POSTER 25

Effects of glyphosate and cylindrospermopsin at environmental concentrations on growth, photosynthesis and mineral content in lettuce plants

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Glyphosate is the most widely used herbicide, mainly due to the extensive cultivation of glyphosate-resistant plants. The intensification of agriculture has increased water eutrophication and the presence of natural cyanobacterial toxins, such as cylindrospermopsin. Previous studies support the hypothesis that glyphosate and cylindrospermopsin can affect the yield of crop plants, depending on the exposure concentration. Lettuce (*Lactuca sativa* L.) is a commercial leafy vegetable, extensively consumed worldwide with major importance for human nourishment and economy. A study investigating the effects on lettuce exposed to these contaminants simultaneously is necessary to predict their potential interactions. This study aimed to assess the effects of environmentally relevant concentrations of cylindrospermopsin (50µg/L), glyphosate (750 µg/L) and the cylindrospermopsin/glyphosate mixture on growth, photosynthesis and mineral content in lettuce plants grown in soil and hydroponic system. In general, for all the treatments, the plants exposed in soil system resulted in a decrease in fresh weights of the shoots and roots; however an increase in the fresh weight of roots was observed in plants exposed to cylindrospermopsin. The plants in hydroponic system showed an increasing trend in shoot weight and negligible differences in root weight. No negative effect on photosynthesis was observed, even leading to an increase in this parameter in lettuce in soil system. In both the soil grown and hydroponic plant leaves, a general decline in mineral content was observed in majority of the macro and micro elements, with a few elements showing an enhanced concentration. Our results suggest that glyphosate and cylindrospermopsin can change yield and nutritional quality of lettuce when present in relevant concentrations in the environment. Further research is needed to understand the under-lying impacts.

Keywords: cylindrospermopsin · glyphosate · *Lactuca sativa*