عنوان مقاله:

Assessment of Inhibitory Effects of Citrus Flavanones on Deoxynivalenol Production Using Response Surface Methodology

محل انتشار:

فصلنامه کنترل کیفیت مخاطرات مواد غذایی, دوره 3, شماره 2 (سال: 1395)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

Background: Deoxynivalenol (DON) is a mycotoxin produced mainly by Fusarium graminearum in grains such as wheat and maize. The aim of this study was to evaluate the inhibitory effects of citrus flavanones including, naringin (NAR), hesperidin (HES), and neohesperidin (NEO) on deoxynivalenol production using Response Surface Methodology (RSM). Methods: The studied flavanones were extracted from residues of citric industries and assayed in rice media inoculated with F. graminearum. After Gas Chromatography (GC) analysis, RSM was applied to find the optimal flavanones concentrations that would lead to total inhibition of DON production. The four levels studied were 0, 0.11, 0.21, and 0.42 mmol/kg rice in dry basis, for each flavanone. Statistical analysis was performed using the statgraphics centurion XV package, version 15.2.6 (StatPoint Technologies, USA). Experimental design consisted in ten factorial points was evaluated in triplicate and used in the model.Results: All flavanones and their mixtures significantly decreased the accumulation of DON in rice media respect to control ($p<0.05$). NEO, when applied alone, was the only flavanone that could reach 100% inhibition of DON accumulation in all concentrations tested, followed by HES and NAR that could only reach total inhibition of DON at 0.21 and 0.42 mmol/kg, respectively. Only the mixtures NAR-HES 0.11-0.11 mmol/kg andNEO-HES 0.11-0.11mmol/kg could not completely inhibit DON accumulation in comparison with other mixtures. The obtained optimal combinations were HES-NAR 0.050- 0.236, HES-NEO 0.046-0.217, and NAR-NEO 0.034-0.193 mmol/kg rice in dry basis. Conclusion: Using RSM, the citric flavanones studied in this work, was proved to be effective for total inhibition of DON accumulation.

کلمات کلیدی:

lavanones، Fusarium، Deoxynivalenol، Prevention and Control