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Hydrology and Earth System Sciences Discussions

Interactive comment on "Cyanobacterial and microcystins dynamics following the application of hydrogen peroxide to waste stabilisation ponds" *by* D. J. Barrington et al.

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Thank you for taking the time to review our manuscript. The comments and suggestions you have provided will allow us to improve the quality of a revised manuscript. In the revision we will address your specific comments, as detailed below.

Comment 1: As you have noted, the trials were expensive and difficult to perform, and we thus sacrificed replication in the second laboratory trial for a wider range of hydrogen peroxide doses. We will explicitly state in the revised manuscript how this has impacted upon our statistics. It has come to our attention from both your own comments and those of Reviewer 1 that the error bars for Figures 2 and 3 are incorrect,

and these will be removed.

Comment 2: In the manuscript we currently express our units as grams using scientific notation, but your suggestion to use mg and decimal notation will make the paper easier for water practitioners to follow. We will thus alter the hydrogen peroxide concentrations to this notation in the revised manuscript.

Comment 3: We agree that there are many factors influencing the oxidative power of hydrogen peroxide, and that this effect differs between living cells and cyanotoxins. We measured multiple parameters which may influence this, although the results of many of these measurements are not included in the manuscript for the sake of brevity. The temperature for both laboratory experiments was controlled at $\sim$25°C, and we will indicate this in the revised manuscript. The pH of the laboratory experiments was measured daily, and we agree that including the pH at the time of hydrogen peroxide addition would be appropriate in the revised manuscript. Unfortunately, in the field experiment neither the pH nor the water temperature were measured, although the minimum and maximum air temperature throughout the one month trial was measured by a local weather station and could be included in the revised manuscript if deemed necessary.

Comment 4: The molecular masses were identified for the three microcystins, indicating they were microcystin-LR, microcystin-FR and microcystin-WR. We will include this detail in the revised manuscript.

Comment 5: The error bars in figures 2 and 3 were originally calculated by analysing multiple samples taken from the same mesocosm. In the revised manuscript the error bars will be removed from figures 2 and 3. During extraction the intracellular samples were pooled because they were subsequent extractions of the same filter paper, to ensure that the maximum amounts of cyanotoxins were extracted. We will ensure this is clear in the revised manuscript.

Comment 6: We investigated the effect of sonication on the release of phycocyanin

from cyanobacterial cells in 5 minute intervals. We continued these measurements until no further phycocyanin was released from cells (we saw a plateau of phycocyanin concentration from $\sim$50 minutes onwards); thus indicating the maximum increase in spectrofluorescence we could expect following cell lysis from sonication. We will explain this in the revised manuscript.

Comment 7: We feel that the results of the first laboratory trial will be of interest to readers, despite the cyanobacterial biomass being greatly increased compared to the second laboratory trial and field trial. Figure 1 demonstrates some interesting results related to microcystins increase under stress conditions. Also, although it may be impractical to use hydrogen peroxide for the control of entire water bodies containing such high cyanobacterial biomass, it may be of interest to water managers interested in removing isolated scum, and we will indicate this in our revised manuscript.

Thank you once again for your helpful suggestions. We hope that our willingness to incorporate such improvements to the manuscript will result in our revised manuscript being accepted for publication in HESS.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 2067, 2013.