation process.

Who is allergic to sulfites?

The FDA in the US estimates that one in 100 people is sulfite sensitive to some degree, but for the 10% of the population who are asthmatic, up to 5% are at risk of having an adverse reaction to the substance. More importantly, the most significant sulfite sensitivity reactions occur in susceptible asthmatics. From a public health standpoint, the subgroup of greatest concern is the sulfite-sensitive asthmatic population. Of those, the ones in whom the most severe reactions have been reported are steroid-dependent and are taking such drugs as prednisone or methylprednisolone. Most of these individuals have been cautioned by their doctor to avoid sulfite-containing foods or beverages. The number of asthmatic patients that are included in this sulfite sensitive group is estimated to be 500,000 in the United States. The USFDA requires labeling of foods containing 10 ppm or more of sulfites.

What are the symptoms of a sulfite reaction?

The symptoms of a sulfite sensitivity reaction vary from mild to life-threatening. The most common symptoms are mild and involve a skin rash accompanied by redness, hives, itching, flushing, tingling and swelling. Respiratory symptoms include difficulty breathing, wheezing, and stridor. Gastrointestinal reactions involve nausea and stomach cramps. Much less common but more serious signs and symptoms of sulfite sensitivity are low blood pressure, shock, extreme difficulty breathing, and loss of consciousness. As noted above, these symptoms of a severe reactions are most apt to occur in the steroid-dependent asthmatic person.

I get headaches, stuffy nose, and rosy cheeks from red wine. Is this an allergic reaction?

Technically, this is not an allergic reaction. What is being described is usually referred to as the "red wine headache syndrome." This is not related to the sulfite content of the wine but probably due to other substances contained within the wine such as histamines, tyramine, and phenolic flavonoids. Aside from the discomfort of the headache, these symptoms do not appear to be a risk for progression to a more serious reaction. Studies have suggested that these headaches can be avoided or minimized by taking either aspirin, ibuprofen, or acetaminophen prior to drinking wine.

I can drink only white wines. Do red wines have more sulfites?

Actually, red wines may have less sulfite. In 1993 the European Union passed regulations permitting higher levels of total sulphur dioxide in dry white wine than in dry red wine and an even higher level in sweet white wines and rose wines. The higher levels in the sweet wines are necessary to prevent the further fermentation of

the higher levels of residual sugar. If you have a problem with red wines as compared to white wines, it may be related to the "red wine headache syndrome" [which was described last month]. Or, you may just be unfortunate enough to have an idiosyncratic allergy to one or more naturally occurring chemicals in some red wines. Experiment with small quantities of various wines until you find some that don't bother you.