Spectrophotometric evaluation and comparison of biofilm formation by three Mycobacterium avium ssp. paratuberculosis isolates in aqueous extract of schmutzdecke for clarifying untreated water in water treatment operations

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Objective
Mycobacterium avium ssp. paratuberculosis (Map) is the causative agent of Crohn’s and Johne’s diseases of humans and animals respectively. Extracellular polymers produced by Map prevent its removal and facilitate its spread in the environment. This work reports the formation of biofilm by Map in water treatment operations and the influence of schmutzdecke nutrients on the viability of the organism.

Methods
Aluminium and stainless steel coupons, which are two topographically different substrata, were employed for adherence assay, and polyvinyl chloride (PVC) plates for biofilm development. Aqueous extracts of schmutzdecke were used to grow Map as a paradigm to a similar situation in water treatment operations.

Results
The aluminium coupon, which had a rougher surface, encouraged much adherence of Map than stainless steel, which had a smoother surface. At P<0.05, the extent of biofilm development as influenced by sterile unfiltered schmutzdecke was significant at 0.0487 and 0.0307 for sterile filtered schmutzdecke.

Conclusion
Map has the competence to form biofilm under conditions that its immediate environment provides, and composites of schmutzdecke can influence growth and facilitate biofilm formation and spread of the pathogen during water treatment and storage in water outlets dedicated for public use.