

A W R I



The Australian Wine
Research Institute

Wine and Health Information



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The A–Z of information on wine and health issues

The Australian Wine Research Institute routinely receives a variety of questions about wine and health issues. We would like to share the following frequently asked questions and their answers, and additional information on alcohol/wine and health related issues. For information on alcohol abuse and alcohol dependence or alcoholism, however, please refer to the website of the [US] National Institute on Alcohol Abuse and Alcoholism (NIAAA) on: www.niaaa.nih.gov, or the website of the Australian Department of Health and Aged Care on: www.health.gov.au

The Australian Wine Research Institute advocates the moderate consumption of wine, but does not recommend that abstaining individuals should commence consuming wine to benefit their health. Consuming wine more than moderately increases the risk of both short- and long-term harm to health.

The Australian Wine Research Institute also encourages you to consult the National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) on <http://www.nhmrc.gov.au/publications/synopses/ds10syn.htm>.

The following information is arranged in alphabetical order:

Allergy



I am allergic to eggs/fish/milk and their products. I have noticed that there is often a statement on the label of wine bottles and casks, which says "fined with casein/potassium caseinate/milk/evaporated-milk/milk products/egg white/egg products/fish/isinglass/fish products and traces may remain". Can I safely consume this wine?



Wine may be 'fined' with processing aids, which are derived from eggs, fish or milk. The process of fining removes protein and other impurities from the wine, which may otherwise make the wine unstable.

If the wine is made according to good manufacturing practice and the fining is followed by further fining or clarification, only ng–µg/L trace levels of these processing aids should remain in the finished wine. These levels are 100–1000-fold less than the doses eliciting a reaction as recorded in previously conducted clinical challenge studies. From the winemaker's perspective it is important that little or no residual processing aid remains in the wine after clarification, as the presence of relatively large amounts of residual processing aid leads to visible protein precipitates that require remedial winemaking practices.

The Grape and Wine Research and Development Corporation sponsored an analytical and clinical study into the allergenic potential of wine, which was undertaken by The Alfred Hospital, Monash University and The Australian Wine Research Institute. The study showed that there was no residual protein remaining in Australian red and white wine after fining with egg, fish or milk. The study also showed that no allergic subjects experienced a significant or adverse reaction requiring treatment after consuming egg, fish or milk fined-wine. Similar results have been shown in recent French, German and Italian studies.

Food Standards Australia New Zealand legislated in May 2009 that wine labels no longer need to contain an allergy warning for fish and fish products, as fining wine with isinglass, a fish product, is no longer considered to compromise human health. Winemakers continue to include a warning statement on the label for egg and milk as a 'duty of care' for the consumer if they are at all uncertain as to whether the wine may contain traces of these processing aids.

If you have a known allergy to eggs or milk, then you consume an allergen-labelled egg and milk fined-wine at your own risk, as there is still a small chance that traces may be present in the wine.

Asthma

I am an asthmatic. Can I consume wine?

If your asthma is triggered by sulfur compounds, such as sulfur dioxide, then you should not consume wine.

If your asthma is not triggered by sulfur compounds, then wine is unlikely to trigger an asthma attack.

If so, what kind of wine?

If your asthma is not triggered by sulfur dioxide, then any kind of wine can be consumed by an asthmatic with minimal risk of inducing an asthma attack. If you are 'sulfite-sensitive', however, wines that contain a lower concentration of sulfur dioxide are recommended. For example, those wines labelled as 'organic' contain approximately 50% less sulfur dioxide. Cask wines, which contain a higher concentration of sulfur dioxide, should not be consumed. No wine, however, is 'sulfur dioxide free', as 10–50 mg/L of sulfur dioxide is produced naturally during the fermentation by yeast cells. A concentration of 1–3 mg of sulfur dioxide released from wine and inhaled will trigger an allergic reaction in significantly sulfite-sensitive individuals. For a list of wines with a lower concentration of sulfur dioxide, you can contact the Biological Farmers of Australia [formerly Organic Vignerons Association of Australia] on ph: (07) 3350 5716 or fax: (07) 3350 5996 or Website: <http://www.bfa.com.au> or postal address: PO Box 530, Chermerside QLD 4032, and your local bottle or liquor shop should stock a selection of these wines.

How much wine can I consume per day?

If your asthma is not triggered by sulfur dioxide, then any light to moderate amount of wine can be consumed without triggering your asthma. If you are 'sulfite-sensitive', even one 100 mL glass of wine, containing approximately 45–120 mg/L of sulfur dioxide, may trigger an allergic reaction. Data from recent research undertaken by the Department of Medicine of The University of Western Australia indicate, however, that the low concentration of sulfur dioxide observed generally in Australian wine is not problematic for a significant proportion of sulfite-sensitive individuals.

Bacteria

Bacteria is mentioned on the back label of the wine bottle. Does this mean that I am drinking something that is potentially harmful to my health?

No, the mention of bacteria on the back label of a wine bottle does not mean that you are drinking something that is potentially harmful to your health.

Types of bacteria that may be naturally present in grape juice and wine: lactic acid bacteria; and acetic acid bacteria. These bacteria are not harmful to humans, and are also found in other foodstuffs such as yoghurt.

Lactic acid bacteria can convert the malic acid in the wine to lactic acid, which is referred to as malolactic fermentation. Red and certain white wine undergoes malolactic fermentation, which can add desirable flavours and aromas to the wine. Lactic acid bacteria can also contribute to off-flavours and off-odours in the wine.

