

# LAMP assay coupled with CRISPR/Cas12a system for portable detection of African swine fever virus

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## Abstract

African swine fever (ASF) is one of the most severe infectious diseases of pigs. In this study, a LAMP assay coupled with the CRISPR Cas12a system was established in one tube for the detection of the ASFV p72 gene. The single-strand DNA-fluorophore-quencher (ssDNA-FQ) reporters and CRISPR-derived RNA (crRNAs) were screened and selected for the CRISPR detection system. In combination with LAMP amplification assay, the detection limit for the LAMP-CRISPR assay can reach 7 copies/ $\mu$ l of p72 gene per reaction. Furthermore, this method displays no cross-reactivity with other porcine DNA or RNA viruses. The performance of the LAMP-CRISPR assay was compared with real-time qPCR tests for clinical samples, a good consistency between the LAMP-CRISPR assay and real-time qPCR was observed. In the current study, a LAMP coupled with the CRISPR detection method was developed. The method shed a light on the convenient, portable, low cost, highly sensitive and specific detection of ASFV, demonstrating a great application potential for monitoring on-site ASFV in the field.

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