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Loop-mediated isothermal amplification assay for the rapid and visual detection of the novel porcine circovirus 3

Yu-Ri Park[a], Hye-Ryung Kim[a], Seong-Hee Kim[b], Kyoung-Ki Lee[b], Young S Lyoo[c], Sang-Geon Yeo[a], Choi-Kyu Park[a,*]

[a] College of Veterinary Medicine & Animal Disease Intervention Center, Kyungpook National University, Daegu 41566, Republic of Korea

[b] Animal Disease Diagnostic Division, Animal and Plant Quarantine Agency, Gimcheon 39660, Republic of Korea

[c] College of Veterinary Medicine Konkuk University, Seoul 05029, Republic of Korea

*****Corresponding author: College of Veterinary Medicine & Animal Disease Intervention Center, Kyungpook National University, 80 Daehak-ro, Bukgu, Daegu 41566, Korea

E-mail addresses: siyul2402@gmail.com (Y.R. Park), gpfuddl25@naver.com (H.R. Kim), soho923@korea.kr (S.H. Kim), naturelkk@korea.kr (K.K. Lee), lyoo@konkuk.ac.kr (Y.S. Lyoo), sgyeo@knu.ac.kr (S.G. Yeo), parkck@knu.ac.kr (C.K. Park).

Highlights

- LAMP assay using HNB was developed for the rapid and visual detection of PCV3.
- The LAMP assay is simple, rapid, highly specific and highly sensitive.
- The assay will be a valuable tool for the rapid diagnosis of PCV3.

Abstract

A loop-mediated isothermal amplification (LAMP) assay using hydroxynaphthol blue was developed for the rapid and visual detection of the capsid gene of porcine circovirus 3 (PCV3). The amplification could be completed in 40 min at 62 °C, and the results could be visually detected by the naked eye. The assay specifically amplified PCV3 DNA and not other porcine viral nucleic acids. The limit of detection of the assay was 50 PCV3 DNA copies, which was comparable to that of the real-time polymerase chain reaction (qPCR) and lower than that of conventional PCR. In the clinical evaluation, the PCV3 detection rate of the LAMP assay was higher than that of PCR and agreed 100% with that of qPCR. These results indicate that the LAMP assay will be a valuable tool for the rapid, sensitive, and specific detection of PCV3 in clinical samples.

Keywords: Porcine circovirus 3, loop-mediated isothermal amplification, capsid gene, hydroxynaphthol blue

Porcine circovirus (PCV), which belongs to the genus *Circovirus* of the family *Circoviridae*, is a non-enveloped, spherical, single-stranded DNA virus (Tischer et al., 1982). To date, three types of PCVs have been reported to infect pigs: PCV1, PCV2, and PCV3 (Allan et al., 2012; Palinski et al., 2017; Phan et al., 2016; Shen