Identification methicillin-resistant *Staphylococcus aureus* by using loop-mediated isothermal amplification combined with a lateral flow dipstick

CKUMDEE J[1], SANTIWATANAKUL S[2], KAEWPHINIT T[3*],

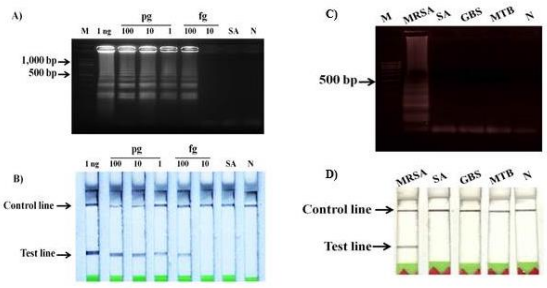
[1]Department of Clinical Pathology, Faculty of Medicine, Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand
[2]Department of Pathology, Faculty of Medicine, Srinakharinwirot University, Bangkok, Thailand
[3]Innovative Learning Center, Srinakharinwirot University, Bangkok, Thailand
*E-mail: thongchaika@g.swu.ac.th

Keywords: Loop-mediated isothermal amplification, Lateral Flow Dipstick, methicillin-resistant *Staphylococcus aureus*, MRSA

I. Abstract

Infectious disease in hospitals is a major public health problem that is increasing every year due to advance in medical health science tools for patients are numerous. It is increased the risk that patients have been infected with pathogens from contaminated instruments Medical Equipment including contamination in healthcare worker routine such as *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus* (MRSA). In particularly MRSA, the antibiotic-resistant superbug usually associated with hospital infections. Nowadays, molecular biology based assays, such as PCR (polymerase chain reaction) test, these techniques entail various disadvantages such as high cost, time consuming, or use of toxic substances. Novel loop-mediated isothermal amplification (LAMP) permits DNA to be amplified rapidly at a constant temperature. Here, a LAMP procedure was integrated with a lateral flow dipstick (LFD) specifically and rapidly under isothermal condition. The DNA amplicon hybridized to detection 5 min after application. The reaction was optimized at 61 ◦C for 45 min and amplified DNA was detected at LFD test line 5 min after application. The result showed that the sensitivity limited of detection was 100 fg. The specificity was no cross-reactions with other bacteria. This assay showed high sensitivity, relatively short analysis time, low cost, and the lack of requirement for a thermocycler were important advantages of this technique. Due to its simplicity, rapidity and high sensitivity, LAMP might be used as the alternative technique for MRSA detection in medical diagnostic laboratories

II. Image:



Sensitivity LAMP detection of MRSA. Amplification of the target sequence monitored by gel electrophoresis (A) and LFD (B). Specificity LAMP detection of MRSA show that amplification of the target MRSA sequence only monitored by gel electrophoresis (C) and LFD (D). *Staphylococcus aureus* (SA), Group B *streptococcus* (GBS), *Mycobacterium tuberculosis* (MTB) and Negative (N)

III. Reference:

1 Holfelder, M., U., Eigner, A.M. Turnwald, W. Witte, M. Weizenegger and A.Fahr, 2006. Direct detection of methicillin-resistant *Staphylococcus aureus* in clinical specimens by a nucleic acid-based hybridisation assay. Clin. Microbiol. Infect., 12:1163-1167

2 Kaewphinit, T., N. Arunrut, W. Kiatpathomchai, S. Santiwatanakul, P. Jaratsing and K. Chansiri, 2013. Detection of *Mycobacterium tuberculosis* by using loop-mediated isothermal amplification combined with a lateral flow dipstick in clinical samples. Biomed. Research. International, 2013:926230.

IV. Biography:

Assoc. Prof. Dr. Thongchai Kaewphinit received the M. Sc. in Biomedical Science from Srinakharinwirot University (SWU), Thailand in 2007, and Ph.D. in Molecular Biology from SWU in 2010. Recently, he is lecturer of Innovative Learning Center, SWU. Biosensor, nanotechnology, molecular biology and applied microbiology are his current research field. He has published more than 12 papers in refereed journals.

V. Presenting author details



Full Name: Assoc. Prof. Dr. Thongchai Kaewphinit
Contact number:
Twitter account:
Linked In account:
Session name/ number: Diagnostic biochemistry
Category: (Poster presentation)
Passport Number: