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RAPID DETECTION TECHNOLOGY OF SPACE MICROORGANISM USING
LAMP COUPLED FLUORESCENCE LATERAL FLOW CHROMATOGRAPHY TEST STRIPS

Abstract

Monitoring microbial species and their content is an important part of microbial control in the space station. However, the microgravity conditions of the space environment and constraints make it difficult to conduct routine ground detection experiments. Therefore, on-orbit microbial detection mainly relies on culture methods. The biomolecule identification detection method based on lateral flow chromatography test strips has the advantage of not being affected by the microgravity environment. The coupled fluorescence detection method can achieve higher detection sensitivity and is one of the potential methods for on-orbit microbial detection. Aiming at the microorganisms in the space environment that are potentially harmful to astronauts' living environment and instrumentation and equipment, a microbial nucleic acid identification technology based on loop-mediated isothermal amplification (LAMP) coupled with fluorescent lateral flow chromatography test strips was studied. Research results show that this technology can achieve highly sensitive, highly specific and rapid detection of common harmful microorganisms in space stations such as *E. coli* and *Staphylococcus aureus*. The detection time is less than 60 minutes and the sensitivity reaches $100 \text{ copy} \cdot \text{L}^{-1}$.