Thesis Advisor: Assistant Professor Wichai Kosiritatana, Ph.D. 136 pages.

Citrus canker disease caused by Xanthomonas axonopodis pv. citri, is serious diseases of Citrus spp. in worldwide including Thailand. Biochemical and physiological characteristic studies of 113 strains of X. axonopodis pv. citri from Thailand isolated strains were performed. X. axonopodis pv. citri is a rod shaped with 0.5×1.7 μm in size, Gram-negative aerobic bacterium, single polar flagellum, utilization of starch, gelatin, casein, tween 80 and esculin hydrolysis positive, lecithinase and hydrogen sulfide production, nitrates not reduced, arginine and gluconate utilization negative, urease negative, growth at 36°C and tolerance NaCl 3% 5% and 7%. They can utilized of arabinose, xylose, glucose, fructose, galactose, mannose maltose, lactose, trehalose, sucrose, glycerol, mannitol, glycogen, dextrin, malonate, citrate, and succinate but can not utilized L-methyl D-glucoside, raffinose, inositol, inulin, dulcitol, oxalate, and acetate. They were varied on the utilization of rhamnose, sorbitol, and salicin. All strains produced typical erumpent bacterial canker lesions on Mexican lime, sweet orange, grapefruit, lemon and pomelo.

The rep PCR with BOX and ERIC primers was used for characterization of X. axonopodis pv. citri from Thailand. The result showed that most of bacterial strains of X. axonopodis pv. citri from Thailand were grouped with canker A group. However, four strains of X. axonopodis pv. citri isolated from pomelo at Kanchanaburi province in 2004 were different.

The detection of X. axonopodis pv. citri was successfully done by using PCR with primers D1(GGCCTTTGATCAAAAAAGGACC)/D2 (TTGAAGTAGGGGACGGTTTA) and one tube nested PCR with primer Ph3F (GGTACCGCGGCGTGCATGA) ph3R (GTTGAGGGGCAGGGG AGA) and D3(GGTGT GGTGCCTCGATAGAT)/ D4 (CGAACAGACCATTGCCCTAT). All primers were designed from phA gene. The sensitivity of detection by PCR and one tube nested PCR were at the minimum DNA concentration of 25 and 0.5 pg/reaction respectively and the lowest concentration of cell suspension at 8.1×10^5 and 9.4 CFU/reaction respectively. An immunomagnetic separation and nested PCR method (IMS-nested PCR) were developed for detection of X. axonopodis pv. citri in the field sample. The results showed that IMS-nested PCR assay had high specificity for X. axonopodis pv. citri. The sensitivity for detection of X. axonopodis pv. citri in plant extract was 5.8 cells/reaction and 10-fold more sensitive than the nested PCR. With 50 samples of naturally infected material, The IMS-nested PCR achieved better results than other PCR techniques. The IMS-nested PCR can detect X. axonopodis pv. citri in symptomatic and asymptomatic samples and showed positive results in 44 samples (88%), whereas nested PCR and PCR and showed positive results in 38 samples (76%) and 15 samples (30%), respectively.