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Simultaneous determination of natural toxins in feed by liquid chromatography-tandem mass spectrometry

Z. Jandric¹, M.N. Rathor¹, J. Švarc-Gajic², B.M. Maestroni¹, J.J. Sasanya¹, A. Cannavan¹

¹ Food Environmental and Protection Laboratory, FAO/IAEA Agriculture and Biotechnology Laboratories, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, International Atomic Energy Agency, Wagramer Strasse 5, P.O. Box 100, 1400 Vienna, Austria

² Department for Applied and Engineering Chemistry, Faculty of Technology, Novi Sad, Serbia

E-mail: z.jandric@iaea.org

Abstract The tropane alkaloids and glycoalkaloids are natural toxins recognized by the European Food Safety Authority (EFSA) as undesirable and toxic substances in feed materials and feed. To facilitate the analysis of feed for these compounds, a rapid and sensitive multiresidue method is reported for the simultaneous determination of tropane alkaloids (tropine, atropine, scopolamine, homatropine, anisodamine) and glycoalkaloids (a-solanine, a-chaconine) in feed materials.

Dispersive solid phase extraction of grain samples was performed with 0.5% formic acid in acetonitrile/water and a mixture of magnesium sulphate, sodium chloride and sodium citrate. A matrix solid phase dispersion clean-up step using C18 material was applied to remove co-extracted non-polar components. During method development, the individual steps of the method were optimised using radiolabelled (D,L)-Atropine, [N-methyl-14C].

The method was applied for the analyses of feed samples obtained from a local supermarket. Results showed (n=3) that feed used for pigs, chicken, cattle and rabbit were contaminated with: atropine, scopolamine, a-solanine and a-chaconine in range of 1.1 ± 0.2 ng/g to 21.7 ± 1.5 ng/g (mean \pm SD) while in feed for horses and wild animals, none of the target alkaloids were detected.

Keywords tropane alkaloids; glycoalkaloids; feed, liquid chromatography; tandem mass spectrometry