

## Characterization of Malaysian *Pectobacterium* spp. from vegetables using biochemical, molecular and phylogenetic methods.

### Abstract

In August 2011, vegetable crops showing symptoms of maceration and water soaked lesions on their tuber, leaf, and fruit were collected from four major vegetable growing states in Malaysia including Pahang, Johor, Melaka and Selangor. The majority of the causal organisms isolated from infected tissues (52 strains) were identified as *Pectobacterium* spp. based on PCR amplification of the pectate lyase (*pel*) gene and amplification of the 16S-23S rRNA (ITS) with G1 and L1 primers. Physiological and biochemical assays divided Malaysian *Pectobacterium* species into two main groups: *Pectobacterium wasabiae* and *Pectobacterium carotovorum* subsp *carotovorum*. Partial sequence of PCR product from reaction of putative *Pectobacterium* spp. with 16S rRNA confirmed the results obtained from physiological and biochemical assays used for identification of the bacterium. Application of specific primers such as Eca1F/Eca2r, Br1f/L1r, EXPCCF/EXPCCR, and also ITS-PCR following by RFLP by restriction enzyme (*RsaI*) successfully differentiated Malaysian *P. wasabiae* and *P. carotovorum* subsp *carotovorum* isolates from other species and subspecies of *Pectobacterium*. Phylogenetic analysis of Malaysian isolates with housekeeping genes (*mdh*, *gapA*) grouped Malaysian *P. carotovorum* subsp *carotovorum* and *P. wasabiae* in the same cluster with *P. carotovorum* subsp *carotovorum* (Ecc380) and *P. wasabiae* (SCRI488) respectively.

**Keyword:** *Pectobacterium wasabiae*; Vegetables; Soft rot; Malaysia.