IN VITRO STUDIES OF LACTIC ACID BACTERIA AGAINST THE CAUSATIVE AGENT OF PAPAYA DIEBACK DISEASE

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Abstract: Papaya is an economically significant fruit crop grown in Malaysia. Nevertheless, the outbreak of Papaya Dieback disease has caused major threats to the papaya plantation for almost a decade as effective treatment found to date has been limited. Endophytic bacteria have been used as biological control agent against several plant diseases. This study proposed that bacterial endophytes isolated from papaya plant might be used as biological alternative to synthetic bactericide to restrain this disease. The aim of this study is to find an effective microorganism to suppress Papaya Dieback disease. In this study, a total of 230 bacterial endophytes with antagonistic activities against *Erwinia mallotivora* were isolated from seeds and sarcotesta of two papayas (*Carica papaya* L.) collected from Sabak Bernam (PPS) and Perak (PPK) through rapid screening using Agar Overlay method. Twenty-eight pure isolates from the respective PPS and PPK showed significant inhibitory effect against *Erwinia mallotivora* as revealed by Agar Disc Diffusion technique. PPKSD19 showed the highest value of inhibition zone at 21.7 mm during *in vitro* screening on MRS agar. The isolates were characterized as Gram-positive rods, cocci or coccobacilli, catalase - negative and positive in acidity test, suggesting that they are potentially Lactic Acid Bacteria. API 50 CH profiles and 16S rRNA sequencing allowed identification of bacteria as *Weissella sp.* and *Lactococcus sp.* The selected high-performing endophytic bacteria will be investigated for their synergistic activities and bacteriocin-production. Their effects on infected papaya plant will be tested under greenhouse experiment. Our findings suggest that *Carica papaya* L. seed-borne bacterial endophytes could potentially be applied as biological control agent to inhibit Papaya Dieback disease.

Keywords: Antagonism, Biological control, *Carica papaya*, Endophytic bacteria, *Erwinia mallotivora*, Papaya dieback