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Effect of Matrix Clean-Up for Aflatoxin Analysis in Corn and Dried Distillers Grains

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Author(s)

A. McDaniel, W.E. Holmes, K.L. Armbrust, D.L. Sparks, A. E. Brown

ABSTRACT

Aflatoxins are a group of highly carcinogenic mycotoxins that contaminate a wide variety of agricultural crops and have a detrimental economic impact on industries, such as corn and ethanol production. They are regulated by the FDA, and therefore, rapid, reliable cleanup techniques with low detection limits are needed for aflatoxins in a wide array of matrices. In this study the effect of using an immunoaffinity column versus simple filtering as a cleanup was tested for aflatoxins extracted from corn and Dried Distillers Grains (DDG). The aflatoxins were analyzed by liquid chromatography tandem mass spectrometry (LC-MS/MS). The use of an immunoaffinity column resulted in greater signal-to-noise ratios (S/N), S/N of 70 vs. S/N of 5 for corn, as well as fewer non-target peaks in the analysis. Recoveries of aflatoxin using immunoaffinity ranged from 40% to 104.5% (spiked substrate) and 49% to 120% (spiked extract) while percent recoveries of filtered samples ranged from 84% to 119% (spiked substrate) and 88% to 119% (spiked extract). This comparison study showed that filtering is acceptable for small sample sets or where rapid throughput is needed. However, for larger sample sets a more stringent cleanup method is necessary to ensure instrument performance.

KEYWORDS

Aflatoxin, LC-MS/MS, Immunoaffinity, SPE

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