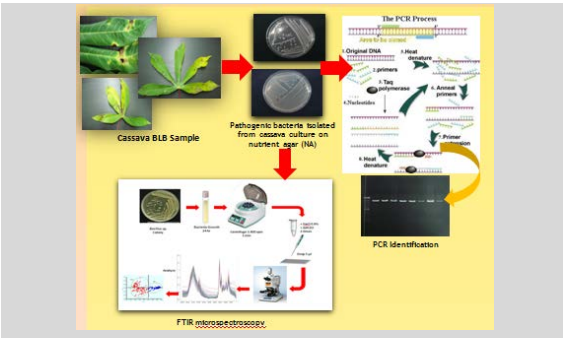
Identification of a cassava bacterial blight pathogen, *Xanthomonas axonopodis* pv. *manihotis* using FT-IR spectroscopy

Natthiya Buensanteai[1*], Kanjana Thumanu[2], Mathukorn Sompong[1], Dusit Athinuwat[4], Khanistha Kooboran[1] and Sutruedee Prathuangwong [5]

[1]*School of Crop Production Technology, Institute of Agriculture Technology, Suranaree University of Technology, Nakhon Ratchasima, 30000 Thailand*
[2]*Siam Photo Laboratory, Suranaree University of Technology, Nakhon Ratchasima, 30000 Thailand*
[4]*Major of Organic Farming Management, Faculty of Science and Technology, Thammasat University, Pathumthani, 12121 Thailand*
[5]*Department of Plant Pathology, Faculty of Agriculture, Kasetsart University, Bangkok, 10900 Thailand*

Xanthomonas axonopodis pv. *manihotis* is the causal agent of cassava bacterial blight disease, reduced yield of cassava economic crops around the world, especially Thailand [1]. In this study, we developed a novel strategy for the rapid identification of *X. axonopodis* pv. *manihotis* based on Fourier transform infrared microspectroscopy (FTIR microspectroscopy). Two reference strains and 5 isolates of gram-negative bacteria isolated from cassava field were used in this study. The isolates were identified according to the guidelines of bacteriology. Cassava bacterial blight pathogen were further identified by 16S rDNA and sequencing. A standardized experimental protocol was established, and FTIR spectral database containing more than 200 infrared spectra was investigated. FTIR microspectroscopy identification system consisted of two hierarchical levels. The top-level FTIR network allowed the identification of *X. axonopodis* pv. *manihotis* and an identification success rate more than 95%. The second-level network was developed to differentiate the two most relevant species of *X. axonopodis* pv. *manihotis* and *X. axonopodis* pv. *cassavae*, with a correct identification rate more than 95%. Our results demonstrate the high degree of reliability and strong potential of FTIR spectrum analysis for the rapid identification of plant pathogenic bacteria suitable for use in routine *X. axonopodis* pv. *manihotis* diagnosis.



Schematic of cassava bacterial leaf blight (BLB) identification using polymerase chain reaction with Xathomonas specific primers and Fourier-transform infrared (FTIR) microspectroscopy.

[1] N. Buensanteai et.al. SLRI PR. (2013).