The effectivity of dragon fruit extract as UV protectant for *Bacillus thuringiensis* fusions against cabbage cluster caterpillar, *Crocidolomia binotalis* (Lepidoptera: Crambidae)

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Abstract

Cabbage cluster caterpillar, *Crocidolomia binotalis*, is the common insect pest of vegetables. The excessive application of chemical insecticides for insect pest management known to have side effects. Biological control agents are safe, effective, and environmentally friendly alternatives for chemical insecticides. Ultraviolet is the main delimiting factor for the persistence of biological agents. The addition of dragon fruit extract as additives in formulation of *Bt* fusion has important role for the protection of protein crystal and spore for at least 9 hours after exposed under ultraviolet light. Dragon fruits are potential for the additive candidates as ultraviolet protectant, UV absorbents, and surfactants. The bioassay of the formulated fusion is on going in the laboratory. Screening and bioassay of natural additives which cheap and biodiversity –based are the challenge for developing the long lasting biological control agents' persistence.

Keywords: Biocontrol, UV protectants, additive, bio-pesticide, bacterial fusion

Research Findings

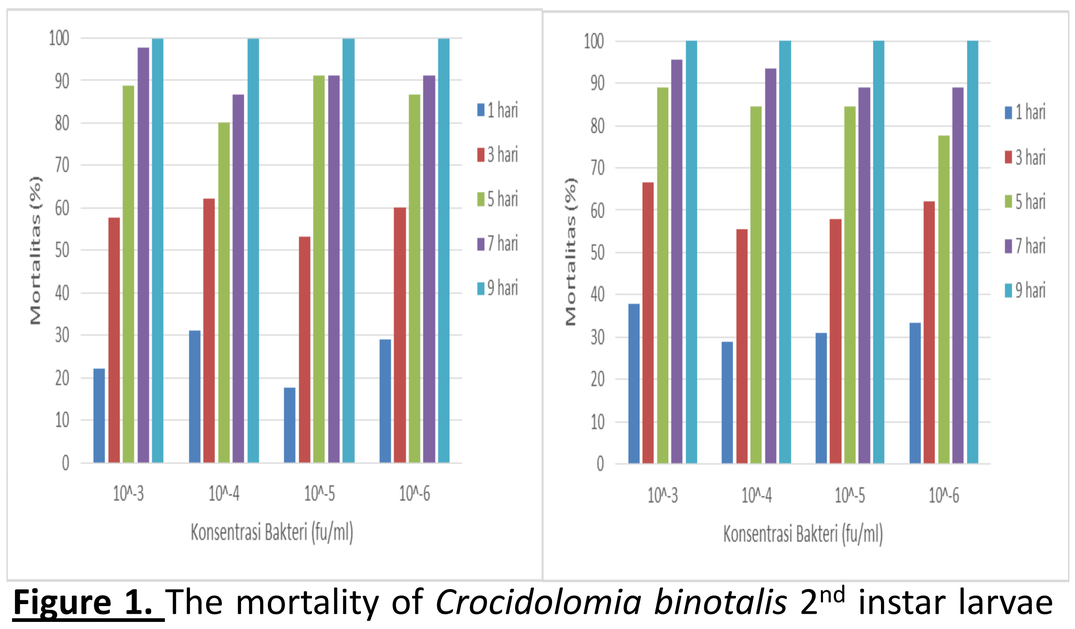

Figure 1. The mortality of *Crocidolomia binotalis* 2nd instar larvae after treated with *Bt* Fusion F28 (left) and F 31 (right) cultured in nutrient agar

