# Resum de Tesi Doctoral

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola de Doctorat

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| Títol de la tesi | "Reclaimed water use pilot scale practices in the Catalonian region. Viability quantitative PCR for microbial water quality monitoring." |
| Unitat estructural | Instituto de Sostenibilidad |
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(Mínim 1 i màxim 4, podeu veure els codis a http://doctorat.upc.edu/gestio-academica/impresos/tesi-matricula-i-diposit/codis-unesco)

Resum de la tesi de 4000 caràcters màxim (si supera els 4000 es tallarà automàticament)


Reclaimed water use is an essential element in the integrated water resources managment. The wastewater treatment and reuse are activities that increase the aquatic capital without depleting the natural resource, whose lack, both in terms of quality and quantity, is currently a serious worldwide problem. Reclaimed water can be used in different applications depending on its quality, thus reducing the potable water demand, and allowing for hidric natural sources regeneration. Furthermore, the regenerated effluent is kept out of surface waters and groundwater preventing their quality deterioration, and consequently reducing environmental degradation.

Despite large advances in wastewater treatment, waterborne diseases still pose a major threat to public health. Consequently, the use of this type of resource usually requires more stringent monitoring procedures than when "good quality" water (such as groundwater and drinking water) is used. Therefore, improving water microorganism detection techniques is an essential step in the health risk management.

This dissertation work was performed along two main intertwined lines of research: (1) the study of quantitative PCR (qPCR) methods as fast and efficient tools for microbial water quality monitoring; and ( 2) the study of microbiological colonization associated to reclaimed water use at pilot-scale practices. The developed work contributes to reduce persistent uncertainty about the potential adverse effects that may encompass the use of reclaimed water on human health by demonstrating that the utilization of this resource, under suitable and controlled conditions, does not entail greater microbiological contamination when compared to well water. It also provides more light on the use of qPCR and viability qPCR techniques as tools for control and monitoring of water quality in order to address effective microbial pollution prevention. Quantitative PCR is essential for detection of specific pathogens and/or pathogens which can be present in low numbers. The fact that this technique also provide information on the viability and infectivity of microorganisms makes it a very powerful tool for rapid and reliable monitoring of water quality, as well as, it allows for quick response time for decision making. Therefore, it could be an useful tool for the implementation of microbial quality control programs. Additionally, the viability qPCR approach proposed in this dissertation provides a realistic estimate of the number of live cells in complex matrices like wastewater samples, particularly when protocol optimization will be difficult to be performed.

As established Dr. Lucas Van Vuuren , "water should be judged by its quality, not its history" and viability qPCR is a good tool to achieve this goal .


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