Acetic acid bacteria can convert alcohol in the wine to acetic acid, or its ester, ethylacetate. Both resultant compounds cause characteristic off-flavours and off-odours in the wine.

Benefits of wine to human health



I have read that the French experience less heart disease than other nationalities. Does any research indicate that there are health benefits from drinking wine?



The term 'French paradox' refers to the observation that while both the French and Americans have a diet high in saturated fats, smoke cigarettes and exercise little—which are all risk factors for cardiovascular disease—the French have a significantly lower risk of cardiovascular disease than that of the Americans: 36% compared with 75%. The difference in risk has been attributed to the consumption of alcohol and, in particular, red wine. The French currently consume 53.9 L per capita of wine per year, while the Americans only consume 8.5 L per year.

Recent research suggests that the regular and moderate consumption of alcohol, and in particular wine, may reduce your risk of diseases, such as coronary artery disease, ischaemic stroke and heart failure associated with coronary artery disease. Furthermore, your overall lifespan may also be significantly increased. Moderate consumption is considered as approximately two standard drinks of alcohol per day for men and one to two for women, where a standard drink is 10 g of alcohol or approximately 100 mL of wine. The consumption of alcohol and wine above this moderate amount will, conversely, increase your risk of cardiovascular and other diseases, and hence decrease your overall lifespan. This is referred to as a J-shaped relationship.

Recent research suggests that the regular and moderate consumption of wine promotes both short-term and long-term cardioprotective effects. For example, regular wine consumption prolongs and maintains these short-term cardioprotective effects on blood clotting, on the plasma concentration of cholesterol, and on the ability of the blood vessel wall to contract and relax.

Also suggested by recent research, the cardioprotective effects of wine are imparted by the alcohol component (approximately 75% of the effects) and by the wine-specific phenolic compounds and their polyphenolic forms (approximately 25% of the effects). Phenolic compounds, such as anthocyanins and tannin, give wine its characteristic colour and flavour, and red wine typically has a 200-fold greater concentration of phenolic compounds than does white wine.

The AWRI does not advocate or encourage current abstainers and consumers to drink to achieve a health benefit. Consumers should only drink wine for enjoyment.



Cancer



I have read in the media that alcohol causes cancer. Does this mean that I shouldn't consume any wine?



There is sufficient evidence to suggest that an average consumption of 25 g of alcohol per day, or two and a half 10 g standard drinks, is associated with an increased risk of developing cancers of the mouth, throat (pharynx and larynx), oesophagus, liver and bowel (colon and rectum). These are the body tissues that come into direct contact with alcohol. There is also sufficient evidence to suggest that alcohol increases the risk of developing breast cancer in women, particularly in women who have a family history of breast cancer.

While the risk of developing these cancers increases with each drink of alcohol you consume during a day, it is further increased if you smoke cigarettes as well. In reality, the consumption of all alcoholic beverages accounts for 3.1% of the total cancer burden in Australia. That is, alcohol consumption accounts for 3.1% of the years of life lost due to premature death from cancer coupled with years of healthy life lost due to disability from cancer. In comparison, tobacco consumption accounts for 20.3%, physical inactivity for 5.6%, high body mass index for 3.9%, and occupational exposures and hazards also accounts for 3.1%. In contrast, alcohol consumption accounts for -4.7% of the total cardiovascular disease burden in Australia. Consequently, while moderate alcohol consumption may be a risk factor for cancer, it is not for cardiovascular disease, although heavy alcohol consumption is a risk factor for both. Therefore, to reduce your risk of death and disability due to alcohol consumption in the short- and long-term from all causes, you should only consume alcohol and wine within the recommendations of the National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) on <http://www.nhmrc.gov.au/publications/synopses/ds10syn.htm>.

The relationship between the consumption of wine and cancer is more complex. Moderate wine consumption may actually reduce the risk of mouth, throat, oesophagus, lung and colorectal cancers as well as Non-Hodgkin's Lymphoma by approximately 20%. Moderate consumption is considered as approximately two standard drinks of alcohol per day for men and one to two for women. The consumption of alcohol and wine above this moderate amount will, conversely, increase your risk of cancer and other diseases. This is referred to as a J-shaped relationship.

Damage to the DNA of cells by chemicals in the environment and food, as well as by the physical environment, can lead to cancer. Recent research suggests that the phenolic compounds in wine may protect the DNA of cells of body tissues from damage or may stop the growth of cells with damaged DNA. Further research in human populations is required to establish if there is sufficient evidence to suggest whether any wine consumption actually provides any significant protection against certain cancers.

For further information on alcohol and cancer, please refer to the website of the Cancer Council Australia on: www.cancer.org.au

Cardiovascular disease

I have a heart condition. Can I consume wine?

 Yes, you can consume wine in moderation, but only if alcohol does not adversely affect the medication that you are on for your heart condition.

The consumption of wine is not recommended, however, if you have uncontrolled high blood pressure, but once satisfactory control has been achieved with medication, you can resume consuming wine in moderation.

If so, what kind of wine?

 If alcohol does not adversely affect your medication, any kind of wine can be consumed in moderation. Diabetics and asthma sufferers should refer to the sections on page 8 and page 4, respectively.

How much wine can I consume per day?

 Recent research suggests that approximately two 100 mL glasses of wine per day for men and one for women should not exacerbate a heart condition. From research undertaken by the Department of Medicine at the University of Western Australia, greater than these one or two 100 mL glasses of wine, however, can significantly increase your blood pressure, which would, therefore, exacerbate your heart condition.

