Value Added Processing of Aflatoxin Contaminated Peanut Meal.

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Peanut meal (PM) is the solid material remaining after commercial extraction of oil. Despite being an excellent source of high quality protein, applications of PM are limited to feed markets as this material typically contains high concentrations of aflatoxin. Our research group has developed a novel processing technology for sequestering aflatoxin from contaminated PM to generate protein/peptide concentrates with negligible aflatoxin levels. For the current study, this process was evaluated for the first time on the pilot scale to better understand commercial potential. Approximate 400 L aqueous dispersions (18% w/v) of aflatoxin contaminated PM (191 ppb dry weight) were mixed with one of two commercial available bentonite clays and the commercially available protease, Alcalase, in a jacketed mixer, hydrolyzed for 1 h, heated to inactive protease, and solids and liquids were separated using a decanter. Under optimum conditions, liquid hydrolysates derived from this process had > 95% reduction in dry weight aflatoxin when clays were present due to aflatoxin sequestration. There were no significant differences in angiotensin-converting enzyme (ACE) inhibition among clay type or amount, with liquid hydrolysates having an IC₅₀ value of 297.5 µg/mL. After ultrafiltration, the fraction that exhibited the highest inhibitory activity was the <3 kDa fraction (IC₅₀ = 113.0 µg/mL), indicating that low molecular weight peptides are more affective ACE inhibitors than larger ones. Insoluble solids derived from this process had >80% reduction in aflatoxin when clay was present compared to an approximate 33% reduction for control samples lacking clay. Insoluble fractions were dried and proximate compositions determined for a separate turkey poult feeding study. These results suggest that this novel process is feasible on a commercial scale, and further research is needed to explore potential functional food applications for PM hydrolysates.