



Área: ANA

DETERMINATION OF PESTICIDE RESIDUES IN PET FOOD USING THE QuEChERS METHOD AND GC-MS

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Keywords: Pesticide residues; companion animals; sample preparation; method validation; animal health.

Highlights

The QuEChERS method was applied for the extraction of pesticides in pet food; GC-MS was employed for compound determination; The method will be used to monitor pesticide residues in commercial samples.

Abstract

The growing concern regarding animal health has increased the monitoring of potential pesticide residues in pet food. Exposure to such compounds may result in several adverse effects, including endocrine disruption, hyperthyroidism, and carcinogenesis¹. However, current legislation establishes Maximum Residue Limits (MRLs) only for the raw materials used in feed production, without defining specific values for the final product. Considering the complexity of pet food as a matrix—marked by its high levels of fats, lipids, and additives²—sample preparation becomes a critical step to ensure analytical compatibility and accuracy. In this context, the present study aimed to develop a method for determining pesticide residues in commercial pet food. The QuEChERS method was employed for sample treatment, followed by gas chromatography coupled to mass spectrometry (GC-MS) for compound identification and quantification. Sample preparation involved homogenization through grinding, addition of water at a 1:1 ratio to obtain a slurry, thus enhancing solvent–matrix interaction. Subsequent steps were conducted according to the original, acetate, and citrate QuEChERS protocols. GC-MS analyses were carried out in Selected Ion Monitoring (SIM) mode, with conditions optimized for each analyte. Method validation was performed in accordance with INMETRO guidelines, evaluating selectivity, linearity, limits of detection (LOD) and quantification (LOQ), accuracy (recovery), and precision, ensuring reliability and traceability of results. Preliminary findings demonstrated the efficiency of the method. Recovery tests (R%) applied to the three QuEChERS variations showed promising results: the original protocol recovered 22 out of 26 analytes (R% between 61% and 107%); the acetate version recovered 24 analytes (R% between 70% and 113%); and the citrate procedure recovered 23 analytes (R% between 72% and 114%). These initial results confirm the applicability of the QuEChERS method for extracting and quantifying pesticide residues in complex pet food matrices.

(1) LEAL, S. M. S.; *et al.* Arquivos de Ciências Veterinárias e Zoologia da UNIPAR, 2024.

(2) FEDIAF. Nutritional Guidelines For Complete and Complementary Pet Food for Cats and Dogs. 2024

(3) LEHOTAY, S. J., *et al.* Journal of AOAC INTERNATIONAL, 2007

Acknowledgements

The authors gratefully acknowledge the Federal University of Rio Grande and the funding agencies FAPERGS, CAPES, and CNPq for their support and encouragement of research in the field of Chemistry. Special thanks are also extended to the LACOM Laboratory for their continuous assistance in academic activities, the training opportunities provided to students, and their encouragement in pursuing scientific projects and aspirations.