UJI ANTAGONIS *Trichoderma harzianum* DAN *Bacillus subtilis.* TERHADAP PATOGEN *Fusarium verticillioides* PENYEBAB PENYAKIT BUSUK TONGKOL FUSARIUM PADA TONGKOL JAGUNG

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ABSTRAK

Rendahnya produksi jagung Indonesia disebabkan oleh banyak faktor salah satunya adalah diakibatkan karena jamur *Fusarium* sp. yang menyebabkan busuk tongkol jagung. Penelitian bertujuan untuk mengetahui pengaruh antagonis *Trichoderma harzianum* dan *Bacillus subtilis* serta kombinasinya terhadap *Fusarium verticillioides*. Penelitian dilaksanakan di Laboratorium Proteksi Tanaman UPN "Veteran" Yogyakarta pada bulan Juli-September 2020. Penelitian disusun menggunakan Rancangan Acak Lengkap (RAL). Uji antagonisme *in vitro* pada media PDA terdiri atas 4 perlakuan yaitu *F. verticillioides vs. T. Harzianum, F. verticillioides vs. Bacillus subtilis*, *F. verticillioides vs. T. harzianum + B. subtilis,* dan kontrol negatif: *Fusarium verticillioides* tanpa agen hayati dengan setiap perlakuan terdiri atas 6 ulangan masing-masing terdiri atas 3 sampel. Uji antagonisme *in vivo* pada tongkol jagung dengan 4 perlakuan yaitu *F. verticillioides vs. T. harzianum, F. verticillioides vs. B. subtilis*, *F. verticillioides vs. T. harzianum + B. subtilis,* dan kontrol negatif: *F. verticillioides* tanpa agen hayati dengan setiap perlakuan terdiri dari 6 ulangan masing-masing terdiri atas 10 sampel. Data yang diperoleh dianalisis dengan uji F (ANOVA) taraf 5%, apabila hasil menunjukkan perlakuan berpengaruh nyata, kemudian dilakukan uji lanjut menggunakan Uji Jarak Berganda Duncan taraf 5%. Data persentase yang sebarannya tidak normal ditransformasi ke arcsin√x. Hasil uji antagonisme *in vitro* menunjukkan perlakuan *T. harzianum + B. subtilis* memiliki hasil persentase penghambatan (%) terhadap *F. verticillioides* yang paling tinggi. Hasil uji antagonisme *in vivo* menunjukkan perlakuan *F. verticillioides vs. T. harzianum + B. subtilis* memiliki hasil masa inkubasi (hari) yang paling lama, kejadian penyakit (%) yang sama dengan perlakuan lainnya, dan intensitas penyakit (%) yang paling kecil. Terdapat mekanisme antagonisme kombinasi mikroba endofit *T. harzianum* dan *B. substilis* terhadap *F. verticlloides* sehingga dapat digunakan untuk mengendalikan penyebab penyakit busuk tongkol jagung.

Kata kunci: Jagung, Uji Antagonis, *Trichoderma harzianum, Bacillus subtilis,* Penyakit Busuk Tongkol, *Fusarium verticillioides*

ANTAGONISTIC TESTS OF *Trichoderma harzianum* AND *Bacillus subtilis* AGAINST *Fusarium verticillioides* THE PATOGHEN OF CORN COB ROT

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ABSTRACT

The low production of corn in Indonesia is caused by many factors, one of which is the fungus *Fusarium* sp. which causes corn cobs rot. This study aimed to determine the antagonistic activity *Trichoderma harzianum* and *Bacillus subtilis* as well as their combination against *Fusarium verticillioides*. The research was conducted at the Laboratory of Plant Protection UPN "Veteran" Yogyakarta in July-September 2020. The experiment was arranged in a Completely Randomized Design (CRD). *In vitro* antagonistic tests on PDA media consisted of 4 treatments, namely *F. verticillioides* vs. *T. harzianum*, *F. verticillioides* vs. *Bacillus subtilis*, *F. verticillioides* vs. *T. harzianum* + *B. subtilis*, and negative control: *Fusarium verticillioides* without biological agents with each treatment consisted of 6 replications with 3 samples. *In vivo* antagonistic tests were conducted on corn cobs with 4 treatments, namely *F. verticillioides* vs. *T. harzianum*, *F. verticillioides* vs. *B. subtilis*, *F. verticillioides* vs. *T. harzianum* + *B. subtilis*, and negative control: *F. verticillioides* without biological agents with each treatment consisted of 6 replications with 10 samples. The data obtained were analyzed with the F test (ANOVA, α=5%) post hoc tests were carried out using Duncan's Multiple Range Test at 5% level. Percentage data with abnormal distribution were transformed into arcsin √x. *In vitro* antagonistic tests results showed the treatment of *T. harzianum* + *B. subtilis* had the highest percentage of inhibition (%) toward *F. verticillioides*. *In vivo* antagonistic tests results showed the treatment of *F. verticillioides* vs. *T. harzianum* + *B. subtilis* had the longest incubation period (days), the same disease incidence (%) as other treatments, and the smallest disease intensity (%). There was an antagonism mechanism of the combination of the endophytic microbes *T. harzianum* and *B. substilis* against *F. verticillioides* so that it can be used to control the causes of corn cob rot disease.

Keywords: Corn, Antagonist Test, *Trichoderma harzianum*, *Bacillus subtilis*, Cob Disease, *Fusarium verticillioides*