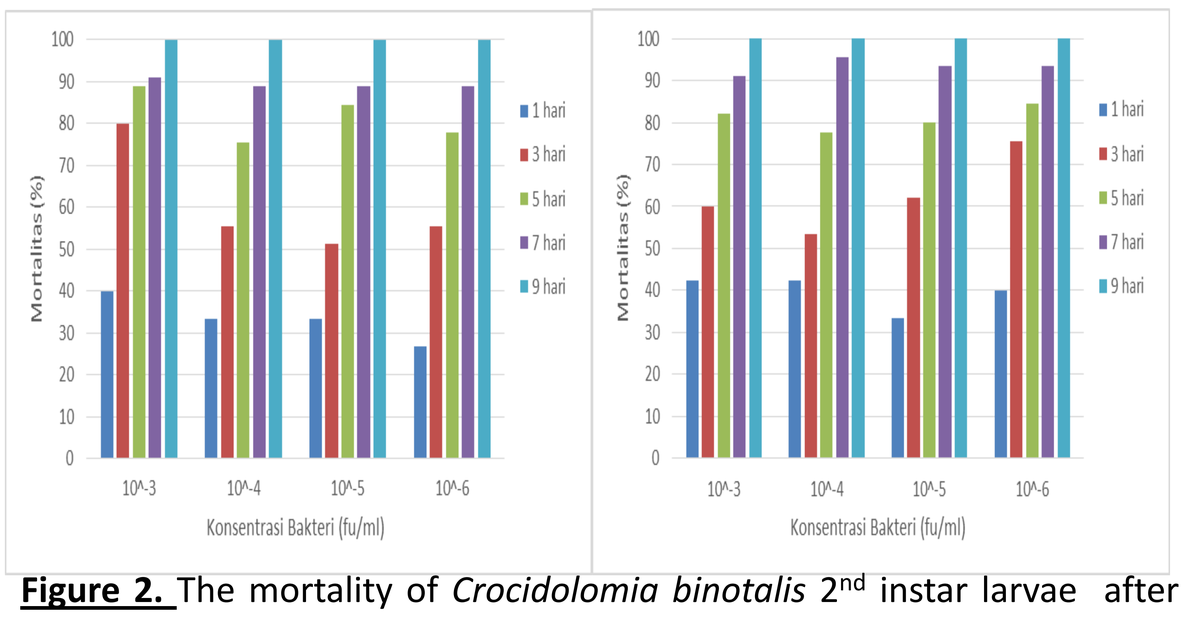

Figure 2. The mortality of *Crocidolomia binotalis* 2nd instar larvae after treated with *Bt* Fusion F28 (left) and F 31 (right) cultured in nutrient broth and yeast extract

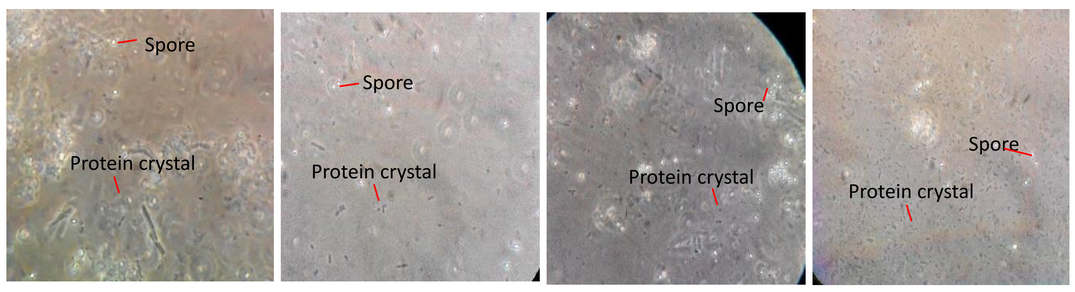

Figure 3. The effect of dragon fruit extract formulation on spores and protein crystal of *Bt* Fusion 28 after exposed under ultraviolet for 3 – 24 hours

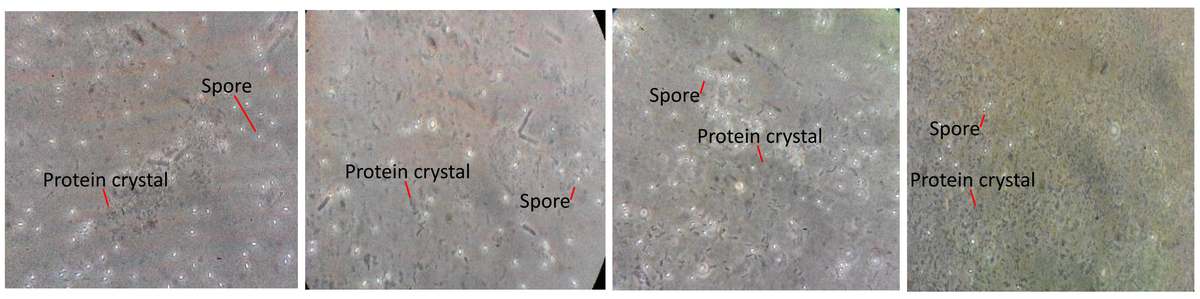

Figure 4. The effect of dragon fruit extract formulation on spores and protein crystal of *Bt* Fusion 31 after exposed under ultraviolet for 3 – 24 hours

-There was no pathogenicity difference of Fusions that cultured in nutrient agar and nutrient broth + yeast against *Crocidolomia binotalis*
-The dragon fruits extract formulation gives at least 9 hours protection to the spores and crystal protein exposed under ultraviolet light

Acknowledgments

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