Mycobacterial Diseases
ISSN: 2161-1068
OPEN ACCESS Freely available online
Commentary

Innovative Approaches to Control *Mycobacterium avium* Contamination

Hendrai Tesfaye*

Department of Medicine, Monash University, Clayton, Australia

DESCRIPTION

Mycobacterium avium (*M. avium*) is a bacterium belonging to the *Mycobacterium Avium* Complex (MAC). It is widely found in water, soil, and dust and can pose serious health risks, particularly to immunocompromised individuals. Managing and monitoring *M. avium* in the environment is essential for public health and to prevent potential outbreaks. This article explains effective disinfection strategies and methods for monitoring *M. avium*. *M. avium* is a slow-growing, Non-Tuberculous Mycobacterium (NTM) that thrives in diverse environments. It is highly resistant to environmental conditions and traditional disinfection methods. These characteristics make it a persistent and challenging pathogen to control. This bacterium is often transmitted through inhalation of aerosols or ingestion of contaminated water or food. Infections caused by *M. avium* can lead to pulmonary disease, lymphadenitis, or disseminated infections in vulnerable populations, such as individuals with HIV/AIDS or those undergoing immunosuppressive treatments.

Challenges in disinfection

M. avium's resistance stems from its robust cell wall, which limits the penetration of disinfectants. Furthermore, its ability to form biofilms in water systems adds another layer of protection, making eradication more difficult. Traditional disinfection methods, such as chlorination, are often insufficient for *M. avium*. The bacterium can survive in treated water systems and persist in plumbing, making it a continual source of contamination. Advanced Oxidation Processes (AOPs), such as ozonation and UV-C light treatment, are effective against *M. avium*. These methods disrupt the bacterium's DNA and cellular structure, ensuring better inactivation compared to traditional methods. Monochloramine has shown greater efficacy than free chlorine in penetrating *M. avium* biofilms. It provides a residual effect, offering longer-lasting protection in water distribution systems. High temperatures can kill *M. avium* effectively. Periodic flushing of water systems with hot water at temperatures above 70°C can reduce biofilm-associated bacteria. This method releases ions into the water, disrupting microbial growth. It has proven effective in controlling *M. avium* in hospital and institutional water systems. Regular cleaning of water tanks, pipes, and humidifiers can minimize biofilm formation. Preventing stagnation in water systems is another key measure to reduce bacterial proliferation.

Monitoring *M. avium* in the environment

Effective monitoring is important to detect and control *M. avium* in the environment. Culture-based methods involve isolating and growing *M. avium* from environmental samples on specific media. Though time-consuming, they provide definitive results. Molecular detection techniques such as Polymerase Chain Reaction (PCR) offer rapid and sensitive detection. These methods target specific genes of *M. avium*, enabling early identification. Flow cytometry is an advanced method provides insights into the viability of M. avium in water samples. It can differentiate between live and dead cells, aiding in assessing the efficacy of disinfection processes. In cases where direct *M. avium* monitoring is not feasible, surrogate microorganisms or markers can be used to estimate contamination levels. Monitoring and controlling *M. avium* is vital to reducing its impact on public health. Healthcare facilities, water suppliers, and industries must adopt stringent disinfection protocols to safeguard individuals, especially those at higher risk of infection. Community awareness is equally important. Educating the public about safe water practices, such as boiling water or using certified filters, can further minimize exposure risks.

CONCLUSION

M. avium poses a unique challenge due to its environmental resilience and resistance to conventional disinfection methods. Advanced disinfection strategies and robust monitoring techniques are essential to control its spread. By integrating innovative technologies with proactive public health measures, we can mitigate the risks associated with *M. avium* and create safer environments for all.

Correspondence to: Hendrai Tesfaye, Department of Medicine, Monash University, Clayton, Australia, Email: tesfayhend@gmail.com

Received: 20-Oct-2024, Manuscript No. MDTL-24-35358; **Editor assigned:** 23-Oct-2024, PreQC No. MDTL-24-35358 (PQ); **Reviewed:** 06-Nov-2024, QC No. MDTL-24-35358; **Revised:** 13-Nov-2024, Manuscript No. MDTL-24-35358 (R); **Published:** 20-Nov-2024, DOI: 10.35248/2161-1068.24.14.516.

Citation: Tesfaye H (2024). Innovative Approaches to Control Mycobacterium avium Contamination. Mycobact Dis. 14:516.