

Loop-mediated isothermal amplification (LAMP): a versatile technique for detection of micro-organisms

ABSTRACT

Loop-mediated isothermal amplification (LAMP) amplifies DNA with high specificity, efficiency and rapidity under isothermal conditions by using a DNA polymerase with high displacement strand activity and a set of specifically designed primers to amplify targeted DNA strands. Following its first discovery by Notomi et al. (Nucleic Acids Res 28: E63), LAMP was further developed over the years which involved the combination of this technique with other molecular approaches, such as reverse transcription and multiplex amplification for the detection of infectious diseases caused by micro-organisms in humans, livestock and plants. In this review, available types of LAMP techniques will be discussed together with their applications in detection of various micro-organisms. Up to date, there are varieties of LAMP detection methods available including colorimetric and fluorescent detection, real-time monitoring using turbidity metre and detection using lateral flow device which will also be highlighted in this review. Apart from that, commercialization of LAMP technique had also been reported such as lyophilized form of LAMP reagents kit and LAMP primer sets for detection of pathogenic micro-organisms. On top of that, advantages and limitations of this molecular detection method are also described together with its future potential as a diagnostic method for infectious disease.

Keyword: Biotechnology; Detection; Diagnosis; Diseases; Rapid methods.