Coeliac's disease

I have Coeliac's disease. Can I consume wine?

 Additives that contain gluten are not allowed to be added to still wine and dessert wine and, therefore, you can safely consume these products.

Australian-made sparkling wine does not contain any additives that contain gluten, but imported sparkling wine and Champagne may contain spirit derived from wheat grain. Therefore, it would be prudent to consume Australian rather than imported sparkling wines. This is the same for Australian versus imported fortified wines. Aperitif and fortified wines, however, are also permitted to add caramel during production. While caramel, which is additive number 150, may originate from wheat starch and hence could contain residual gluten, it is now commonly considered that the caramel is so highly processed that Australian aperitif and fortified wines are considered to be 'gluten free' and, as such, suitable for consumption by Coeliacs.

For further information on Coeliac's disease, please refer to the website of the Coeliac Society of Australia on: www.coeliac.org.au

Dementia



I have read in the media that heavy alcohol consumption can cause dementia. Does moderate alcohol consumption cause dementia too?



Cognitive function is defined as the intellectual or mental processes by which knowledge is acquired, including perception, reasoning, acts of creativity, problem-solving and possible intuition. Dementia is a form of cognitive impairment whereby an individual loses the ability to think, remember and reason due to physical changes in the brain, and Alzheimer's disease is a form of dementia. Regular heavy alcohol consumption is associated with an increased risk of developing dementia, probably directly due to the toxic effects of the alcohol component on brain cells or indirectly due to associated poor nutrition or trauma to the brain. Heavy consumption is considered as approximately five or more standard drinks of alcohol per day for men and for women.

Recent research suggests that regular moderate alcohol consumption is, however, associated with a reduced risk of cognitive impairment and developing dementia for both men and women. Moderate consumption is considered as approximately two standard drinks of alcohol per day for men and one to two for women, where a standard drink is 10 g of alcohol or approximately 100 mL of wine. The consumption of alcohol above this moderate amount will, conversely, increase your risk of cardiovascular, cancer and other diseases. This is referred to as a J-shaped relationship.

Diabetic



I am a diabetic. Can I consume wine?



Yes, you can consume wine, but preferably with a carbohydrate food/a meal. The consumption of wine without a meal can cause your blood sugar level to fall unexpectedly (hypoglycaemia), in particular, if you are an insulin- or medication-dependent diabetic. For example, normally when your blood sugar level starts to drop your liver begins changing stored carbohydrate into glucose, which is then released into the blood stream to stop or slow the drop. When you consume an alcoholic beverage such as wine, however, the liver breaks down the alcohol so it can be removed from the body in preference to changing the carbohydrate. The liver will not begin releasing glucose until all of the alcohol is broken down.

Indeed, when you consume more than a light to moderate amount of alcohol, the alcohol in wine can react with many of the prescribed diabetic medications, and worsen the side effects of diabetes, such as increasing your blood pressure.

Therefore, you should also only consume wine at or below the National Health and Medical Research Council (NH&MRC) recommendations, for example, a maximum of two 10 g standard drinks per day for men and one 10 g standard drink per day for women. One 10 g standard drink is approximately 100 mL of wine.

Recent research also suggests that the regular and light to moderate consumption of wine by a diabetic with a meal, may also reduce your overall risk of cardiovascular disease. This is related to the positive effect of alcohol on your body's metabolism of glucose and insulin, and on your plasma concentration of high density lipoprotein (HDL), which increases the removal of cholesterol from your body. Conversely, the heavy consumption of alcohol will worsen the effects of diabetes, such as significantly increasing your fasting plasma concentration of fats, such as triglyceride.



If so, which kind(s) of wine



Wine contains sugar. Low sugar or 'dry' varieties of wine are recommended for diabetics. These include still and sparkling styles, and also dry aperitif styles but not a sweet or medium dry/sweet aperitif style and not a sweet dessert wine. High sugar liqueurs and fortified wines are also not recommended for diabetics.

For further information on diabetes, please refer to the website of Diabetes Australia on: www.diabetesaustralia.com.au or that of the American Diabetics Association: www.diabetes.org

Drinking and driving



If I want to drink and then drive, how much can I consume before I am over the legal limit of 0.05 (BAC)?



Men

The amount of alcohol in the blood stream is called the blood alcohol concentration (BAC). A BAC of 0.05 means that an individual has 0.05 g of alcohol in their body for every 100 mL (0.1 L) of blood. A standard drink is 10 g alcohol, which is approximately equal to 100 mL of wine. A man's BAC will generally increase by between 0.01 to 0.02 for each standard drink. A man's BAC will generally decrease by 0.01 per hour (approximately 1 standard drink).

The University of Adelaide's Centre for Automotive Safety Research recommends, however, that to remain under the legal limit of 0.05, a man should consume no more than two 10 g standard drinks in the first hour and one each hour following.

The consumption of alcohol with a meal, however, will significantly slow the absorption of alcohol from the gastrointestinal tract. The maximum BAC recorded will, therefore, be lower than when alcohol is consumed on an empty stomach. In addition on a full stomach BAC will be recorded for a longer period of time.

Women

The amount of alcohol in the blood stream is called the blood alcohol concentration (BAC). A BAC of 0.05 means that an individual has 0.05 g of alcohol in their body for every 100 mL (0.1 L) of blood. A standard drink is 10 g alcohol, which is approximately equal to 100 mL of wine. A woman's BAC will generally increase by between 0.02 to 0.03 for each standard drink. A woman's BAC will generally decrease by 0.0075 per hour (approximately $\frac{3}{4}$ of a standard drink).

