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Wastewater in Small Communities

MICROPLASTICS IN SMALL WASTEWATER TREATMENT PLANTS: A CASE OF STUDY IN SIERRA DE CÁDIZ (SPAIN)

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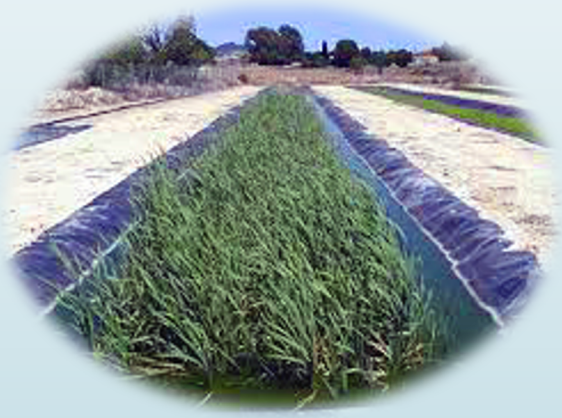
INTRODUCTION

- Microplastic pollution as an increasing problem.
- Wastewater treatment plants (WWTPs) are important inputs of these pollutants.
- Small WWTPs should be considered.



METHODOLOGY

Wastewater Treatment Plants.

El Bosque IWWTP

Industrial effluent.

1. **Pre-treatment.** Roughing.
2. **Biological treatment.**
   Activated sludge with areation.
   Coagulation-flocculation.
3. **Disinfection.** Chlorination chamber.

Prado del Rey UWWTP

Urban effluent.

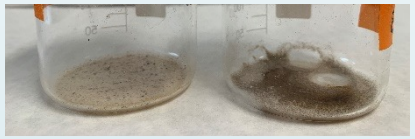
1. **Pre-treatment.** Roughing.
   Desanding-degreasing unit.
2. **Biological treatment.**
   Activated sludge with prolonged aeration.
3. **Secondary decantation.**

METHODOLOGY

Experimental procedure.

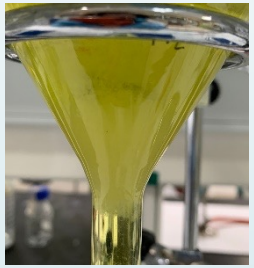
Sample collection

- Influent (5 L) and effluent (30 L).
- Filtered through 1000, 355 and 100 µm stainless sieves.



Dry sample

Wet Peroxide Oxidation (WPO)



Density separation

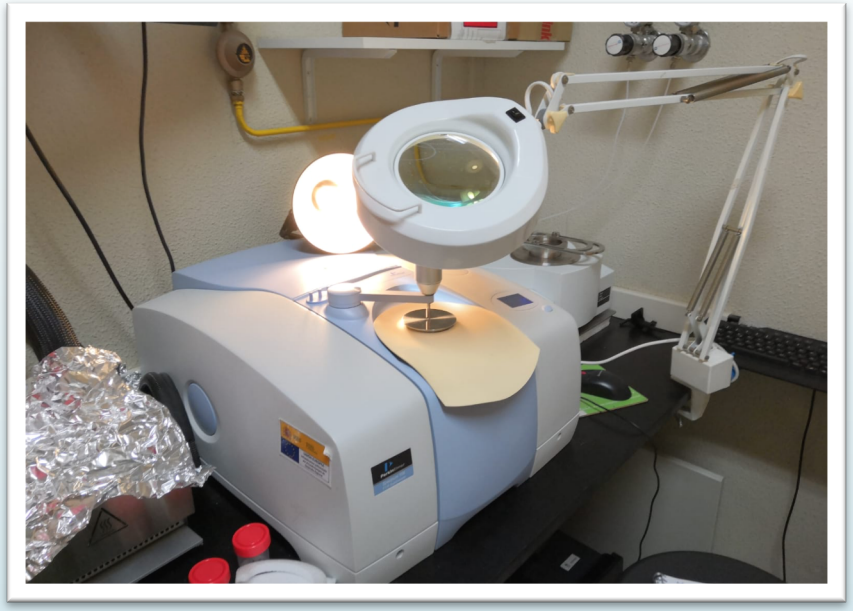
Filtration

METHODOLOGY

Experimental procedure.

Identification and quantification of microparticles and microplastics

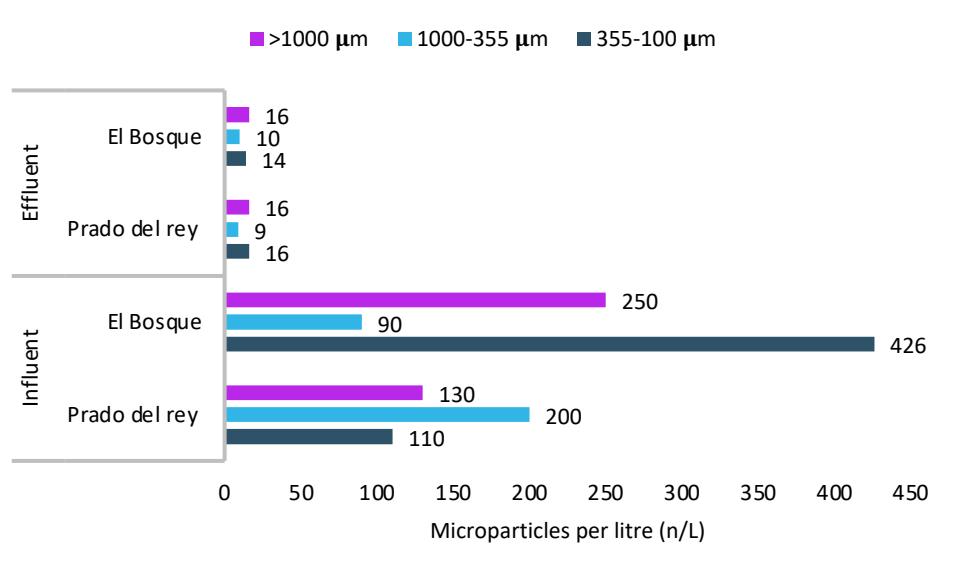
Morphological characterization



Chemical characterization (FT-IR)

RESULTS AND DISCUSSION

Microparticles quantification and morphological identification.

