Isolation and characterization of a novel *Pseudomonas* sp. strain from *Deschampsia antarctica* as a potential biocontrol agent

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The post-harvest decay of fruits and vegetables is a major global challenge. Fungicides are a primary means of controlling post-harvest diseases, and their use worldwide is variable. Biological control presents an attractive option, and the use of microorganisms for the control of plant disease has shown potential as an alternative to synthetic fungicides for the control of post-harvest diseases. Notwithstanding, the use of components (molecules) produced by microbial agents has attracted interest due to their natural properties. Biological control in the post-harvest environment has significant advantages over that under field conditions because the two most important factors effecting biocontrol, temperature and relative humidity, are constant and under strict control. Thus, the objective of this study was to select effective psychrophilic bacteria from the leaf surfaces of *Deschampsia antarctica*, one of only two native flowering plants occurring throughout maritime Antarctica with antagonistic properties against *Botrytis cinerea*, a plant pathogenic fungus that is common in temperate climates. Epiphytic bacteria, isolated from *Deschampsia antarctica*, were screened for their potential to inhibit *Botrytis cinerea*, a causal agent of gray mold disease of strawberry pseudofruits. The pathogenic fungus is more active and the disease is more serious in temperate climate where the temperatures are lower. The approach involved the isolation and characterization of psychrophilic bacteria from the phyllosphere of the native plant of Antarctica *D. antarctica*, and the evaluation of these bacteria in the biocontrol of the disease. One bacterial strain, *Pseudomonas* sp. ANT 44-4, inhibited the mycelial growth, and its ethyl acetate extract and chitinase enzyme also inhibited conidial germination. A LC-MS-Qtof analysis of the bioactive purified fraction revealed the presence of cyclo(Pro-Val), a compound belonging to the class of diketopiperazines (DKPs). When applied prior to the pathogen under controlled conditions, this bacterial strain completely reduced the fruit rot of strawberry during the first days of incubation. These findings provide highlights on the main mode of action of *Pseudomonas* sp. ANT 44-4 in controlling *B. cinerea* and support its potential use as promising biological control agents.