Performance of Household Point-of-Use Water Treatment Systems in Colonias of El Paso County, Texas

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Introduction

- Safe drinking water is essential for human health and helps prevent waterborne diseases caused by microbial contamination.
- Residents of colonias often face limited access to reliable water infrastructure, which may affect the quality and safety of household drinking water.
- POU systems are designed to reduce contaminants and improve drinking water quality, but their long-term performance under real-world conditions remains unclear.

Research Objective

To evaluate the effectiveness of household point-of-use water treatment systems in colonias of El Paso County, Texas by comparing **filtered and non-filtered water quality**.

Methods

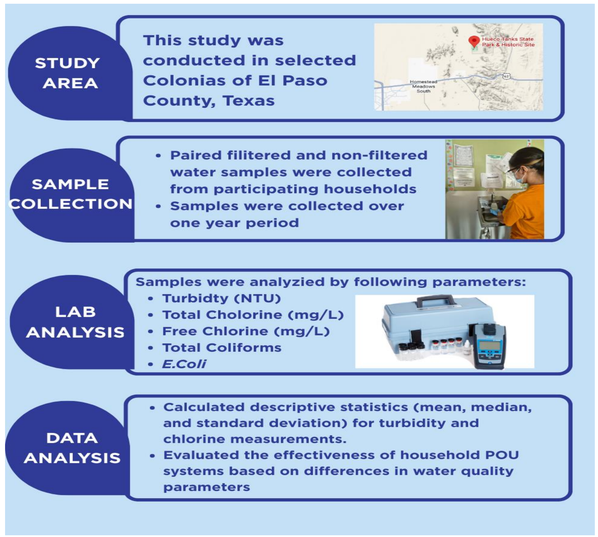

Figure 1. Overview of the study design, sample collection, laboratory analyses, and data analysis procedures used to evaluate household point-of-use water treatment systems.

Results

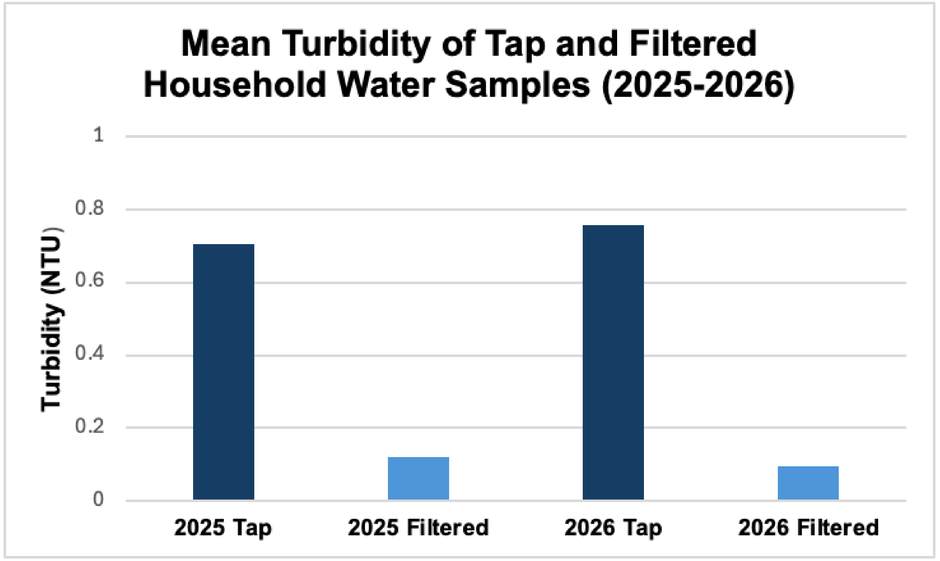

Figure 2. Mean turbidity of tap and filtered household water samples collected in 2025 and 2026. Filtration significantly reduced turbidity in both years ($p < 0.001$).

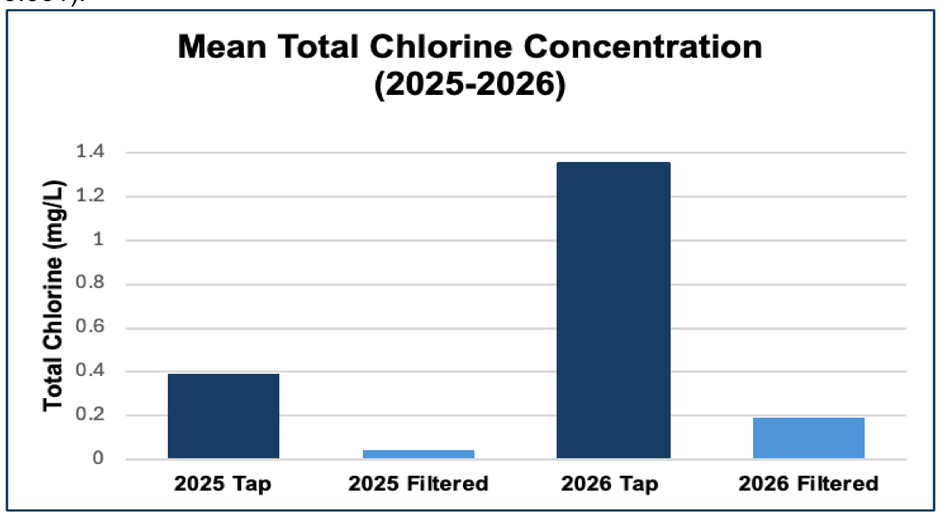

Figure 3. Mean total chlorine concentration of tap and filtered household water samples collected in 2025 and 2026. Chlorine concentrations varied between years and between tap and filtered samples.

Discussion

- Household point-of-use (POU) treatment systems significantly reduced turbidity in both sampling years ($p < 0.001$), resulting in an average reduction of **82.9% in 2025** and **87.3% in 2026**.
- Total chlorine concentrations decreased following filtration, with reductions of **89.7% in 2025** and **86.1% in 2026**.
- ***E. coli*** was not detected in any water sample analyzed, while three tap water samples tested positive for total coliforms.
- The consistent reduction in turbidity across both years suggests that household POU treatment systems remain effective under real-world conditions.
- These findings demonstrate the potential of POU systems to improve drinking water quality in colonias of El Paso County.

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References