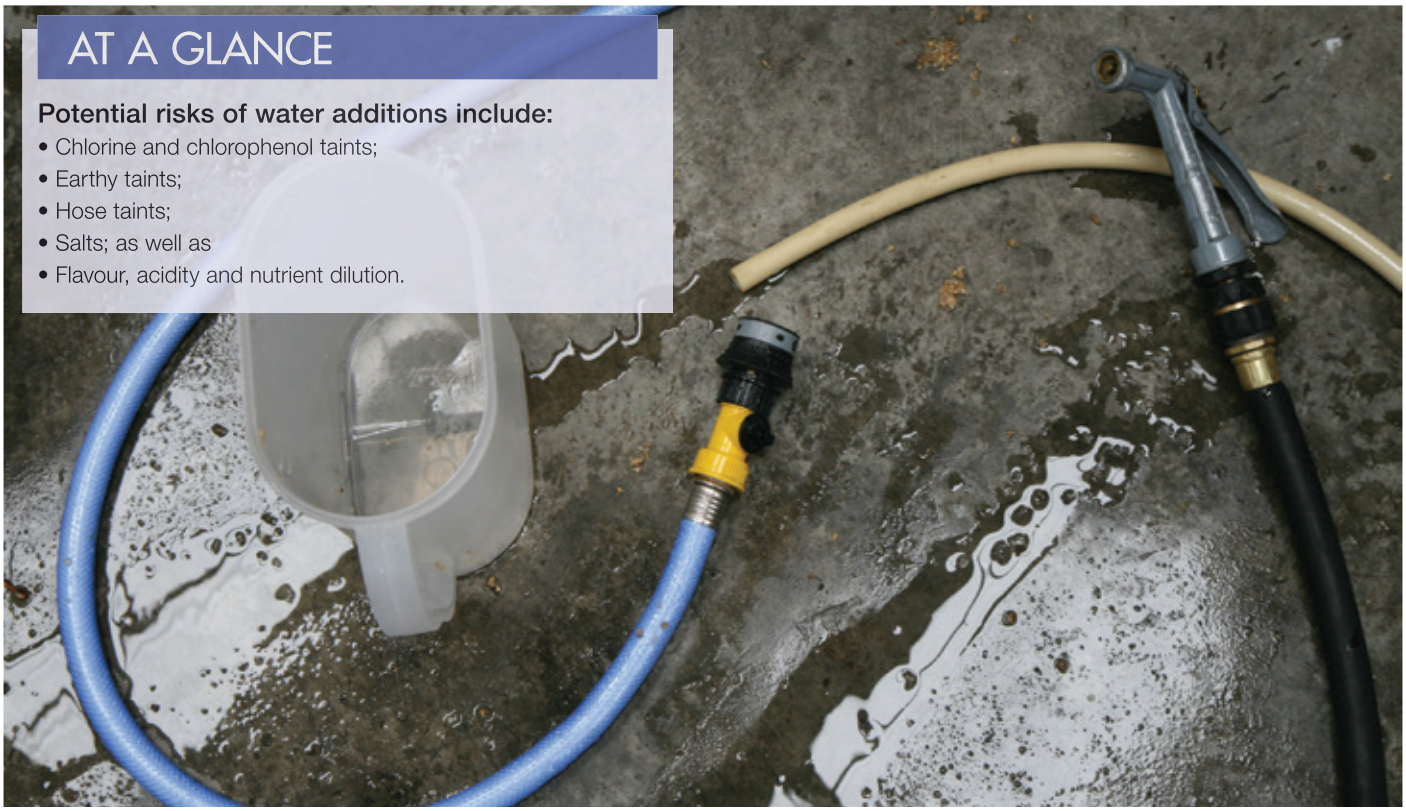

AT A GLANCE

Potential risks of water additions include:

- Chlorine and chlorophenol taints;
- Earthy taints;
- Hose taints;
- Salts; as well as
- Flavour, acidity and nutrient dilution.

Adding water to high sugar must

IN FEBRUARY, an amendment was made to the Australia New Zealand Food Standards Code (FSC) to allow limited addition of water to high sugar must and juice to reduce the chance of fermentation problems. Previously water had not been allowed as a direct additive to grape juice, must or wine, with a maximum (cumulative) addition of 70 mL/L water allowable only for the incorporation of permitted additives or processing aids during the winemaking process.

HOW MUCH WATER CAN BE ADDED?

Water may be added to juice or must to reduce the sugar level to no less than 13.5° Baumé (Bé) (equivalent to 24.3oBrix).