The University of Adelaide's Centre for Automotive Safety Research recommends, however, that to remain under the legal limit of 0.05, a woman should consume no more than one 10 g standard drink in the first hour and one each hour following.

The AWRI recommends that wine consumers should not drink and drive.

For additional information on drinking and driving, please refer to the The University of Adelaide's Centre for Automotive Safety Research at website: <http://casr.adelaide.edu.au>



Ethnic differences



I have noticed that some of my Asian friends cannot consume alcohol without feeling ill. Why does this happen?



Once absorbed, alcohol is metabolised or broken down in the liver. Until the alcohol is broken down by the liver it circulates in the blood stream.

There are two pathways in the liver which break down alcohol to acetaldehyde (step 1) and then to acetate (step 2), before it is finally removed from the body by the kidneys. This first pathway is always functioning or 'switched on'. The second pathway only functions when there is a certain concentration of alcohol in the liver. For example, this pathway 'switches on' after the consumption of approximately four or more standard drinks.

Some Asian populations, such as the Chinese and Japanese, have a large proportion of individuals with an 'inactive' gene for the second step in the first pathway. The acetaldehyde cannot be broken down to acetate by the first pathway. Acetaldehyde, therefore, accumulates in the blood stream and liver until a certain concentration is reached in the liver and the second pathway 'switches on' to break down the 'toxic' acetaldehyde to acetate. The blood concentration of acetaldehyde in individuals with the inactive gene can be 10-times higher than normal.

The physical effects of having the inactive gene include the following:

- facial flushing—a rapid increase in blood flow to the skin of the face, neck and chest;
- a rapid heartbeat;
- a headache;
- nausea and vomiting;
- extreme drowsiness or tiredness; and
- low blood pressure.

These physical effects can occur after only one standard drink of wine, and are so unpleasant that individuals with the inactive gene generally consume little if any alcohol.

Is this facial flushing the same as that experienced by Caucasians?

No, the facial flushing experienced by Caucasians (for example, Australian of European descent), is physiologically different to that experienced by Asians. In Asians, the alcohol directly dilates the cutaneous blood vessels of the face and neck to produce warm, flushed skin, but does not increase blood flow to the face and neck.



Headache



I get a headache after consuming a certain kind of wine.

What would cause my headache?



Wine contains alcohol. Alcohol acts on various parts of the human body, including the head. Headaches are referred pain to the surface of the head from the deep structures, such as the brain and its related tissues, veins and arteries. Pain is referred via pain receptors on the deep structures to either the front or the back of the head.

The headache experienced after consuming alcohol is generally related to your blood alcohol concentration (BAC). Alcohol and its primary breakdown product, acetaldehyde, which are toxic compounds in high concentration, readily diffuse from the blood into the fluids of the brain and spinal cord. They directly irritate the meninges, which is the membrane that envelops the brain and spinal cord, to cause pain at the front surface of your head. The more wine that you consume, the higher will be your BAC, the more the alcohol and acetaldehyde will irritate the tissues of your brain, and the more severe will be your headache.

It is possible that on some occasions the consumption of a wine will cause a headache and on other occasions it will not. Your BAC is related to the rate of alcohol consumption, such that absorption in the blood stream from the small intestine is rapid. The alcohol is then transported in blood to the liver, which breaks down the alcohol. The capacity of your liver to break down alcohol is limited, so that if more alcohol is presented to the liver than it has the capacity to break down, then the remaining alcohol will circulate in your blood to the other organs and tissues of your body, such as the brain. The alcohol will remain circulating until it has all been broken down by the liver, to its primary breakdown product acetaldehyde, and then to its secondary breakdown product, acetate, which can be then be removed from your body by the kidneys or incorporated into cells.

The consumption of food, and even other non-alcoholic fluids, with the wine, will slow down and reduce the amount of alcohol that is presented to your liver for break down at any one time.

If you are taking certain medications, which are also broken down in the liver by the same mechanism as is alcohol, then the medications may be broken down in preference to alcohol. More of the consumed alcohol will circulate in the blood (and for a longer period of time), and you will record a significantly higher BAC, with the potential problem of a headache.

It has been suggested that a headache and an allergic reaction, such as facial flushing, following the consumption of wine may be due to the presence of biogenic amines, such as histamine, in wine. This appears unlikely. Recent research shows that wine contains a very small amount of histamine, which is approximately 10-times less than that measured in other foods, such as cheese, fish and vegetables including eggplant, spinach and tomatoes. These other foods are generally consumed daily and in large amounts, whereas the consumption of wine is generally not daily and only a relatively small amount is consumed.

Moderation



Doctors talk about drinking in moderation or drinking a moderate amount. What is moderation?



