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CORK TECHNOLOGY

Cork company takes up TCA challenge

Sonya Wiley

The world's biggest supplier of natural cork stoppers, Amorim, has sunk US\$7 million into a new cork processing plant at Ponte de Sôr, in southern Portugal, as part of its continued drive to eradicate contamination, primarily TCA.

The plant commenced full production on 3 March, and is capable of processing 15,000 tonnes of cork annually. Sparkling wine and Twin Top corks processed by the new plant are expected to start arriving in Australia around July, while natural corks will reach our shores by the end of the year.

The showpiece of the facility is a new boiling system, which has been designed to extract TCA and other volatile organic compounds from natural cork planks. The planks are placed into four stainless steel hoppers – each capable of holding two tonnes of cork at a time – where they are boiled in purified natural spring water at a temperature of between 94-98°C for one hour. During this period, the water is pumped aggressively around the planks in a closed circuit, flushing out any organic matter and volatile compounds from the cork. This water is filtered three times throughout the hour to remove micro-organisms before being pumped back into the hopper.

Amorim is currently testing the efficacy of a second device which it has specially designed to extract volatile organic compounds, such as TCA, from the water.

Called a VCT, in-house testing has shown the unit to be 97% effective. During one such test, 40ppt (parts per trillion) of TCA was inserted into a volume of water. The level of TCA in the water was reduced to just 0.5ppt after just one filtration cycle through the VCT.



• After harvesting, natural cork planks are brought to Ponte de Sôr, sorted according to the properties from which they came, and left to season for six months.



• Amorim employees at Ponte de Sôr sort cork planks according to quality before they are processed into natural corks or cork disks or discarded for the production of other cork products.

CORK TECHNOLOGY

Given that the water will be pumped through the VCT three times during the 60-minute boiling process, Amorim expects the VCT's efficacy to be even greater after one hour.

Removing other compounds

The VCT was also tested for its effectiveness in removing 21 other volatile organic compounds (VOCs). Seventeen of the VOCs decreased by an average of 70% after one cycle, while four disappeared from the water altogether.

"This is good news for the VCT system as it shows a near eradication of contamination from the water," said Amorim's communications and marketing manager, Francisco Brito Evangelista.



• Natural cork planks are loaded into a hopper at Ponte de Sôr where they are boiled for one hour to remove TCA and other volatile organic compounds.



• Still steaming, cork planks are removed from the new boiling system at Ponte de Sôr.

A prototype of the VCT is currently fitted to only one of the four hoppers currently used for boiling cork at Ponte de Sôr. Similar units will be installed on the remaining three hoppers as soon as the company has more accurate results of its efficacy.

Brito Evangelista said Amorim acknowledged that a number of factors could contribute to the formation of TCA, so had put several measures in place at its Ponte de Sôr facility, besides the boiling process, to prevent its formation.

First, there has been a change in the way in which cork planks are stored after harvesting and before processing. It is common practice to allow cork planks to season in the open air for around six months before processing. Previously, planks were left to season on the forest floor. Now, they are transported to Ponte de Sôr, where they are sorted according to each property and left outside to season away from direct contact with soil, which has been identified as a possible source of TCA contamination.

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P R O F E S S I O N A L

This is the first time that Amorim has sorted bark according to its source and ensures that the company will ultimately be able to track an individual cork from the forest to the bottle.

Amorim says the new boiling process has other benefits besides being able to extract micro-organisms and volatile compounds. Under the old boiling system, planks would emerge with a moisture content of 22%. They would then be left to rest for around two-and-a-half weeks until their moisture content stabilised at around 8%, which is considered most suitable for punching corks. The presence of moisture and warmth during this time had the potential to create an ideal environment for mould growth. However, under the new boiling process, the planks emerge somewhat drier, meaning the moisture content in the cork decreases to 8% in just two days and is ready for punching.

This means there is less opportunity for TCA contamination to grow. Previously, moulds could develop in three to four days after boiling. Now the period is at least 15 days. Even so, Amorim is installing a new stabilisation chamber at Ponte de Sôr, where planks will be stored after boiling under atmosphere-controlled conditions using ozone to further inhibit mould growth. Previously, planks would be left in a closed, unventilated room to de-humidify.

Processing majority of cork disks

Ponte de Sôr is now being used to process the majority of



• Ponte de Sôr now produces the majority of Amorim's cork disks.

cork disks used for Amorim's Twin Top and Champagne corks, which feature discs of natural cork at either end of a granulated cork body. These disks are placed in an autoclave where hot water is pumped into the cork structure. The water is then removed from the autoclave, creating a vacuum, which extracts moisture and contaminants.

Brito Evangelista said that in theory INOS II, as this washing process is called, should work with whole corks, not just disks. However, the system is yet to be perfected for whole corks.

"We need to be sure that INOS II is efficient with natural corks. The main thing we have to ensure is that INOS II doesn't apply too much pressure to natural corks and destroy their cell structure, therefore killing their sealing capacity. So, although we're not quite ready to apply INOS II to natural and granulated corks, we believe it's a matter of months before we find the right balance between pressure and vacuum so that we can.

"Together with the new boiling process, the likelihood of TCA is reduced

even further with the INOS II, because we're starting with even cleaner cork."

As a final strategy against mould development, Amorim will also install a second ozone treatment chamber at Ponte de Sôr, similar to the one already being used at Amorim Australia, where corks will be stored for 24 hours after they have been printed but before they are coated.

"We can't yet prove that ozone will break down TCA on an industrial scale, but it works in principle. We expect to soon prove that ozone can break down TCA molecules. It is certainly a strong oxidant and disinfecting agent," said Brito Evangelista.

It is anticipated that all TCA extraction and prevention systems planned for Ponte de Sôr, including full implementation of VCT units in the boiling process and the installation of the two ozone stabilisation rooms, will be in place by the end of 2000.

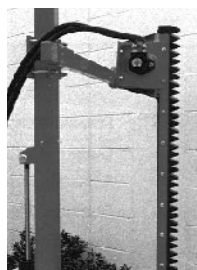
"We want to guarantee the removal of existing contaminants and avoid new contaminants along all the stages of the cork production process," said Brito Evangelista.

Sonya Wiley travelled to Portugal as a guest of Amorim. ■

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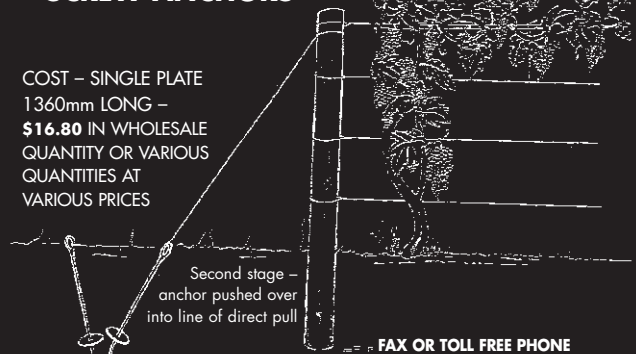
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