This means that the amount of water allowed will depend on the initial sugar level of the juice or must. An additional 70 mL/L (7%) of water can then also be added to incorporate additions.

HOW CAN I CALCULATE HOW MUCH WATER TO ADD?

While sugar levels in juice or must are usually measured as Bé or Brix, these measures represent density of the must rather than actual sugar concentration. In addition, because the density of must changes with the amount of solids present, the conversion between Bé or Brix to g/L sugar is not linear; that is, the conversion factor changes with the Bé of the must.

This means that calculating the amount of water needed to decrease the Bé to a particular value is not as simple as one might think. As such, the AWRI is working on a water addition calculator, which will be accessible via the AWRI Winemaking Calculators App or from the calculators page on the AWRI website. (https://www.awri.com.au/industry_support/winemaking_resources/calculators/)

WHAT RECORDS NEED TO BE KEPT?

As part of its regulatory function, Wine Australia monitors compliance with the FSC.

Accordingly, when conducting compliance audits, Wine Australia could ask winemakers to demonstrate compliance by identifying any must or juice ameliorated with water to aid fermentation, and providing accurate records of the resultant Bé level.

ARE THERE RISKS ASSOCIATED WITH WATER ADDITIONS?

Chlorine and chlorophenol taints:

Mains/potable water is often treated with chlorine, chlorine dioxide, chloramines, ozone and hydrogen peroxide, combinations of these and other minor disinfectants. Chlorination is used in metropolitan areas and chloramines are more commonly used in regional areas where the water has longer to travel.

Information about the disinfectants and levels used in local mains water can be sourced from local water authorities. Chlorine-containing disinfectants have potential to introduce chlorine-like or chlorophenol taints into treated must.

Brewers use much larger volumes of water in beer production. Water is typically treated to reduce chlorine levels down to <1 mg/L to prevent these taints. Normal ranges of total chlorines in mains water are between 0.5-1.5 mg/L (maximum <5 mg/L) (Australian Drinking Water Guidelines 2011). A 10 to 20% dilution of must with water should reduce the chlorine concentrations in must to below 1 mg/L.

Chlorine and chloramines can be removed from water by carbon filtration.

Reverse osmosis, sparging or boiling water are also options. Sodium thiosulfate can be used to dechlorinate tap water for use in aquariums and swimming pools but is not recommended for water intended for consumption.

Earthy taints:

Stored water supplies may develop geosmin and 2-methylisoborneol taints, which are responsible for 'earthy', 'musty', 'muddy' aromas.

Geosmin taint in water that has been used to push wine through hoses has been known to cross contaminate wines with this aroma. Water aroma should therefore be assessed before addition to musts.

Hose taints:

Water hoses used for adding water to musts should be food grade to avoid adding any taints.

Salts:

Water sources across Australia vary in their hardness. Hard water contains high levels of calcium and magnesium salts. Hard water can cause scale build-up on tanks or could introduce higher levels of calcium into must.

Water can be softened by water treatment plants but this can then lead to higher levels of sodium and chloride.

Water that is too soft, such as water treated by reverse osmosis, can also become corrosive, with potential to damage pipes and fittings. Corrosiveness (Langelier index) is reduced by increasing calcium carbonate concentration.

Wineries should be aware of the potential for adding calcium, magnesium, sodium and chloride to musts through water additions and monitor their concentrations to ensure compliance with maximum export levels for these elements.

They should also be aware of the potential risk of calcium instabilities from increased calcium levels.

Flavour, acidity and nutrient dilution:

Diluting juice or must will proportionally dilute flavour compounds, must nutrients and acidity.

Wineries should thus measure and adjust acid and nutrient levels in must post-water addition to ensure successful fermentations.

WHAT WATER SHOULD I USE?

The common types of water used in wineries include rainwater, mains/potable water, water from boilers or treated river water.

Bore water is not generally recommended for human consumption. The AWRI has always recommended that yeast hydration water should not contain any chlorine as chlorine can affect yeast viability, and it is therefore preferable to use rainwater for any additions.

However, as most wineries are unlikely to have the volumes of rainwater required for must dilution, it is advised to use mains /potable water. It is recommended to treat water to remove chlorine/chloramines before addition to must to minimise risks of fermentation problems and/or chlorine-related taints.

The AWRI is conducting trials during the 2017 vintage to assess a range of effects of water additions.

For more information regarding water additions, contact the AWRI helpdesk on helpdesk@awri.com.au or 08 8313 6600.