

Antimicrobial Activities of Chili and Black Pepper Extracts on Pathogens of Chinese Kale

Kaewalin Kunasakdakul* and Prapaipit Suwitchayanon

Department of Entomology and Plant Pathology, Faculty of Agriculture, Chiang Mai University, Chiang Mai 50200, Thailand.

*Corresponding author. E-mail: kaewalin.k@cmu.ac.th

ABSTRACT

*Antimicrobial activities of chili and black pepper extracts were evaluated on *Xanthomonas campestris*, a pathogenic bacteria causing black rot, and *Alternaria brassicicola*, a pathogenic fungi causing leaf spot disease, both of which can cause severe damage to Chinese Kale crop production. The extracts were diluted with sterile distilled water in concentrations of 3.0%, 1.5% and 0.75% (w/v). After soaking in a 1:1 mixture (v/v) of bacterial suspension (1×10^4 cfu/ml) and diluted extracts, all tested concentrations of black pepper extract completely inhibited the bacteria. In contrast, the chili extract concentrations varied in their inhibition ability, from highest (3.0%) to moderate (1.5%) to none (0.75%). These results were also observed in the trials of fungal inhibitory effects. Radial growth of *A. brassicicola* were completely inhibited after the cultured disc was incubated on PDA agar supplemented with all tested concentrations of black pepper extract for 15 days, while the chili extracts caused less inhibition effect than the pepper extracts. Only the 3.0% chili extract, after 3 days incubation, demonstrated a 100% inhibition effect. Significant reductions of the inhibition percentages for the 1.5% and 0.75% trials were observed, 61.8% and 55.5%, respectively, after incubation for three days. In addition, microscopic observations of the fungal growth clearly showed an effect on the disorders causing swollen and frequently septa mycelia. Increasing extract concentrations resulted in fewer conidia and malformed germ tube developments. Spraying 3.0% diluted black pepper extract was the most effective for reducing the number, size and severity of leaf spot lesions with non-phytotoxicity*

Keywords: Chili extract, Black pepper extract, *Alternaria brassicicola*, *Xanthomonas campestris*

INTRODUCTION

Chinese Kale, in the *Alboglabra* group of *Brassica oleracea* is a popular leaf consuming vegetable crop grown throughout Asia. *Brassica* crop yields have been reduced worldwide by pathogenic *Xanthomonas campestris* and *Alternaria brassicicola*, a bacterial black rot and fungal leaf spot pathogen, respectively (Westman et al., 1999). Controlling the diseases chemically by application of