

Cutting copper contaminants for cleaner water

Wastewater from distilling Scotch Malt Whisky requires removal of copper before returning to its source, a successful pilot at a Speyside distillery from Elentec and the SWRI looks to provide a new approach.

The need

Distillation of Scotch Malt Whisky takes place in some of the most beautiful parts of Scotland and so treatment of distillery waste water is essential before returning it to the burns and watercourses responsible for the unique taste of each individual whisky.

Copper is a possible contaminant from the distilling process and must be reduced to a safe level for the environment; each distillery has its own individual target set by the watercourse into which it discharges.

Robust but environmentally sensitive technologies are required in the market. Biosciences KTN introduced SWRI to Elentec, who have the technical know-how to deliver a solution for this problem.

The results

A collaboration instigated by the Biosciences KTN between the Scotch Whisky Research Institute (SWRI) and a Welsh SME, Elentec, is aiming to help keep the industry green by providing a low-energy, cost-effective and flexible technology for copper removal helping to improve their environmental footprint. A visit to the SWRI by the Biosciences KTN to learn more about its research and function alerted them to this clean-up requirement from the distillation process and the potential for a collaborative project.

Current systems include the use of ion-exchange chromatography to remove copper from spent lees, the waste water remaining in the still after distillation. This approach although effective requires regular monitoring and is quite a complex system at scale, with considerable capital expenditure and ongoing chemical costs.

After an introduction from the Biosciences KTN, Elentec and the SWRI carried out some lab-scale tests to assess the suitability of an alternative electrochemical technique for treating the waste water from the distillery

process. These proved to be favourable and so a pilot study was conducted at a SWRI member's Speyside distillery to investigate further the feasibility of treating the distillery waste at a commercially relevant scale.

A test rig was constructed for this application (see photo overleaf) and the efficiency of the process in reducing copper tested for a range of conditions determined. These showed a 40—fold reduction in copper levels of the spent lees fraction treated by Elentec's experimental rig at a relevant flow rate. The pilot study has identified a few specific improvements for this application that should reduce running costs further and improve overall efficiency of the process, these will be tested in the next developmental phase.

The results of this pilot study have been presented to the Scotch Whisky Research Institute's members for their consideration and future development. Elentec are using this pilot to develop further their prototype for the copper removal application and hope to be in commercial operation shortly.

Project at a glance

In 2010 Scotch Whisky exports generated £3.45 bn for the UK economy, the industry employs 10,300 directly with another 25,000 jobs supported indirectly. The Scotch Whisky Association has an Environment Strategy, where amongst other targets it pledges to protect its pristine water supplies.

The Scotch Whisky Research Institute provides a centre of scientific excellence for pre-competitive research and development in all areas of spirit manufacture. It works with universities and commercial technology providers to service its members' requirements maintaining and improving product quality and sustainability using innovative approaches.

Elentec Ltd is a SME based in North Wales that exploits its electrochemical expertise in a wide range of remediation applications including waste water and soils.



“This partnership has enabled us to pilot our technology for this application quickly and will help us reach out to the distillers' market more effectively”

John Bostock,
Founder and Managing Director
Elentec Ltd

“The whisky industry can obtain significant benefits from the establishment of such links with new technology providers”

Frances Jack
Scotch Whisky Research Institute



Above: Test rig for removing copper from waste water.

Additional Information

A second generation rig is due to be sited at the test distillery this Spring (2012) and will include a sand filter pretreatment to remove particulate contaminants sometimes found in the spent lees before passing through the electrochemical cell for copper scavenging. This distillery-based pilot forms the vanguard of Elentec's application of its electrochemical technologies in the food and drink sector and future development in clean-up of wastestreams and industrial plant for a variety of related industries are planned for 2012.

Project Details

Project partners:

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