

## INTISARI

### EKSPRESI GEN *PR-1* DAN *DEFENSIN* PADA TANAMAN CABAI TERHADAP INFEKSI *Colletotrichum* spp. YANG DIPERLAKUKAN NANOPARTIKEL KITOSAN

Antraknosa merupakan salah satu penyakit penting pada budidaya tanaman cabai. Penyakit ini disebabkan oleh *Colletotrichum* spp. yang sulit dikendalikan meskipun dengan perlakuan kimia. Nanoteknologi menjadi isu terkini dalam sektor pertanian yang dapat meningkatkan efektivitas perlakuan dan menginisiasi mekanisme ketahanan tanaman. Pada penelitian ini ingin diketahui kemampuan nanopartikel kitosan (CNP) dalam menghambat infeksi patogen penyebab antraknosa pada cabai keriting varietas OR Twist 42 juga mengestimasi level ekspresi gen-gen yang berkaitan dengan ketahanan setelah diinduksi dengan berbagai perlakuan. Pada penelitian ini CNP diformulasi dengan metode gelasi ionik dan diperoleh konsentrasi 0,1% sebagai konsentrasi terbaik, melalui teknik makanan beracun. Cabai keriting OR Twist 42 disemprot dengan beberapa perlakuan, meliputi hanya larutan CNP (CNP), inokulasi (PC), CNP+inokulasi (CNP+I), dan kontrol (NC). Level ekspresi gen ketahanan, meliputi *PR-1* dan *Defensin* diekspresikan dengan Real-Time PCR. Gen patogenisitas *ChEC3* diamplifikasikan menggunakan PCR konvensional. Pada hasil diketahui bahwa dalam uji *in vitro* pertumbuhan patogen terhambat oleh pemberian CNP 0,1% dengan persen penghambatan sebesar 25,954%. Level ekspresi *PR-1* dan *Defensin* 24 jam setelah perlakuan meningkat pada seluruh buah uji, tetapi menurun pada beberapa sampel daun. Gen patogenisitas *ChEC3* berhasil terdeteksi pada seluruh buah perlakuan, kecuali kontrol. Berdasarkan penelitian ini disimpulkan bahwa CNP merupakan senyawa yang bersifat fungistatik terhadap pertumbuhan *Colletotrichum* sekaligus berpotensi sebagai penginduksi gen ketahanan pada buah cabai, meski masih diperlukan penelitian lebih lanjut.

**Kata kunci :** Cabai, *Colletotrichum* spp., nanopartikel kitosan, induksi ketahanan

## ABSTRACT

### EXPRESSION OF *PR-1* AND *DEFENSIN* GENES ON CHILI TO INFECTION OF *Colletotrichum* spp. TREATED BY CHITOSAN NANOPARTICLE

*Anthracnose is known as the important disease in chili cultivation. It is caused by fungal pathogen Colletotrichum spp., which hard to be controlled by chemical treatment. Nanoparticle is a novel issue in the agriculture sector which increases the effectivity of treatments and leads induce resistance mechanisms. In this study the capability of chitosan nanoparticle (CNP) against infection of anthracnose pathogen on chili var. OR Twist 42 was determined, also the level expression of defense-related genes induced by treatments were estimated. In this study CNP was formulated by the ionotropic-gelation method then got 0,1% as the best concentration after it was estimated by the potion food technique. OR Twist 42 chili plants were spraying using several treatments, including only CNP (CNP), inoculation (PC), CNP+inoculation (CNP+I), and negative control (NC). Defense-related genes were PR-1 and Defensin expressed by Real-Time PCR. The pathogenicity-related gene was ChEC3 also amplified by PCR. The in vitro test showed pathogen development was suppressed by CNP 0,1%, with a percent of inhibition at 25,954%. Level expression of PR-1 and Defensin were upregulated in all treatment fruits at 24 hours after treatment, but downregulated in some leaves. ChEC3 gene was detected in all treatment fruits except control. Based on this study were concluded that CNP had potencial roled as fungistatic compound against Colletotrichum also as an inducer of defense-related genes on chili fruits, but still need further observation.*

**Key words :** Chili, *Colletotrichum* spp., chitosan nanoparticle, induce resistance