SHORT COMMUNICATION

Use of Zinc Acetate in Extract Purification for Aflatoxin Assay of Cottonseed Products

ABSTRACT

The official Association of Official Analytical Chemists' and American Oil Chemists' Society's methods for aflatoxin assay of cottonseed products utilize 20% lead acetate solution to remove gossypol, fatty acids, and traces of lipids as insoluble lead derivatives. The substitution of a 20% zinc acetate solution containing a trace of a trivalent metal chloride to precipitate zinc derivatives yields, in some cases, superior cleanup of interfering compounds of primary extracts.

INTRODUCTION

The use of a heavy metal salt to precipitate insoluble metal derivatives of interfering pigments, fatty acids, and trace lipids followed by partition extraction with dichloromethane or chloroform to separate the aflatoxins from residual metal salts and pigments is useful for purification of primary extracts of a variety of agricultural materials. This precipitation is used effectively in the methods of Pons, et al., (1-3) with the use of lead acetate to precipitate lead derivatives and by Velasco (4) with the use of ferric salts to precipitate ferric derivatives from acetone-water extracts.

In some instances, the acetone-water extract of cottonseed meal produced from poorer quality cottonseed and some cottonseed meals containing soapstock are difficult to clean up or purify.

It has been found that some of these materials yield cleaner aflatoxin extracts when a 20% zinc acetate solution containing 0.5% of aluminum chloride is substituted for 20% lead acetate solution in the methods of Pons, et al. (3). The use of zinc acetate also may present less potential toxicity in the laboratory, as well as less environmental pollution upon disposal, than does the use of lead salts.

DISCUSSION

Traditionally, the addition of a trace of a trivalent cation in the form of its chloride is very effective in producing complete floculation and an easily filterable precipitation of inorganic precipitates when they show a pronounced tendency to remain in collodial suspension. In the use of zinc acetate solution, addition of 0.5% aluminum chloride to the 20% zinc acetate solution aids in the complete floculation of the zinc derivative precipitate and the production of a clear acetone-water filtrate.

Zinc acetate precipitations have been run in comparison with lead acetate precipitations on many diverse cottonseed and cottonseed meal samples, and quantitation of aflatoxin has been found to be equivalent.

It has been determined that zinc acetate can be substituted for lead acetate in the precipitation of interfering compounds from acetone-water aflatoxin extracts of cottonseed and cottonseed meals without loss of aflatoxins. The use of this metal salt in many instances produces cleaner aflatoxin acetone-water extracts.

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REFERENCES

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4. Velasco, J., Ibid. 55:1359 (1972).

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