

Assessing the Effect of Rainwater Harvesting Methods on Water Quality for Future Applications

Edyta Kudlek¹, Rafał Rapacewicz^{1,2}, Anna Lempart-Rapacewicz¹

¹ Faculty of Energy and Environmental Engineering, Silesian University of Technology, Konarskiego 18, 44-100 Gliwice, Poland

² PB LEMTER, Mickiewicza 66, 41-902 Bytom, Poland

INTRODUCTION & AIM

Rainwater is increasingly being used as an alternative water source for households and industries. However, it is crucial to properly select the available solutions on the market to meet consumer needs while considering maintaining the appropriate quality of collected water. This research aimed to assess the quality of rainwater collected from roof surfaces in open and closed above-ground and underground tanks.

RESULTS

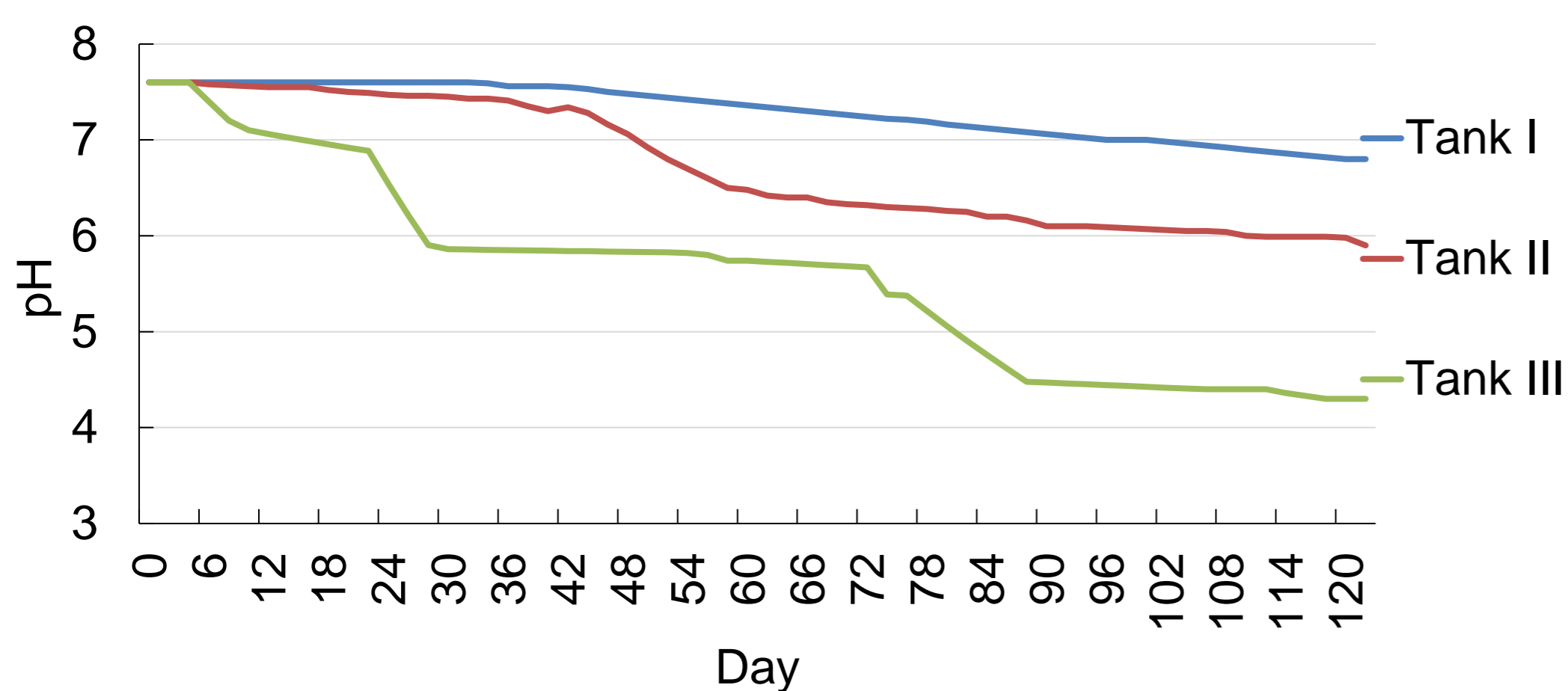


Fig.1. Change of pH value during the experiment

Table 1. Compounds identified in the samples

Compound name	Day 1	After 4 months		
		Tank I	Tank II	Tank III
Bisphenol-A	✓	✓	✓	
Pentachlorophenol	✓	✓	✓	✓
Nonylphenol	✓	✓	✓	
4-tert-octylphenol	✓	✓	✓	✓
Diisobutyl phthalate	✓	✓	✓	✓
Dibutyl phthalate	✓	✓	✓	
Benzo(a)pyrene	✓	✓	✓	✓
Anthracene	✓	✓	✓	✓
4-Chlorophenol				✓
Hydroquinone			✓	✓
Phenol				✓

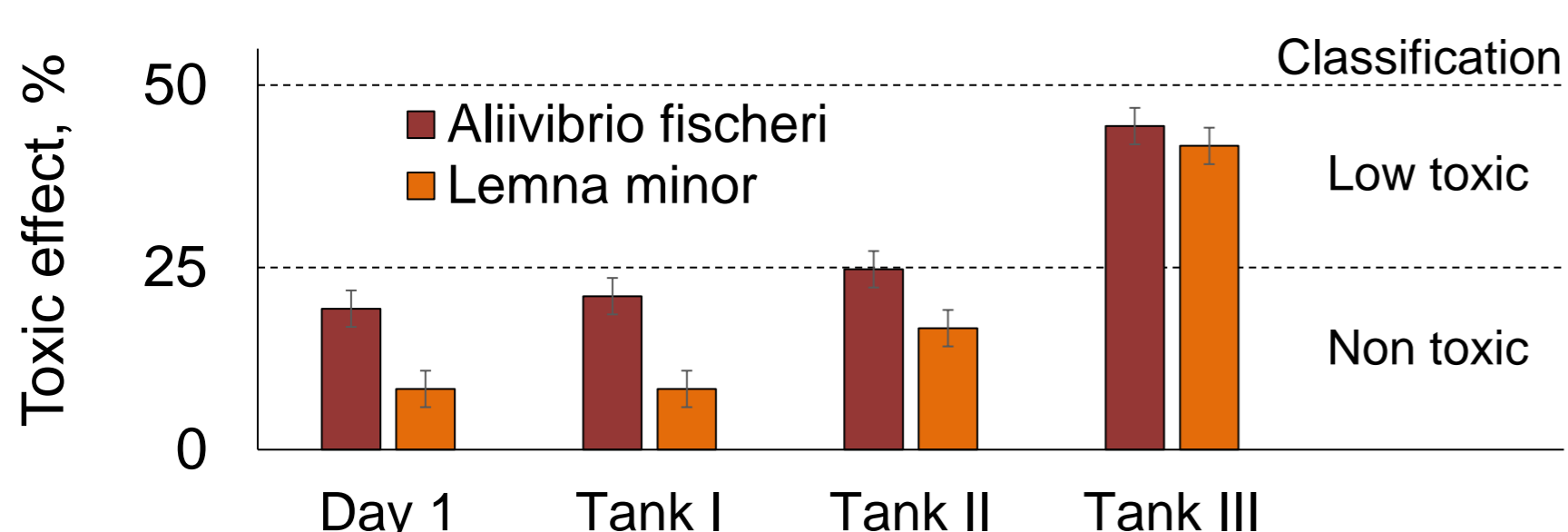
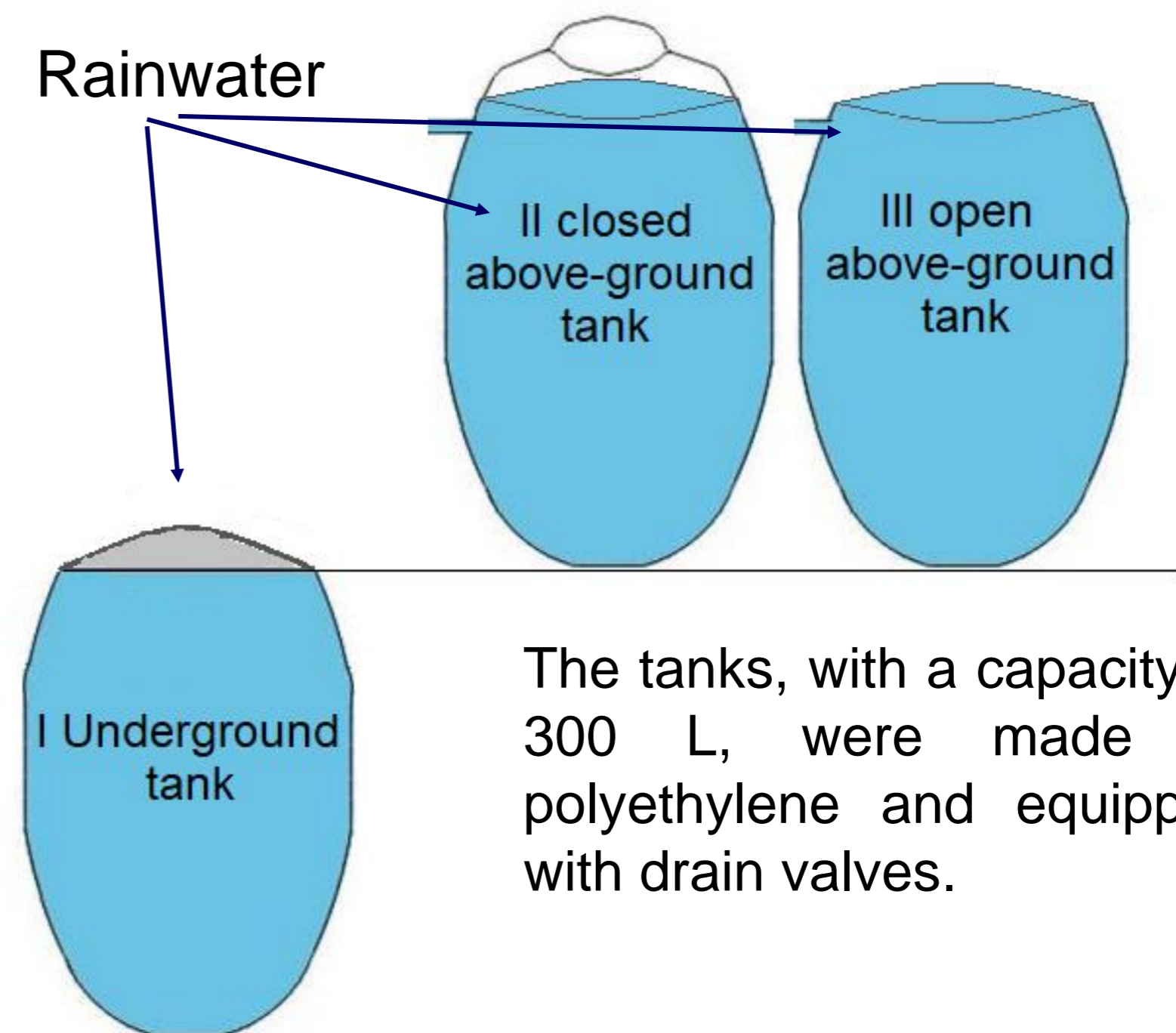


Fig.2. Toxic effect on day 1 and after 4 months

METHOD



The tanks, with a capacity of 300 L, were made of polyethylene and equipped with drain valves.

Water samples were subjected to physicochemical, chromatographic, and toxicological analyses immediately after collection and after a given water storage period in tanks. Samples were taken every two days over four months.

CONCLUSION

- It was shown that the residence time of water in retention reservoirs significantly affects the deterioration of their quality in both above-ground and underground reservoirs.
- The chromatographic analysis of rainwater samples that was performed immediately after the rainfall was collected in the tanks and after a given storage period showed the presence of organic micropollutants that gradually decompose. The presence of decomposition intermediates was particularly clearly observed in outdoor tanks exposed to solar radiation.
- The toxicological analysis showed a change in the water from a non-toxic to a low toxic level.

ACKNOWLEDGEMENTS



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