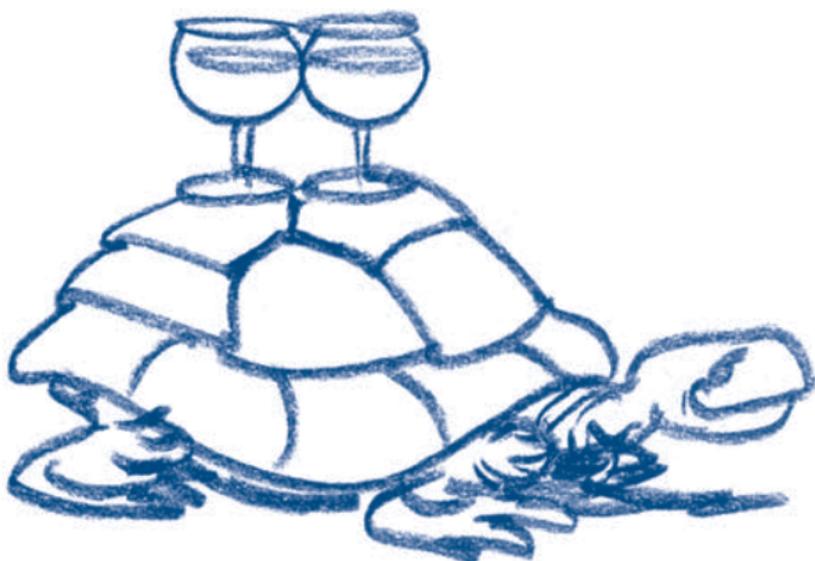
All the medical and scientific studies define drinking in moderation as drinking approximately two standard drinks on any one day for an average man and woman, so that any potential harm to the human body is minimised and any potential benefit is maximised. A standard drink is defined as 10 g of ethanol. Both the amount and the pattern of consumption are important. For example, it is not considered moderate to 'save up' over a week and drink your daily two to three drinks on only two days, that is, 14 drinks over one to two days. This is defined as 'binge drinking'. When you 'binge drink', you significantly increase your blood pressure and the risk of having a heart attack or stroke.

The potential harms of immoderate drinking are related to your maximum blood alcohol concentration and the amount of time alcohol and its first breakdown product, acetaldehyde, are circulating in the blood throughout your body, as both alcohol and acetaldehyde in high concentration are toxic to human tissues. Diseases related to a high blood alcohol concentration experienced for approximately 15 to 20 years are cancer of the mouth, throat and oesophagus, cirrhosis of the liver, dementia, haemorrhagic stroke and pancreatitis, all of which you can die from. The most debilitating disease, however, is the development of alcohol dependence or alcoholism, where an individual can become both psychologically and physically dependent on alcohol.

With moderate drinking, your risk of developing cardiovascular disease and your risk of death from cardiovascular disease as well as from all causes, including accidents and certain cancers, is generally reduced significantly. The risk increases exponentially, however, with each drink above moderation. For example, this relationship between number of drinks on any one day and risk of death is often drawn as a 'J'-shaped curve, where the risk decreases from no alcohol drunk to approximately two drinks, and then increases again with each successive drink.

Therefore, while two glasses of alcohol such as wine per day can be considered to be 'good for you', drinking 'more' will not provide 'more' benefits, only more harms. For further information on moderation, please refer to the National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) on <http://www.nhmrc.gov.au/publications/synopses/ds10syn.htm>.

The AWRI does not advocate or encourage current abstainers and consumers to drink to achieve a health benefit. Consumers should only drink wine for enjoyment.



Polyphenolic compounds

What are polyphenolic compounds or polyphenols?

Phenolic compounds and their polyphenolic forms contribute to the characteristic aromas, colours and flavours of wine. They are extracted from the seeds and skins of grapes during the first fermentation stage of winemaking, when the juice is in contact with the grape skins and seeds in fermentation tanks or vats. The amount of phenolic compounds in red wine is generally six-times greater than that in white wine, because red juice has longer or more contact with the grape skins during fermentation enabling more phenolic compounds to be extracted into the red juice.



Are they the 'magic' ingredients of wine?

Phenolic compounds are also present in other foods such as fruits, grains and vegetables, where the consumption of these foods has been associated with a decreased risk of cardiovascular or heart disease. Therefore, it has been proposed that these phenolic compounds in wine similarly contribute to the decreased risk of heart disease associated with wine consumption. The mechanism of action of these phenolic compounds is being investigated and from initial investigations, it appears that the phenolic compounds in wine have some different effects on the body compared to the ethanol component, which is common to all alcoholic beverages. For example, the phenolic compounds appear to:

- Decrease the oxidative transformation of 'bad' cholesterol in the body called low density lipoprotein or 'LDL'-cholesterol. This prevents oxidised-LDL-cholesterol from accumulating on blood vessel walls, which if untreated could narrow an artery or vein to eventually block blood flow causing a heart attack or stroke;
- Enable blood vessel walls to relax and dilate from being continually contracted and narrowed. When the blood vessel wall is contracted, blood pressure is increased, but when relaxed, blood pressure decreases and this prevents a blood vessel from rupturing to cause a stroke; and
- Decrease the clotting together of red blood cells, which if untreated could form a clot to block blood flow in an artery or vein to cause a heart attack or stroke.

Recent research indicates that the ethanol component of wine also confers health benefits and, accordingly, the moderate consumption of beer and spirits is also associated with a decreased risk of death from cardiovascular disease. It is thought that the ethanol component accounts for 75% of the cardioprotective effects of wine. For example, the ethanol component appears to:

- Increase the amount of 'good' cholesterol in the body called high density lipoprotein or 'HDL'-cholesterol, where HDL-cholesterol removes the LDL-cholesterol from the blood and body;
- Decrease the clotting together of red blood cells, which if untreated could form a clot to block blood flow in an artery or vein to cause a heart attack or stroke; and
- Dissolves blood clots, which have formed in veins and arteries.

Pregnancy & breastfeeding



I am planning to become pregnant. Can I drink wine during my pregnancy?
Can I drink wine then when I am breastfeeding?



This is a controversial question, and different doctors may give different answers.

