FEASIBILITY STUDY ON REGENERATION AND REUSE OF IMMUNOAFFINITY COLUMN

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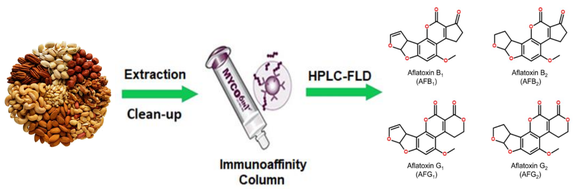
Abstract

Immunoaffinity columns (IACs) are most popularly used for aflatoxins clean up in complex matrices prior to chromatographic analysis. IACs used to remove the matrix interference for achieving effective purification. The aim of this study was to investigate the feasibility of using regenerated Immunoaffinity column (IAC) for aflatoxins B1, B2, G1 and G2 in different food commodities. After each use, the IAC was washed immediately with phosphate-buffered saline and water and storing overnight at 8°C for re-use the following day. In the present study, we have checked the recovery rate for the used IAC with a group of different samples and compare the aflatoxin amounts with new IACs. From the study, we observed that regenerated IACs are giving acceptable recovery rate for some specific sample types at lower concentrations. Regenerated IAC's not only saving the cost but also save environment by reducing the waste. The challenging part of this study is develop an enhanced sample extraction method to improve the efficiency of regenerated IAC clean up for the high aflatoxin content samples.

Keywords: IAC, Aflatoxins, Regeneration, PBS,HPLC

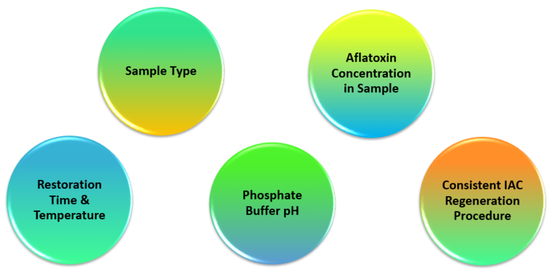
Introduction

Combination of Immunoaffinity Column with high performance liquid chromatography HPLC or LC-MSMS is a quantitative method for the detection of mycotoxins in samples such as grains, nuts, feed, dairy and more. Samples are purified by the IAC and then analyzed with HPLC or LC-MS/MS.



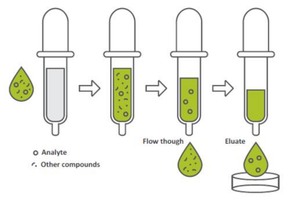
The Aim of This Study Was To Investigate The Feasibility of Regeneration and Reuse of Immunoaffinity Column (IAC) for Aflatoxins B1, B2, G1 And G2 In Different Food Commodities Followed By High Performance Liquid Chromatography-Fluorescence Detection.

Key Factors Associated With Regenerating IAC



Immunoaffinity Column Principle

The packing material of the column includes antibodies which specifically bind the analyte and allow the interfering substances to pass feely. The elution of the analyte is achieved with an antibody denaturing solution.



Methodology Used for Regenerating Used Immunoaffinity Column for Aflatoxin Analysis

Ready to Use
Regenerated IAC's Ready to Reuse.

Storage
Store IAC at 4 -8 ^{0}c for Overnight.

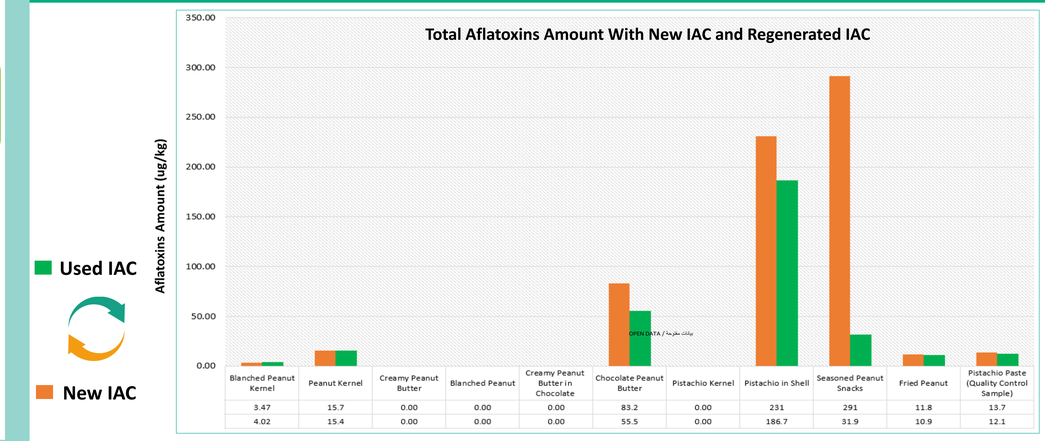
Preservation
Fill IAC With PBS as The Preservation Solution

PBS
Phosphate Buffered Saline (PBS), pH 7.4.

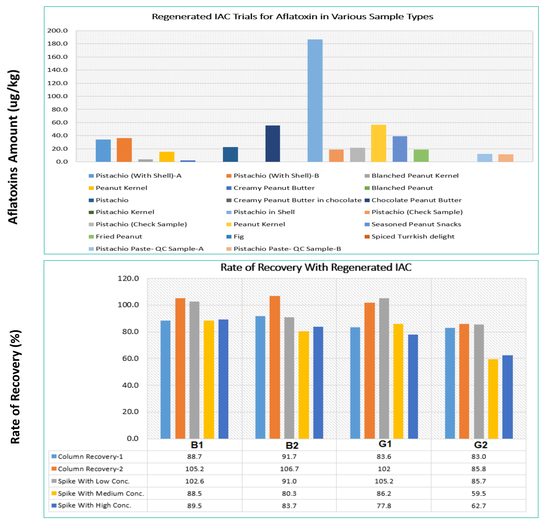
Wash-1
Wash The Used IAC With 20 mL of PBS.

Wash-2
Wash With 20 mL of Deionized Water

Laboratory Trials & Experimental Data for Aflatoxin Analysis With Regenerated Immunoaffinity Column



Results



Conclusion

Based on the fact that the concentrations of mycotoxins in samples are very low and the determination must be very sensitive. To use regenerated IAC for routine sample analysis require more analytical data is highly suggested. Also this data to be validated and audited by an external body.

The presented data in this study indicates that IAC's can be regenerated and it can reuse for aflatoxin analysis to a small extent. Corresponding consumption could be reduced to great extent of the original cost.

References

✓ Regeneration and Reuse of Immunoaffinity Column for Highly Efficient Clean-Up and Economic Detection of Ochratoxin A in Malt and Ginger- Toxins 2018, 10(11), 462 (PMID: 30413078)- MDPI.

✓ Reuse of regenerated immunoaffinity column for excellent clean-up and low-cost detection of trace aflatoxins in malt. Micro-chemical Journal, Volume 157, September 2020, 105007.

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