

# Microplastics as a vector for pharmaceuticals in freshwater

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## Introduction

Plastics are an increasing environmental concern. This issue has been worsened by climate change. Flooding events lead in an increase input of pollutants such as pharmaceuticals and microplastics (< 5 mm). This study investigates the interaction of persistent pharmaceuticals with six microplastic types widely found in the aquatic environment (Fig 1).

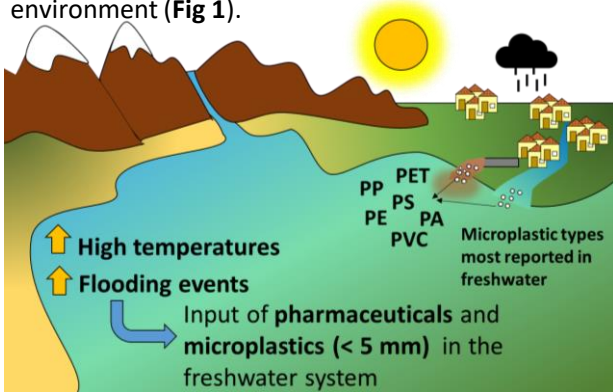


Fig 1. Input of pollutants such as pharmaceuticals and microplastics in freshwater due to climate change consequences.

## Methods

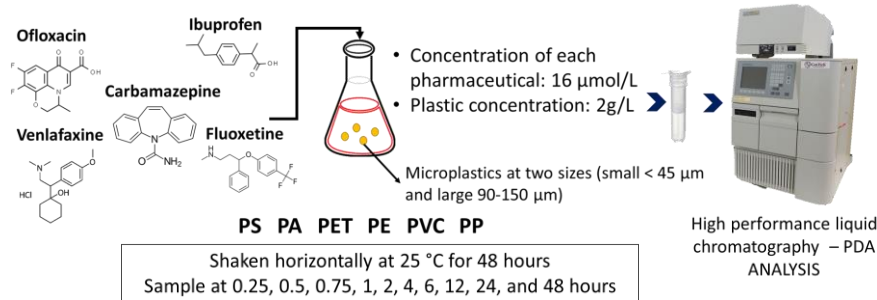


Fig 2. Mixture of five pharmaceuticals placed in contact with six different types of microplastics at two sizes ranges, small and large particles.

## Results

- All pharmaceuticals adsorbed between 20 and 98% on small PP after 48 hours contact (Fig 3).
- The pharmaceutical fluoxetine exhibited ~60% adsorption on small and large PA, and ~70% adsorption on small PVC (Fig 3).
- The other pharmaceuticals and microplastic types did not present clear adsorption behaviour.

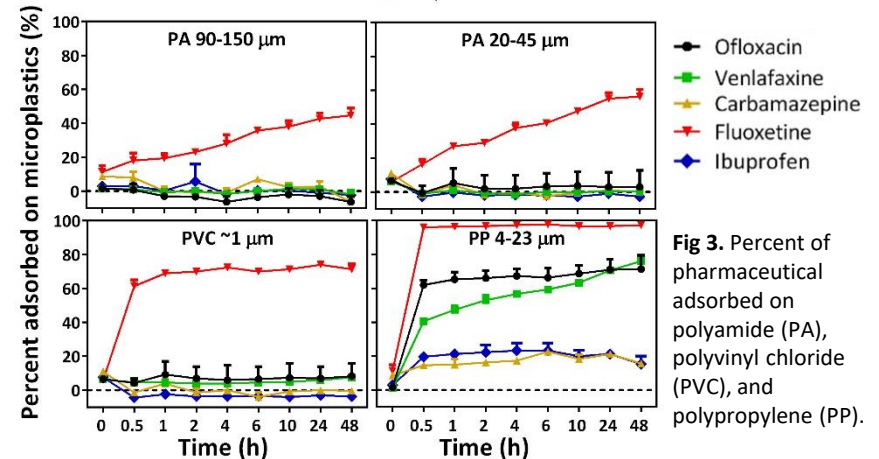


Fig 3. Percent of pharmaceutical adsorbed on polyamide (PA), polyvinyl chloride (PVC), and polypropylene (PP).

- The findings indicate that microplastics can act as a vector for pharmaceuticals in freshwater, potentially getting into the food web.

## Future

- The desorption of micropollutants from different types and sizes of microplastics under different conditions will be evaluated.
- Toxicity studies with *Daphnia* sp. (water flea), a water quality indicator, will be undertaken