The National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) recommend that for women who are pregnant or planning a pregnancy, not drinking is the safest option. This is because a 'no-effect' level for you to avoid harming your unborn baby has not been established nationally or internationally. Pregnant women should never become intoxicated. This is to avoid a high blood alcohol concentration, as the alcohol in your blood stream enters that of your unborn baby and can effect its birth weight as well as increase the risk of congenital or birth defects. Immoderate or regular heavy consumption can even cause a miscarriage to occur in the first trimester.

Similarly, for women who are breastfeeding, not drinking is considered to be the safest option, especially during the first month after the baby has been born until breastfeeding is well established. Thereafter, if you chose to drink while breastfeeding, drink no more than two standard drinks per day as alcohol rapidly and readily crosses from your blood stream into your breast milk. To avoid a high blood and breast alcohol concentration, you should only drink your one to two drinks with a meal and aim to avoid breast feeding for approximately two hours after drinking.

For additional information on consumption of alcohol during pregnancy and breast feeding please refer to the National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) on <http://www.nhmrc.gov.au/publications/synopses/ds10syn.htm>, and from the Australian Breastfeeding Association on <http://www.breastfeeding.asn.au>



Resveratrol



The word 'resveratrol' frequently appears in the media associated with wine and a reduced risk of, for example, cancer. What is resveratrol?



Resveratrol is a chemical compound that the grapevine produces in response to a fungal infection, such as *Botrytis cinerea* or bunch rot, during the growing season. In essence, it is an antibiotic or antifungal agent, which inhibits the progress of the fungal infection, and is found on the skins of grapes and transferred into the juice and wine during crushing and fermentation, respectively. Similar to the other polyphenolic compounds, it is primarily found in red wine rather than in white wine.

The highest concentration of resveratrol in wine is generally found in wines from cooler regions such as Canada and the northern countries of Europe, where a cooler climate with less sunlight and more rainfall encourages the growth of fungal infections. It also occurs on grape varieties that are more susceptible to fungal infections, such as Pinot Noir. In addition, winemaking variables such as contact time between the skins and the juice during fermentation, length and type of post-fermentation storage, and choice of clarifying or filtering, also influence the concentration of resveratrol in the finished wine. Thus, similar to the polyphenolic compounds, it cannot be accurately predicted as to which grape growing region or grape variety will consistently produce the wine with the highest concentration of resveratrol.



Does it really reduce the risk of cancer and/or heart disease?

There is no conclusive medical and scientific evidence to date that resveratrol reduces the risk of cancer or heart disease in humans. It appears, however, that resveratrol is an antioxidant, and has a role in preventing heart attacks and strokes. It also appears that it may act as an anti-cancer agent. The mechanism of this action is still being studied, but it appears related to anti-oxidation, where resveratrol may prevent and repair damage to DNA associated with the initiation of cancer, as well as acting to prevent the growth and proliferation of cancer cells, both at the gene and cell level.

Most of these medical and scientific studies have been undertaken in animals and in the test tube. However, as the human body may act and respond differently to that of animals, and is not an isolated and controlled environment like the test-tube, further studies need to be undertaken in humans to verify these results.



Safe alcohol and wine consumption



How much alcohol and wine can I consume per day before I start harming my body?



Men

The National Health and Medical Research Council of Australia (NH&MRC) recommends that men consume a maximum of two 100 mL glasses of alcohol such as wine per day and a maximum of four glasses occasionally. Consumption over this amount is considered as harmful and hazardous to the male human body. The amount of harm is directly related to blood alcohol concentration (BAC). Long-term harmful and hazardous consumption can lead to numerous alcohol-related diseases, such as those of the liver and pancreas, and can lead to alcohol dependence.

The consumption of alcohol with a meal, however, will significantly slow the absorption of alcohol from the gastrointestinal tract into the blood on route to the liver. Your BAC will, therefore, be lower than when you consume alcohol on an empty stomach, and less harmful to your body's organs and tissues.

Women

The National Health and Medical Research Council of Australia (NH&MRC) recommends that women consume a maximum of two 100 mL glasses of alcohol such as wine per day and a maximum of four glasses occasionally. Consumption over this amount is considered as harmful and hazardous to the female human body. The organs and tissues of the female human body are inherently more susceptible to harm than those of males. The amount of harm is also directly related to BAC, and women record a significantly higher maximum BAC than men when they consume a comparable amount of alcohol.

This significantly higher BAC is related to the difference in body composition between males and females. Absorbed alcohol continues to circulate in the blood until it is distributed into the fluids and tissues of the body. Men have a larger proportion of body water than women into which the alcohol rapidly distributes from the blood. In addition, women have a larger proportion of fat (33% compared with 12%) into which the alcohol distributes slowly from the blood. Men also generally have more liver enzymes than do women, where these liver enzymes are more active in men than in women, such that less alcohol can be metabolised per pass through the liver in women.

Furthermore, larger individuals have a larger proportion of body water and fat into which alcohol distributes, and accordingly record a lower maximum BAC. The amount of blood and fluids in your body is proportional to your weight.

For additional information on the safe consumption of alcohol and wine, please refer to the National Health and Medical Research Council's *Australian guidelines to reduce health risks from drinking alcohol* (March 2009) on <http://www.nhmrc.gov.au/publications/synopses/ds10syn.htm>.

The AWRI does not advocate or encourage current abstainers and consumers to drink to achieve a health benefit. Consumers should only drink wine for enjoyment.

Standard drink



All the drinking guidelines and recommendations refer to one or more standard drinks. What is a standard drink?



