

Title Optimization of HPLC conditions for quantitative analysis of aflatoxins in contaminated peanut

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Citation Food Control, Volume 22, Issues 3-4, March-April 2011, Pages 381-388

Keywords Aflatoxin; Peanut; High pressure liquid chromatography; Mobile phase; Flow rate; Detection value; Response surface methodology

Abstract

The main objective of present study was to investigate the effect of HPLC conditions namely mobile phase composition (X_1), flow rate (X_2) and temperature (X_3) on peak area of four target aflatoxins (i.e. B_1 (Y_1), B_2 (Y_2), G_1 (Y_3) and G_2 (Y_4)) from the spiked peanut. The significant nonlinear response surface models with high coefficient of determinations (R^2) ranging from 0.958 to 0.995 were fitted to evaluate the detection value of target aflatoxins as a function of HPLC variables. Flow rate had the most significant ($p < 0.05$) effect on quantification value of target aflatoxins. The highest quantification value for target aflatoxins could be obtained under the following HPLC conditions: the mobile phase composition of ACN/H₂O/MeOH: 8/54/38, temperature of 24 °C and flow rate of 0.4 mL/min. The recommended optimum HPLC conditions provided higher peak area for all target aflatoxins by 1–2.5 fold compared to two other conditions (A: mobile phase (ACN/H₂O/MeOH: 23/54/23), ambient temperature (28–32 °C), flow rate 1 mL/min; B: mobile phase (ACN/H₂O/MeOH: 17/54/29), temperature 30 °C, flow rate 1 mL/min).