

Winery Washdown & Effluent Remediation

Hydrosmart chemical free water treatment technology, is rapidly gaining a reputation in industry and agriculture as the cost effective solution to most of problems encountered with our water supplies and effluent.

Hydrosmart treatment can not only equal or outperform most of the chemical treatments that are commonly used in the wine industry, but can resolve particularly difficult problems such as, salinity, soluble iron and winery effluent remediation without adversely effecting the environment.

Hydrosmart technology uses a series of computer generated resonance frequencies to weaken the bonds of the minerals and chemicals contained in the water supply. This breaks down the large reactive crystals into tiny non-reactive, sub 4 micron, particles and greatly reduces the interaction between any chemicals or minerals contained in the flow. This sub 4-micron particle size is highly significant as it allows the treated flow to assume all the properties of softened water, without the undesirable sodium by-products or the need for back flushing. (A process, which not only wastes large quantities of water but also, is a major source of pollution, which creates huge problems for the wastewater treatment plants).

Hydrosmart in Vineyards

Scale prevention & de-scaling

As no mineral crystals are building, all scale formation ceases. The resonance frequencies remain active in the treated flow, (unless cancelled out by a strong electromagnetic field) and progressively breakdown any existing scale and bio-film deposits that have built up in the pipes or drippers.

Consequently Hydrosmart treatment automatically provides chemical free scale prevention and de-scaling of any irrigation or water system to which it is fitted. Up till now, this is has been the primary use of Hydrosmart technology in the Wine Industry.

Plant growth & health

Hydrosmart treatment has resulted in significant improvements in plant growth and health. These include significantly improved calcium uptake and baume levels and a reduction in juice chloride levels. In commercial crops Hydrosmart treatment has consistently demonstrated its ability to grow healthy plants in 'high salinity' bore water, whilst simultaneously recording a reduction in soil salinity levels.

Hydrosmart in Winery Washdowns

The Problems

The applications for Hydrosmart treatment for wine production are wide ranging, and in view of the pressing EPA issues, the introduction of Hydrosmart technology for water and effluent treatment, could not have come at a better time.

The significance of improved baume levels and lower juice chloride levels will not be lost on wine makers but the big issue facing the Wineries at present is how to treat and safely dispose of the effluent from the wine making, and in particular the tank and vat cleaning process.

Tartrate crystal build up appears to be the major problem in tank cleaning operations. This is currently dealt with by using caustic soda in the tank washing water. Caustic Soda is very effective at tartrate removal but leaves the tank walls with a high pH value, which would adversely affect the next batch of wine. (It is also highly corrosive). A citric acid wash is therefore used to bring the pH down to acceptable levels.

Both these chemicals appear to be cheap and are readily available and apart from the health and safety issues and the fact the caustic makes the tartrate harder to refine, the use of these chemicals would not be in question, if the EPA were not making effluent treatment and disposal, such a high profile and expensive issue.

It is now clear that it is the use of Caustic Soda and Citric Acid in the tank washing process is fundamental reason that winery effluent is so difficult to treat. Wine is derived from totally organic substances and as such should be easily biodegradable. However the use of Caustic Soda and Citric Acid in the wash-down process kills off all the beneficial bacteria that are fundamental to the breakdown of organic matter. This leaves the winery with a toxic effluent pond with thick solids at the surface, a temperature inversion and an anaerobic dead zone from the surface downwards. The result is either a very expensive and smelly treatment problem, or high disposal costs.

