

# RESEARCH AND IDENTIFICATION OF *CRYPTOSPORIDIUM* AND *GIARDIA LAMBLIA* IN WASTEWATER TREATMENT PLANTS

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## Introduction

- *Cryptosporidium* spp. and *Giardia lamblia* are parasitic protozoa that are responsible for diarrhea and gastroenteritis in humans and animals.
- The most frequently identified source of infestation is water and exposure involves either drinking water or recreation water (Figure 1).
- In young and old people as well as in immunocompromised individuals it can cause severe diarrhea, syndrome of malabsorption, growth delay and death.
- Since the cysts and oocysts are resistant to some treatments used in domestic water systems, it is important to understand if the treatment done in wastewater treatment plants (WWTP) is or not efficient.

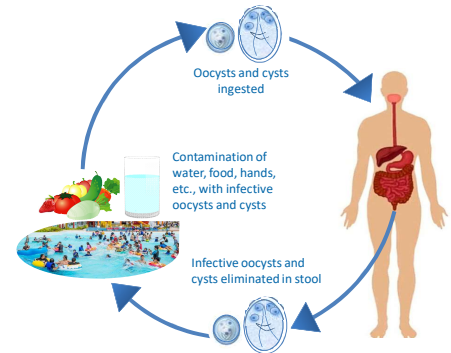


Figure 1 – Life cycle of *Cryptosporidium* and *Giardia lamblia*

## Aim

The aim of this work was to evaluate if treatment done in WWTP is enough to eliminate this infections forms.

## Materials and Methods

- Samples of 3L were collected before and after the treatment in 7 WWTP of SIMTEJO in the great Lisbon area (Alcantara, Beirolas, Chelas, Ericeira, Frielas, Malveira and São João da Talha).
- All the samples were concentrated by centrifugation in Centrifuge 5810R (3500 rpm/3 min), followed by 24h of sedimentation. Microscopic analysis for research and identification of *Cryptosporidium* oocysts and *Giardia* cysts after different staining methods was done.

## Results

- Before treatment, all water samples presented *Cryptosporidium* oocysts (Figure 2a) and *Giardia lamblia* cysts (Figure 2b).
- All the WWTP that have done the tertiary treatment with chlorine continue to present oocysts and cysts.
- Only WWTP of Beirolas and of Frielas that have used UV rays, as final treatment, did not presented the resistant parasitic forms (cysts and oocysts).

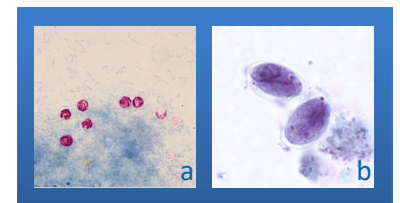


Figure 2: (a) *Cryptosporidium* oocysts (Kinyon stain 100X); (b) *Giardia lamblia* cysts (Giemsa stain. 100X).

## Discussion and Conclusions

- These results suggest that treatment with chlorine is not efficient to eliminate oocysts or cysts, which is in agreement with other studies<sup>1</sup>.
- The presence of these resistant forms in water represents a risk factor of contamination of population in general, specially children, elderly people and immunocompromised individuals.
- The treatment of water shouldn't be neglected.

REFERENCES: 1 Omarova A, Tussupova K, Berndtsson R, Kalishev M, Sharapatova K. Protozoan Parasites in Drinking Water: a system approach for improved water, sanitation and hygiene in developing countries. Int J Environ Res Public Health. 2018; 15: 495. doi:10.3390/ijerph150304

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