



# ACUTE ECOTOXICITY OF ARTIFICIAL GRASS GRAINS ON WATER FLEAS

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## Introduction

In Belgium there are more than 400 artificial grass pitches and their popularity increases. These types of pitches always have an infill layer that often consists of rubber granules, derived from car tires. This research project investigates whether these granules have an acute ecotoxic effect on *Daphnia magna* and the aquatic environment. *D. magna* are at the bottom of the food pyramid and have therefore a considerable impact on ecosystems.

Furthermore, the ecotoxicity of 2-mercaptobenzothiazole, an important component of the rubber granulates and cork granulates, a possible alternative, is tested.

Finally, the infusion of the rubber granulates is examined under the microscope for the presence of microplastics.

## Materials and methods

- *Daphnia magna* were hatched from dormant eggs (Ehippia), others were gathered from a lake in Weerde. They were fed with algae.
- A dilution series with concentrations between 3 and 50 mg 2-Mercaptobenzothiazole/L was made.
- Rubber and cork granulates were gathered from two football pitches, they were soaked in water (½ grain/water-ratio).
- Test plates were kept in darkness and on room temperature.
- After 24 and 48 hours the percentage of inactive *D. magna* was counted



*Daphnia magna*

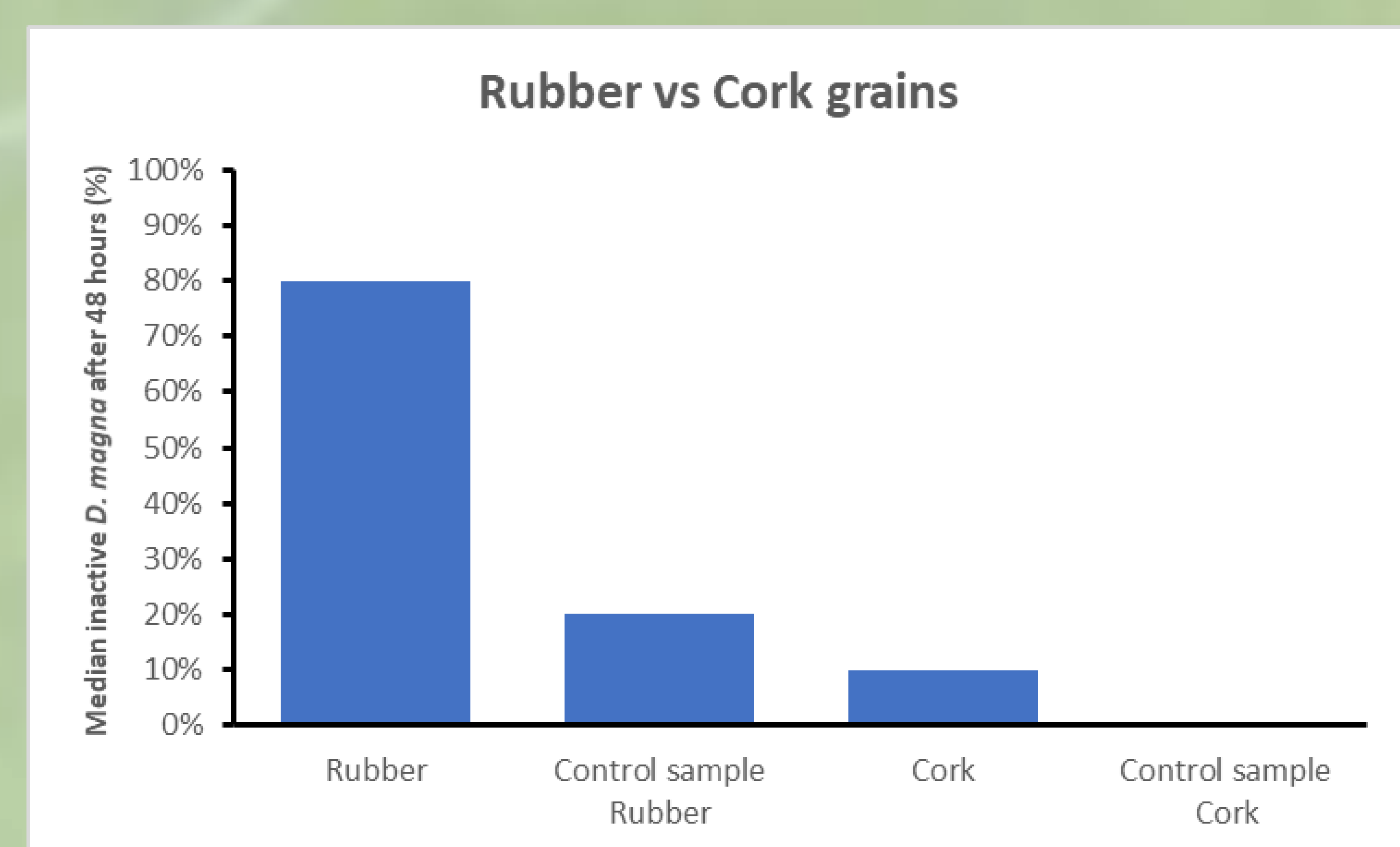
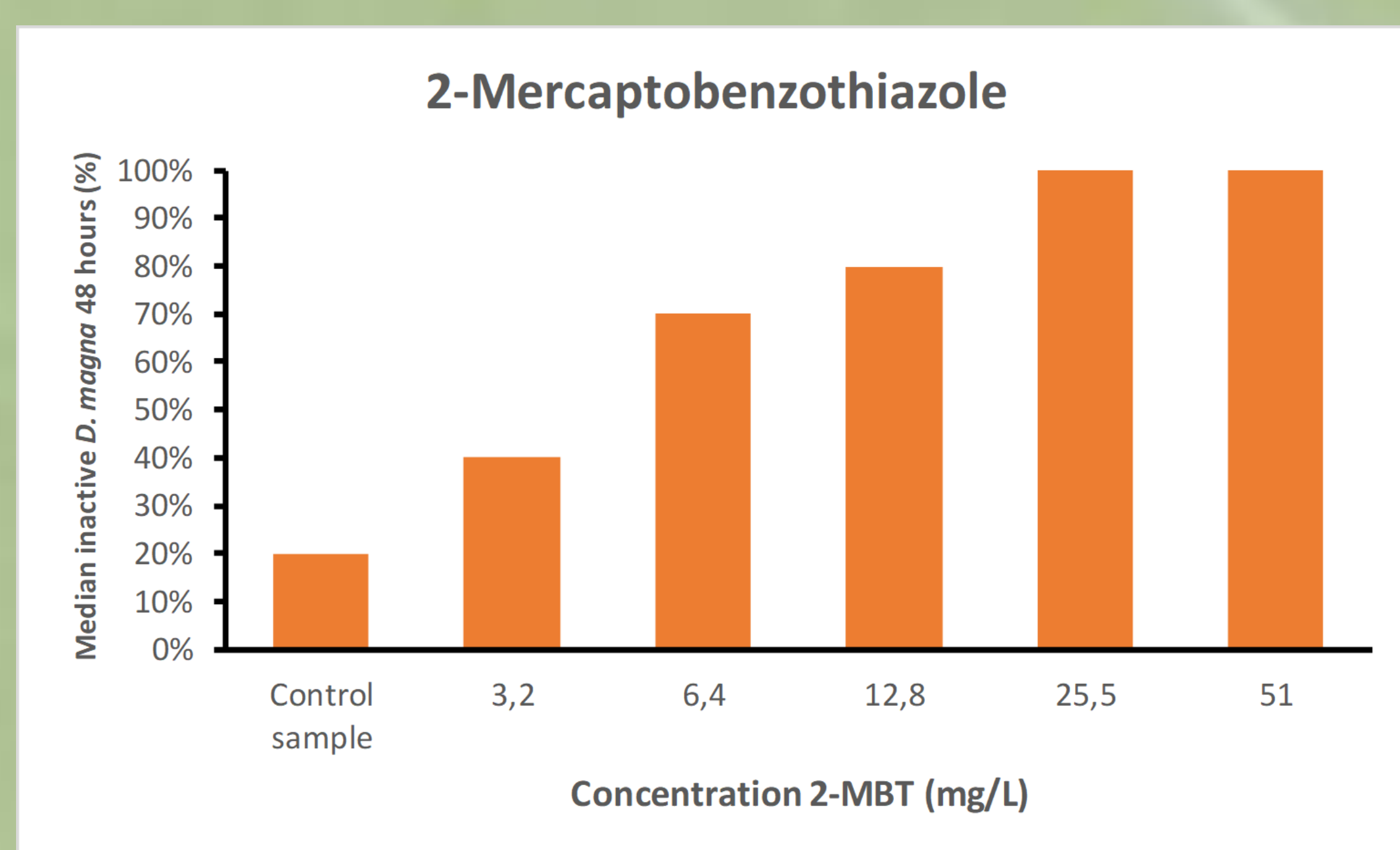


*Daphnia magna* after being exposed to rubber granulates



Rubber granulates

## Results



## Conclusion and discussion

The tests make clear that rubber granulates can have a negative effect on the aquatic environment. The amount of inactive *D. magna* is a lot higher than in the control sample. It's important to note that the amount of tests was very limited, the grains came from just one pitch and no realistic conditions were created.

One component that is definitely harmful for the aquatic environment is 2-mercaptobenzothiazole. The EC50-value could not be calculated in this research, but it is clear that it has a toxic effect.

Cork grains seem to have no significant impact on the activity of *D. magna*. Although it is important to make the same remarks as with the rubber grains. Possibly, cork grains are a good alternative for rubber.

Microscopic research shows that *D. magna* take up a big amount of micro plastics from the rubber granulates in their digestive system. This is an extra point of concern.

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