A standard drink refers to an alcoholic drink, which contains 10 g of ethanol or ethyl alcohol in Australia. This definition was adopted by the Australian government and the wine sector to help people monitor and control their alcohol consumption.

For a 12% v/v alcohol wine, one standard drink is approximately 100 mL, where a 750 mL bottle of this wine would carry a comment stating that "This bottle contains approximately 7.5 standard drinks."

For a 17–22% v/v alcohol fortified wine, such as a port or liqueur, one standard drink is approximately 60 mL.

While many bars, clubs, pubs and restaurants are now serving wine in wine glasses, which have approximately 100 mL or one standard drink marked on the glass, some establishments still serve wine in larger glasses, such that one glass may be equivalent to one and half or even two standard drinks.

For further information on standard drink labelling, please refer to the website of the [Australian] Food Standards Code and the Food Standards Code of Australia and New Zealand at website: www.foodstandards.gov.au



Teeth



I have heard that I may harm my teeth if I consume wine every day. Is this true?



No, consuming a moderate amount of wine every day, that is approximately two to three standard drinks, will not significantly harm your teeth. Constant exposure to a large amount of wine every day can, however, lead to the following problems: chemical erosion; staining; sensitivity; increased risk of tooth decay; and increased risk of damage to restorative materials. Wines generally have a pH value of between 3.0 to 3.8, which means that they are acidic, and it is the acid which can cause chemical erosion and increase the risk of decay and damage. Wines, and in particular red wines, also contain anthocyanin and tannin compounds, which can stain exposed surfaces of teeth.

If you are to attend a wine tasting, it is recommended that you should not brush your teeth on the morning of the tasting, as the film of plaque that remains on the teeth will protect the exposed surfaces from acid attack. Brushing of teeth should also be delayed after the tasting for approximately one to two hours. During the tasting, you should rinse your mouth out with water between wines, to reduce the acid load on your teeth.



Type of wine

Does the type of wine I drink make any difference to my health?

All wines, red and white, irrespective of variety, vintage or year, and geographical indication or region, have the potential to confer 'health benefits', when consumed in moderation, that is, approximately two to three standard drinks per day. From accumulating research results it has been proposed that approximately 75% of the cardioprotective effects of wine are due to its ethanol component, and only 25% of the effects are due to its phenolic component. The ethanol and phenolic components have complementary actions on the cardiovascular system. It has been suggested by overseas researchers that one variety of wine or wines from one region, may contain more phenolic compounds than other varieties and other regions. This research has only been undertaken with a small number of samples, and the results have not been repeated by other overseas researchers, many of whom actually observed the opposite results. There are complex reasons for these opposing results:

- The grapegrowing conditions, such as sunlight, humidity, rainfall and temperature, and nutrients, influence the phenolic content of the grapes and resultant wine; and
- The winemaking conditions, such as the concentration of alcohol in the ferment, the pH value [of the juice] and the temperature at which the fermentation occurs, further influences the phenolic content of the resultant wine.

These grapegrowing and winemaking variables have different effects on each grape variety, and are different between years and regions. Therefore, no one variety, year or region will consistently contain the most phenolic compounds, and hence be the 'most healthful'. In addition, there are at least 10 different types of phenolic compounds in wine, all of which may have different actions on the cardiovascular system. These actions are dependent on the amount of that compound in the wine, and the biochemistry of the human body at the time of consumption.

Therefore, the wine that you should drink to get the most 'health benefits' is the wine that you like most, provided that you drink it in moderation.

The AWRI does not advocate or encourage current abstainers and consumers to drink to achieve a health benefit. Consumers should only drink wine for enjoyment.



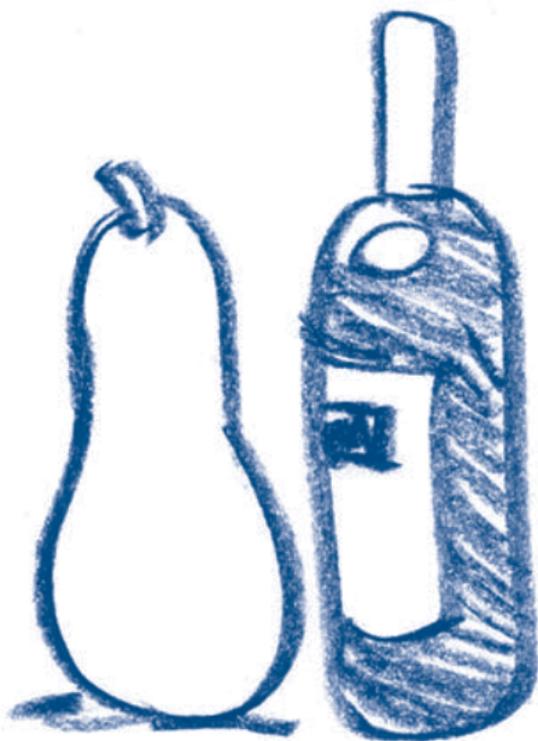
Vegetarians and Vegans

I am a strict vegetarian/vegan. Can I consume wine?

The class of vegetarian that you are will determine whether you can consume wine. The wine may have been clarified with egg albumin (egg protein), casein (milk protein), gelatin (Australian beef tissue) or isinglass (fish tissue), which are all compounds derived from animals. Essentially all of the clarifying agent is removed prior to bottling and hence does not remain in the finished wine.

If so, which kind(s) of wine?

Wine that is labelled as 'organic' may still have been clarified with casein or gelatin.



Yeast allergy

I have an allergy or an intolerance to yeast. Can I consume wine?

