ABSTRACT

Macergens are soft rot causing bacteria in plants, infecting a wide range of host plants worldwide resulting in economic losses. Among these macergens, *Dickeya chrysanthemi* has been widely reported to cause soft rot on crop plants and postharvest crops. Insufficient control strategy of macergen infestation resulted in the need for eco friendly disease control agents. Although bacteriophages have been reported as biocontrol agents, limited studies have been conducted on the biocontrol capability of bacteriophages against soft rot pathogens. Thus, isolation and efficiency of bacteriophages in controlling soft rot disease in plants were assessed in this study. A total of five lytic double stranded DNA bacteriophages DchS1, DchS2, DchS3, DchS4 and DchS5 were isolated from Aimst Sewage water, Sungai Petani river, drain of Kampung Sungai Jagung, Bedong pigfarm wastewater and soil from Pekan Baru plant nursery. DchS1, DchS2 and DchS5 phages belong to *Myoviridae* family while DchS3 and DchS4 phages belong to the *Podoviridae* family. All five bacteriophages were specific against *D. chrysanthemi*. The ability of these phages to prevent the progression of soft rot disease was evaluated individually and as a cocktail on *D. chrysanthemi* infected one month old young plants (tomato, papaya and chili plant) and postharvest vegetables (potato tuber, tomato and cucumber fruit). Individual bacteriophage treatment on infected potato tuber, tomato and cucumber fruit had mixed results, where DchS1 and DchS2 phages prevented progression of soft rot in all vegetables, while the others (DchS3, DchS4 and DchS5 phages) ranged from preventing progression of soft rot to mild occurrence of soft rot in one or more vegetables. Bacteriophage cocktail on the other hand, was able to prevent the progression of soft rot in both *D. chrysanthemi* infected plants and postharvest vegetables. Interestingly, the phage cocktail was able to prevent soft rot in a potato tubers and cucumber fruits that were infected with *D. chrysanthemi* 24 hr and 48 hr after phage treatment by spray method. The same phage cocktail showed mixed results ranged from no infection to mild arrested soft rot occurrence

in potato tuber, tomato and cucumber fruits infected with *D. chrysanthemi* 96 hr after phage treatment by spray method. As for *D. chrysanthemi* infected tomato, papaya and chilli plants, the phage cocktail managed to prevent soft rot occurrence in both groups; where in one of the group the phage cocktail was added 24 hr after infection and the other 48 hr infection. These results indicate that the phage cocktail has the potential to be used as a biocontrol agent to prevent soft rot disease caused by *D. chrysanthemi* which may eventually reduce the challenges faced by farmers and produce disease free crop products.

Key words: Bacteriophages; macergen; *Dickeya chrysanthemi*; biocontrol