

# Accumulation-depuration potential and natural occurrence of Microcystin-LR toxin in basil

Wannes H.R. Van Hassel<sup>1,2,3</sup>; Mohamed Fathi Abdallah<sup>3</sup>; Maria Gracia Guzman *Valesquez*<sup>3</sup>; Christopher O. Miles<sup>4,5</sup>; Ingunn A. Samdal<sup>5</sup>; Julien Masquelier<sup>1</sup>; Mirjana Andjelkovic<sup>1</sup>; Andreja Rajkovic<sup>3</sup>

<sup>1</sup>Sciensano, Belgium; <sup>2</sup> University of Liège, Belgium ;<sup>3</sup> Ghent University, Belgium; <sup>4</sup>-National Research Council Canada, Canada;<sup>5</sup>Norwegian Veterinary Institute,- Norway;

Accumulation of hepatotoxic cyanobacterial toxins, like microcystin-LR (MC-LR), in edible crops through irrigation with contaminated water can result in human health risks.

To assess the accumulation and depuration potential of MC-LR in basil under an optimized laboratory condition and to quantify its natural occurrence in basil plant samples collected from different markets in Belgium.

Basil plants in hydroculture were exposed to 5, 10 or 50  $\mu\text{g L}^{-1}$  MC-LR for 7 days. The depuration process was assessed by transferring plants to uncontaminated Hoagland solution for another 7 days. Moreover, 50 basil products were collected from the Belgian markets. Basil leaves (lab and market) and roots (lab only) were analyzed using a validated UHPLC-MS/MS-based method to quantify MC-LR. ELISA and HRMS-techniques were applied to verify MC-LR presence in accumulation and depuration samples.

Concentration dependent accumulation of MC-LR was observed in both basil leaves and roots, reaching for the highest treatment condition up to 87.90  $\mu\text{g kg}^{-1}$  and 143.80  $\mu\text{g kg}^{-1}$ , respectively. The basil roots accumulated more toxin compared to the leaves. Depuration was observed for all treatment conditions in both roots and leaves. At least six replicates were included and the whole experiment was repeated two times. These results were corroborated by both the ELISA and HRLCMS at the highest treatment condition. Moreover, MC-LR was detected below LOQ (1  $\mu\text{g kg}^{-1}$ ) in one market sample.

These results show the potential of basil to accumulate MC-LR from irrigation water, potentially resulting in human exposure to high levels of toxin. For the first time in Belgium, MC-LR was also detected in a vegetable from the market, showing human exposure through vegetables is already a reality.

This study is financially supported by FPS Public Health, Safety of the Food Chain and Environment (SP 21/5 CYANTIR 1) and the EU Imptox project (Grant agreement 965173).