Hydrosmart Solving the Problems

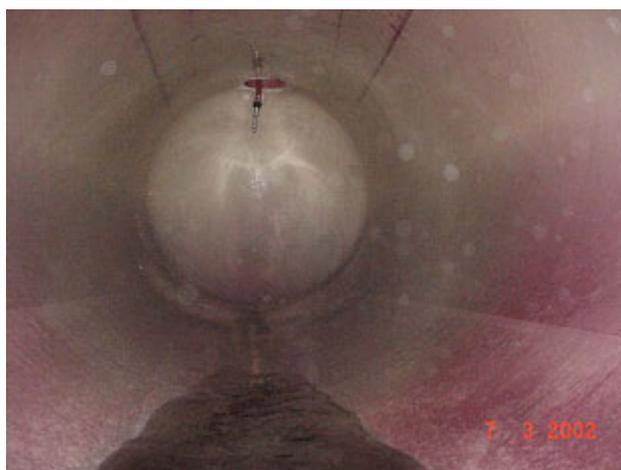
Recent trials at the d'Arenburg winery on a large horizontal concrete lined tank proved Hydrosmart's ability to remove tartrate from the tank walls. The water being used was bore water treated with a portable Hydrosmart system connected in line with the pump. A portable ozone unit was also connected in line as a back up to act as a tank disinfection system. (The ozone unit had to be regulated back to $\frac{1}{4}$ of its normal output as the Hydrosmart treatment greatly increased the ozone production. It later transpired that Ozone does not normally work with bore water).

The tartrate crystal removal in the 35-minute trial was considered a success by the winery. There was some coloration remaining on parts of the tank that were not in the full force of the spray ball. This was easily wiped off with a finger and in the opinion the winery tank cleaning team, could be easily overcome by using a better washing nozzle than the one we were using (see pictures below).

before



after



These results were achieved with a single low temperature wash using normal quantities of bore water treated with Hydrosmart technology. No Caustic Soda or other chemicals were used. The citric acid wash became unnecessary, as there were no high pH levels to neutralize.

This has unprecedented implications and advantages for the Wine Industry

- **No Caustic Soda or Citric Acid in the washdown effluent.**
- **Significant savings in chemical costs.**
- **Reduced health and safety issues.**
- **Tartrates easier to separate from washdown water, (with no caustic soda to remove). Tartrate could therefore become a saleable resource.**
- **Softer, non-corrosive water will prolong equipment life and remove all scale and bio-films from pipes and equipment.**
- **Significant time, energy and water savings by eliminating multiple tank washes.**
- **Winery effluent will become biodegradable without expensive treatments and will be reusable on the adjacent vineyards for irrigation.**

Effluent Treatment

The unique combination of a reduction in chemical activity and the tiny mineral particle size, that result from Hydrosmart treatment, have a wide range of beneficial effects that contribute to the resolution of effluent problems which even the more expensive systems cannot rectify. By setting up one or more Hydrosmart treated circulations on the effluent ponds, the following benefits can be achieved.

- **Greatly improved water clarity**

This is because large particles absorb and scatter light or block it altogether. Sub 4 micron particles produced by Hydrosmart treatment are small enough to allow a large percentage of the light to pass, giving improved clarity and transparency. This is very important for the natural process of biodegradation to take place in effluent as sunlight can progressively penetrate to the bottom of the pond where it can warm the lower layers and set up thermal, (vertical), water movement. (Usually attempted with big aeration systems). This helps to oxygenate the water and restore conditions in which the beneficial bacteria can thrive. These bacteria are at the heart of the biological breakdown process.

- **Enhanced beneficial bacterial activity**

The beneficial bacteria are presented with 'bite-sized' effluent particles, no bigger than 4 microns in size, which they are able to process much more efficiently and quickly and the reduction in chemical reactions keeps more oxygen free for the bacteria.

- **Algae removed**

The sub 4 micron particles are too small for algae to breed and feed on and will progressively disappear from the surface of the pond. This further improves light transmission and makes more oxygen available in the effluent water.

- **Odour reduced**

The odour associated with effluent ponds will significantly reduce, partly due to reduction in chemical interaction in the effluent pond that Hydrosmart treatment produces and partly due to increased oxygen content of the effluent water.

Reed Bed Reticulation

Hydrosmart treatment enhances plant growth across the board and reeds are no exception. This is because all of the minerals in the water are presented to the plant in tiny particles, which are less complex and much easier for the plants to assimilate. Minerals in chloride form are largely absent from Hydrosmart treated flows and are not present at the root zone in sufficient numbers to prevent the uptake of calcium and other essential nutrients. This improves the growth rate of the reeds and greatly increases the number of effluent particles that they can process. This significantly improves both the processing time and the quality of the processed water.

The treated effluent water will not only be of irrigation quality or higher, but will be rich in nutrients presented in a form that the vines can easily take up, thus turning an expensive effluent problem into a valuable resource.