



## **Toxoplasma gondii oocysts in the subsurface environment: Detection and quantification of T. gondii oocysts DNA by real-time PCR and impact of environmental factors on their transport and distribution**

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*Toxoplasma gondii* is one of the most widespread parasites in the world and the cause of toxoplasmosis, a waterborne and foodborne disease. Understanding the mechanisms that govern the fate and transport of *T. gondii* oocysts in soil and water systems is critical to assess the risk to public health. This research investigates the effects of environmental parameters such as soil and water properties on the transport behavior of *T. gondii* oocysts in natural and engineered soil systems. The detection and quantification of *T. gondii* oocysts in soil and water systems were achieved using real-time polymerase chain reaction (qPCR). Our results show that changes in environmental parameters can exert influence on the transport and retention of *T. gondii* oocysts in the subsurface environment. Our study demonstrated the impact of soil characteristics (e.g., natural soils and sand) and water chemistries (e.g., salt, organic matter, and surfactants) on the mobility of *T. gondii* oocysts in porous media. The transport of *T. gondii* oocysts in porous media was found to decrease as salt concentration increased and to increase in the presence of surfactants. Our research findings highlight the importance of the environmental transport of *T. gondii* oocysts and provide insights, which may contribute to hindering the environmental transmission of this zoonotic pathogen.