Abstract

Dengue virus (DENV) infection remains a major public health threat in Indonesia, where current gold-standard diagnostic methods such as RT-PCR are often inaccessible in resource-limited settings. This study aimed to develop and validate a rapid, cost-effective Reverse Transcription Loop-mediated Isothermal Amplification (RT-LAMP) assay for the detection of DENV in clinical samples. Serotype specific primers were designed targeting the envelope (E) gene, and the assay was optimized at 55°C to ensure specificity and efficiency. Analytical validation included sensitivity testing via serial dilutions, specificity testing against Zika and Chikungunya viruses, and clinical evaluation using confirmed patient samples by RT-qPCR. Results demonstrated that the RT-LAMP assay exhibited high specificity, with no cross-reactivity to other major arboviruses, and sensitivity comparable to RT-qPCR for DENV-1, DENV-2, and DENV-4. However, detection of DENV-3 was less sensitive, and clinical performance varied, indicating the need for further primer optimization. In conclusion, the RT-LAMP assay shows strong potential as a decentralized, field-deployable diagnostic tool for dengue in Indonesia, though further validation with larger clinical cohorts is recommended.

Keywords: **Dengue virus**, **RT-LAMP**, **diagnosis**, **Indonesia, point-of-care testing**