Sefater Gbashi et al., Clin Microbiol 2017, 6:1(Suppl)
http://dx.doi.org/10.4172/2327-5073.C1.027

Development and validation of a pressurized hot water extraction method for the extraction of aflatoxin B1 in maize

Sefater Gbashi, Ntakadzeni Madala, Oluwafemi Ayodeji Adebo and **Patrick Berka Njobeh**
University of Johannesburg, South Africa

Aflatoxin B1 (AFB1), the most potent naturally occurring carcinogen has become increasingly worrisome because of its proliferated contamination of various agricultural commodities worldwide. To quantify it like other mycotoxins in various food and feed commodities, many techniques applied in its extraction have the demerits of being time consuming, expensive and involving large volumes of organic solvents that are often toxic and environmentally unfriendly. It was therefore imperative to look for an alternative method that addresses these mishaps, and pressurized hot water extraction (PHWE) seem very promising in this regard. In this study, we developed and validated a PHWE method for the extraction of AFB1 from maize and subsequent analysis on HPLC. Results obtained revealed that PHWE is suitable for the efficient extraction of AFB1 from maize, with recovery rates ranging from 37 to 128%. Variation of the extraction temperature (50, 100 and 150°C) and solvent composition (0, 20, 40 and 60% methanol) positively enhanced the extractability of AFB1 as both temperature and solvent composition increased. Multivariate statistical modeling of our data using the central composite design response surface methodology (CCD-RSM) generated a model that fits the data well (R2=0.9746). Accordingly, it was possible to establish the optimum extraction conditions for the recovery of AFB1. The optimized conditions (based on acceptable recovery rate, minimal temperature and methanol composition) was 100°C and 40% methanol at a recovery rate of 116%. The recovery rates of the optimized PHWE method compared favorably with conventional extraction methods. Subsequent validation of the optimized method showed acceptable values for accuracy or recovery rate (1167%), linearity (%RSD 0.93) and repeatability (%RSD 1.63). In overall, prospects of PHWE as a suitable, cost-effective and greener alternative to traditional techniques of AFB1 extraction is highly promising.

Biography

Sefater Gbashi is a PhD student in Department of Biotechnology and Food Technology at University of Johannesburg, South Africa where he completed his MTech with a distinction. He has been awarded various scholarships based on his academic achievments and has published seven scientific papers in reputed journals. He is also a Senior Staff of University of Mkar, Nigeria.

sefatergbashi@gmail.com

Notes: