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V ENGINEERING, ENVIRONMENT AND MATERIALS IN PROCESS INDUSTRY EEM2023

BOOK OF ABSTRACTS



JAHORINA
MARCH 20-23, 2023

REPUBLIC OF SRPSKA
BOSNIA AND HERZEGOVINA

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OPTIMIZATION OF MEDIUM COMPOSITION FOR PRODUCTION OF BIOCONTROL AGENT TRICHODERMA HARZIANUM

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Abstract

Maize is the most important field crop in Serbia. This agricultural crop, like others, is susceptible to infection by a number of pathogens. Among the most important pathogens, *Helminthosporium carbonum* and *Penicillium* spp. were mentioned. Protection of maize from fungal pathogens is mainly controlled by the application of fungicides which are known to have a negative impact on the environment. However, the discovery of new, biological ways of protection would enable a significant reduction of negative effects on the environment and human health. The usage of microorganisms in biological protection is becoming very important, especially in organic and integral production. *Trichoderma* is certainly a genus that has great potential in protecting plants from fungal pathogens, so the aim of this research was to optimize the medium composition for the production of *Trichoderma harzianum* biocontrol agent effective against the maize pathogens, *H. carbonum* and *Penicillium* sp. To optimize the composition of the cultivation medium in terms of glucose (g/L) (10; 30; 50), soy flour (g/L) (3; 5; 7) and K_2HPO_4 (g/L) (1 ; 2 ; 3) content, experiments were carried out in accordance with Box-Behnken design, and optimization of multiple responses was performed using the concept of desirability function. The experiment was included 15 experiments which were carried out in Erlenmeyer flasks with 100 mL of well-defined medium. The results showed that the maximum inhibition zone diameters of *H. carbonum* (60 mm) and *Penicillium* spp. (23.69 mm) as well as the maximum production of *T. harzianum* biomass (0.4736 g/L) was achieved when the initial content of glucose, soy flour and K_2HPO_4 were 10.03 g/L, 3.26 g/L and 1.03 g/L, respectively. The obtained results show that *T. harzianum* has a significant antagonistic effect on the examined maize pathogens and, at the same time, obtained results represent the first and significant step towards further development of these bioprocesses.

Key words: Biological control, *Trichoderma harzianum*, Maize diseases, Medium optimization, RSM

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