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Phage and aldehyde work in synergy to control *Xanthomonas* infection

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Xanthomonas campestris pv. campestris (Xcc) is a Gram-negative bacterium that causes black rot, one of the most important diseases of vegetable brassica crops worldwide. The use of bacteriophages for the control of vegetable diseases is a sector of growing interest, providing more advantages than the use of chemicals in agriculture. In this study, we isolated and characterized a lytic bacteriophage from the soil, capable of reducing Xcc infection. We evaluated the antimicrobial activity of the phage, and its possible direct administration to the plant xylem. Further, tests were performed both in vivo and in vitro experiments to assess the activity of the bacteriophage in association with several anti-biofilm molecules, such as a long-chain fatty aldehyde and its analogs, that differed in the length of the aliphatic chain, obtained from an Antarctic *Pseudoalteromonas haloplanktis*. We demonstrated that the synergism between the bacteriophage and anti-biofilm molecules could be the most effective way to breakdown the biofilm and control *Xanthomonas* infection.

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