Generally yes, you should be able to consume wine without an allergic reaction occurring, because although yeast is used for the fermentation of wine from grape juice, a negligible amount would remain in the finished wine. A certain concentration of yeast breakdown products will, however, remain in the finished wine.

If so, which kind(s) of wine?

All wine, irrespective of kind, is produced from the fermentation of grape juice by yeast. The fermentation may occur from a yeast which is naturally present in the juice or from a yeast which is added to the juice. Once fermentation is complete, the wine is separated from (racked off) the yeast, and further winemaking practices, such as clarification and filtration, will remove the vast majority of the remaining yeast prior to bottling.

Wine additives (and processing aids)



**Why is it necessary to produce wine with additives?
Why isn't wine 'additive free'?**



Additives are generally added during winemaking to modify or negate the influence of environmental and harvesting factors, which can adversely affect the quality of the grapes and the resultant wine, and to negate any adverse winemaking factors. For example, additives are used to:

- facilitate the fermentation of the grape juice into wine;
- prevent the growth of micro-organisms in the juice and/or wine;
- acidify or deacidify the wine; and
- prevent or remove off-colours, off-flavours and off-odours.

Winemakers, however, can only use a limited set of specific additives that have been approved by Food Standards Australia New Zealand (formerly the Australia New Zealand Food Authority) and by committees of the United Nation's joint World Health Organisation (WHO) and Food and Agriculture Organisation (FAO) Codex Alimentarius Commission. The amount and quality of the additive that can be used may also be specified.

Certain wines are certified and classified as 'organic'. This means that an even more limited set of specific additives has been used during winemaking and the amount used is also limited. For example, the amount of sulfur dioxide, an antimicrobial and an antioxidant agent, which can be added to 'organic' wines is approximately 50% less than that which can be added to 'non-organic' wines. Organic wines, however, should be consumed sooner than traditionally produced wine (for example, within 12 months of bottling and purchase), because the quality of the wine will diminish with age as these wines are more likely to become oxidised and consequently have a less desirable aroma and flavour.

Wine preservatives

Why is it necessary to add 'preservatives' to wine?

The word 'preservative' refers to protecting the wine from microbial contamination or spoilage by unwanted bacteria, moulds and yeast. These unwanted bacteria, moulds and yeast either naturally occur on the grapes and hence are also present in the juice, or enter the juice from harvesting or winemaking equipment that has not been adequately cleaned or sanitised. Microbial spoilage will make the wine smell and taste unpleasant. Another word for preservative is, therefore, antimicrobial agent. Four antimicrobial agents are currently permitted to be added during winemaking in Australia—sulfur dioxide, sorbic acid, lysozyme and dimethyl dicarbonate, where only a restricted amount of each antimicrobial agent is permitted to be added. In Australia, Canada, the EU, New Zealand and USA, there is a legal requirement that the label of a bottle of wine must include:

- 'preservative [sulfur dioxide (220/224) or sorbic acid (200/202)] added', or
- 'contains preservative [sulfur dioxide (220/224) or sorbic acid (200/202)]',

if antimicrobial agents have been added during winemaking.

For additional information on the labelling of additives and preservatives, please refer to the [Australian] Food Standards Code and the Food Standards Code of Australia and New Zealand at website: www.foodstandards.gov.au

Can you buy 'preservative-free' wine?

There are no wines on the market labelled 'preservative free'. This is because all wines contain naturally a small amount (10–50 mg/L) of the antimicrobial agent, sulfur dioxide, as it is produced by yeast during the fermentation stage of winemaking. There are, however, wines on the market labelled 'organically grown', which contain a reduced amount of antimicrobial agents. For example, organic winemakers add approximately 50% less sulfur dioxide during winemaking. There are also wines on the market labelled 'no preservatives added'. This means that no antimicrobial agents have been added during winemaking. Your local bottle or liquor shop should stock a selection of these wines. You can also contact the Biological Farmers of Australia [formerly Organic Vignerons Association of Australia] on ph: (07) 3350 5716 or fax: (07) 3350 5996 or Website: <http://www.bfa.com.au> or postal address: PO Box 530, Chermanside QLD 4032, or The National Association of Sustainable Agriculture Australia (NASAA) on ph: (08) 8370 8455 or fax: (08) 8370 8381 or Email: enquiries@nasaa.com.au or postal address: PO Box 768, Stirling SA 5152

The Australian Wine Research Institute advocates the moderate consumption of wine, but does not recommend that abstaining individuals should commence consuming wine to benefit their health. Consuming wine more than moderately increases the risk of both short- and long-term harm to health.

Disclaimer

1. Definitions

References to "the AWRI" in this disclaimer mean The Australian Wine Research Institute (ABN 83 007 558 296).

References to "information" in this disclaimer mean information provided in this booklet and on the website www.awri.com.au.

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Linkages for additional information
related to alcohol/wine and health
issues and public policy include:

The [US] Wine Institute at www.wineinstitute.org

Alcohol in Moderation at www.aim-digest.com

Australian Drug Foundation at www.adf.org.au/drughit/facts/hdayal.html

DrinkWise Australia at www.drinkwise.com.au

International Centre on Alcohol Policies at www.icap.org

National Drug Research Institute at www.curtin.edu.au/curtin/centre/ndri

National Drug and Alcohol Research Centre at
www.med.unsw.edu.au/ndarc/questions

Office International de la Vigne et du Vin at www.oiv.org

The Portman Group at www.portmangroup.org.uk

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