Effect of Cucumber Fruit Peel Extracts on Inhibition of Phytophthora capsici Growth and Infection

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Cucumbers are an important vegetable crop and an important source of income for farmers of Michigan. The oomycete pathogen Phytophthora capsici causes fruit rot in cucumbers and a wide variety of other vegetables. Previous research in this lab found that certain cucumber cultivars demonstrated increasing resistance to P. capsici after their stage of rapid elongation, transitioning at 10–12 days post-pollination (dpp). This increase of resistance with age is called age-related resistance (ARR). Studies showed that the fruit peel is associated with ARR. Reports from other laboratories indicate that cucumbers are capable of producing methanol-soluble antimicrobial compounds. In this work, bioassays were conducted to evaluate the effect of aqueous and methanolic extracts of cucumber fruit peel on pathogen growth and to test for a difference in effects of varying ages and genotypes of cucumber. Vlaspik (ARR +) 8-dpp (pre-ARR) and 16-dpp (post-ARR) and Gy14 (ARR –) 16-dpp cucumbers were peeled, peel was sequentially extracted twice each with water and methanol, and extracts were lyophilized. OP97, NY 0664-1, NY 0664-1 RA (red fluorescence), and NY 0664-1 GA (green fluorescence) isolates were used to prepare inoculum with a concentration of 10^5 zoospores/mL. Inoculum and extracts redissolved in water or 10% methanol at 25 µg/µL were added to a 96-well plate filled with V8 media. Methanolic extracts inhibited the growth of P. capsici, but aqueous extracts had a stimulatory or no effect. Differences in age and genetic capacity for ARR did not produce observable differences in P. capsici growth.

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