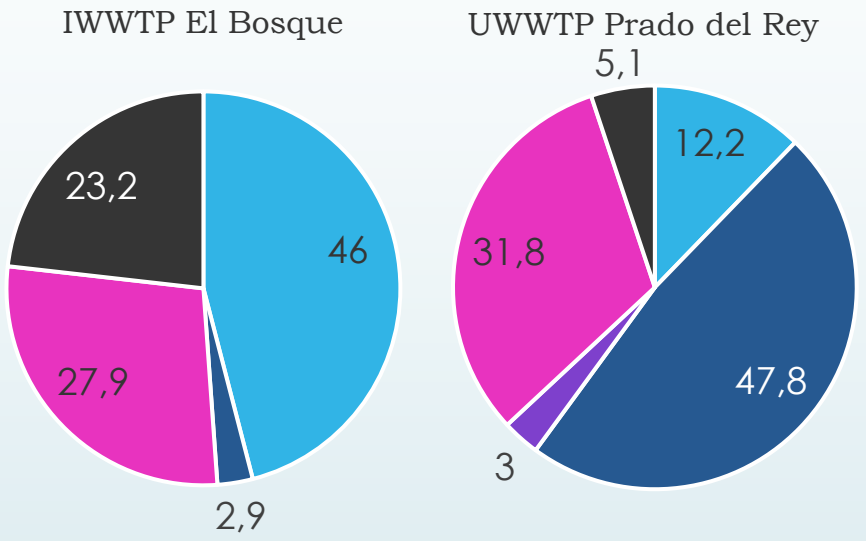


	El Bosque		Prado del rey	
	Influent (n/L)	Effluent (n/L)	Influent (n/L)	Effluent (n/L)
Flake	120	6.4	105.6	6.93
Sphere	3.2	0.4	2.4	0.27
Filament	125.6	7.74	71.2	4.27
Fibre	264.8	12.4	129.6	16.13
Fragment	248	15.73	120.8	15.2

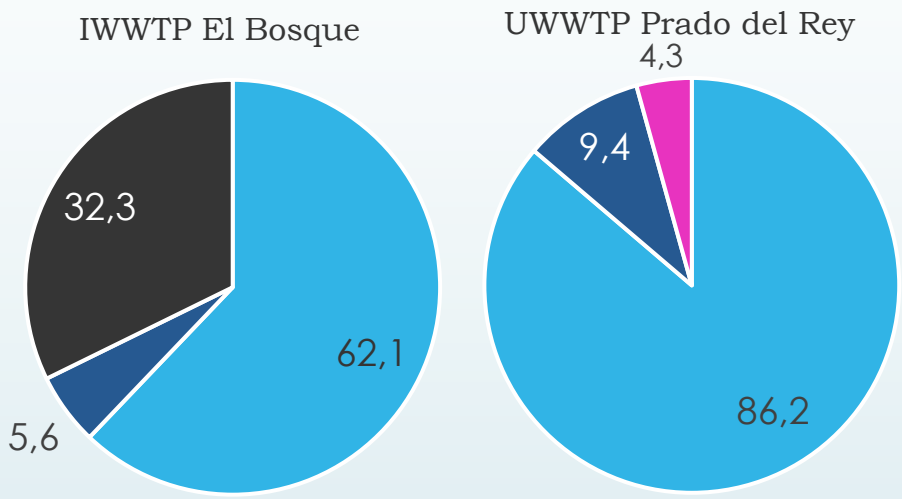
RESULTS AND DISCUSSION

Microplastics identification.

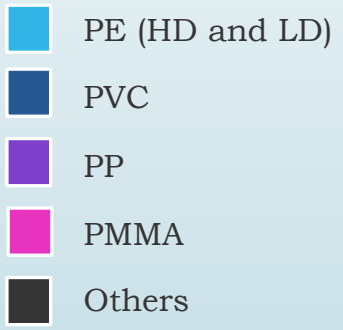
Influent (%)



Effluent (%)



	Influent (MP/L)		Effluent (MP/L)	
	El Bosque	**Prado del Rey**	**El Bosque**	**Prado del Rey**
PE (HD and LD)	281.6	33.98	14.75	7.21
PVC	17.77	132.7	1.33	0.79
PP	--	8.35	--	--
PMMA	171.12	88.31	--	0.36
Others	142.15	14.19	7.66	--



CONCLUSIONS

- Wide variability of n/L at inlet. Greater homogeneity at the outlet in both WWTPs.
- Great variability of polymer types.
- Annual volume of MPs discharged estimated between 1.2-199 MP/year.
- Technologies for removal of MPs are highly recommended.

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THANK YOU FOR YOUR ATTENTION

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