UK WATER INDUSTRY RESEARCH LIMITED

CRYPTOSPORIDIUM: ENHANCING THE WATER INDUSTRY'S CAPABILITY TO RESPOND

Executive Summary

Objectives

To increase the typeability of *Cryptosporidium* slide genotyping and improve the industry's response to *Cryptosporidium* detections and the management of events.

Approach

To assess the state of the art, and identify candidate PCR-based assays for genotyping, a systematic literature review was undertaken, followed by a laboratory-based approach to assay design, evaluation and validation. The newly developed PCR-based assay was challenged step-wise to assess how pre-amplification processes affected the outcome, beginning with DNA extracted from purified oocysts through to that extracted from material removed from *Cryptosporidium*-positive water monitoring slides. To assess any improvements that were achieved, the new assay was compared with the existing genotyping method used at the Cryptosporidium Reference Unit.

Conclusions

This project achieved its principal aim of designing, evaluating and validating a PCR-based assay for genotyping *Cryptosporidium* oocysts. Typeability varied greatly by submitting laboratory (most likely influenced by water source), but from some laboratories was up to 60 %. The performance of the assay was influenced by unpredictable, unknown factors in water monitoring slides.

Recommendations

Joint advice to be issued by the Drinking Water Inspectorate and Cryptosporidium Reference Unit.

Benefits

Improved typeability has been achieved for very low numbers of oocysts that will inform, operational management activities (catchment characterisation) and investigations where water quality may be at risk. Greater understanding of when slides should be sent for genotyping, will improve the industry's response to *Cryptosporidium* detections and the management of events, and provide financial efficiency.

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