Mechanisms implied in *Escherichia coli* removal during wastewater treatment

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**Background**

Wastewater treatment reduces environmental contamination:

- removing gross solids and mitigating its polluting effect
- reducing the number of indicator organisms and pathogens

Recycling of sludge as an organic fertilizer is environment friendly but:

- some pathogens can be present (viruses, bacteria and protozoa) (8)
- these microorganisms could be concentrated in sludge

**Materials and methods**

**Biological model:** *Escherichia coli* ABCgfp, isolated from wastewater (Crispijana WWTP) and modified to express GFP protein. This strain was indistinguishable from the parental non-tagged strain with respect to growth and behavior in sterilized wastewater (6).

**Wastewater samples:** from the Crispijana wastewater treatment plant (WWTP) (5).

**Laboratory-scale activated-sludge unit (ASU)** fed with influent and sludge from Crispijana WWTP. Similar working conditions for Crispijana WWTP and ASU.

**Results and Discussion**

**Aim of the work**

To take an approach to the main mechanisms involved in the reduction of pathogenic microorganisms during activated sludge wastewater treatment.

**Bacteriophages** did not affect the survival of tagged *E. coli* in wastewater.

**Complex interactions** between microbial populations and *E. coli* occur in presence of wastewater microbiota. Wastewater bacteria maintained their population density, while *E. coli* ABCgfp, behaving as predation non-escaping prey, was predated (2). Predation by protozoa is an important removal mechanism of bacteria in activated sludge.

**Conclusions**

Due to the quantitative importance of cell adhesion to sludge with respect to cell removal via predation (real elimination), the recycling of sludge can suppose a sanitary and ecological risk.