

First *Mycobacterium avium* ssp. *paratuberculosis* (MAP) identification in animal and human drinking water from dairy goat farms in Brazil

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ABSTRACT

Paratuberculosis, or Johne's disease, is an infectious chronic inflammatory bowel disease that may affect ruminants by the ingestion of water, colostrum and contaminated food, whose etiologic agent is *Mycobacterium avium* ssp. *paratuberculosis* (MAP). Infected goats suffer progressive weight loss, and diarrhea may or may not be present. The agent is eliminated by these animals mainly in feces and milk, contaminating soil and water. The aim of this study was to detect and typify MAP in water for human and animal consumption in dairy goat farms, from the Zona da Mata, in Minas Gerais State, Brazil. Ten farms were selected and twenty samples of 20 liters of water each were collected (one sample of water for animal consumption and one for human consumption in each farm). The water sample was filtered and after cleanup of the membranes, the retentate was aliquoted to perform DNA extraction and microbiological culture. The samples were decontaminated and placed in solution with antimicrobial, and then they were inoculated in HEYM media, with and without mycobactin J, and finally, incubated at 37°C for a minimum of 16 weeks. We also performed the PCR-REA technique using the IS1311-PCR fragments and ISMav2-PCR for the bacterial identification. The enzymes *MseI* e *HinfI* were used to perform the enzymatic restriction analysis. All the positives samples were sequenced to confirm the results. MAP was identified viable in water for animal consumption from four farms, also positive in PCR. Among these farms, two also tested positive in samples for human consumption. In addition, DNA was detected in water for human and animal consumption on a fifth farm. Thus, MAP was identified in 50% of water samples for animal consumption and 30% for the ones for human consumption. The extracted DNA was subjected to restriction enzyme analysis for molecular typing, which showed that all were type C, from cattle. The results support the possible involvement of water in transmission of MAP contributing to the maintenance agent in the herd, contaminating soil and drinking water. The zoonotic potential, associated with economic and production losses, shows the importance of researching the agent in the water. This is the first report on the isolation and characterization of MAP in water from dairy goat farms.

Keywords: Johne's disease, ruminant, bacteria, molecular typing

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