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Determination of onion organosulfur compounds in animal feed by dispersive liquid-liquid microextraction and gas chromatography-mass spectrometry

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Abstract

Onion organosulfur compounds (OSC) are well known for their health-related properties, which mainly related to the presence of thiosulfinates, volatile sulfur compounds. PDS is the sulfide found mostly in onions and PTSO is the most studied onion thiosulfonate, and it is the responsible for the smell of freshly cut onion. In recent years, the use of PTSO as a feed additive has increased due to improves the digestibility of nutrients, and reduces methane inhibition in ruminants. Besides, PTSO presents antimicrobial activity against Enterobacteriaceae, Escherichia Coli, Salmonella spp., Campylobacter jejuni and Eimeria acervulina. The determination of PDS and PTSO in animal feed was proposed using two analytical methodologies using gas chromatography coupled to mass spectrometry (GC-MS). After extraction of the compounds from animal feed with acetonitrile, a cleaning stage with C18, or dispersive liquid-liquid microextraction (DLLME), using 100 µL of CHCl3, were tried. Pig feed sample were used to validate both methodologies. After the comparison of both validation parameters, DLLME was selected due to this technique provided cleaner extracts, five-times greater linear ranges and lower detection limits than the simple cleaning due to the enrichment factor achieved. The relative standard deviation decreased from 22 % with the solid-based cleaning stage to 13% with DLLME. The usefulness of DLLME-GC-MS methodology was tested by analysing 10 different samples of chicken, hen, cow and fish feed. The concentrations of PDS were in the range 0.1-1.7 µg g-1 and those of PTSO were between 0.09-2.1 µg g-1.

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Biography:

Marta Pastor Belda defended her PhD in 2018 at the age of 28 years with mention cum laude and international doctorate, obtaining the PhD award by University of Murcia (UMU), Spain. She has co-directed 7 TFG and 1 TFM and she has participated in teaching activities in the Department of Analytical Chemistry of UMU. She has a h-index of 9, she has published 21 papers in JCR journals which have been cited 224 times.

Speaker Publications:

1. "A rapid dispersive liquid–liquid microextraction of antimicrobial onion organosulfur compounds in animal feed coupled to gas chromatography-mass spectrometry", Analytical methods/ Issue 21, 2020

2."Occurrence of Organochlorine Pesticides in Human Tissues Assessed Using a Microextraction Procedure and Gas Chromatography-Mass Spectrometry", Journal of analytical toxicology/ 29 April 2020

3. "Determination of amphenicol antibiotics and their glucuronide metabolites in urine samples using liquid chromatography with quadrupole time-of-flight mass spectrometry", Journal of Chromatography B/ Volume 1146, 1 June 2020, 122122

4. "Dual stir bar sorptive extraction coupled to thermal desorption-gas chromatography-mass spectrometry for the determination of endocrine disruptors in human tissues", Talanta/ Volume 207, 15 January 2020, 120331
5. "Bioaccumulation of Polycyclic Aromatic Hydrocarbons for Forensic Assessment Using Gas Chromatography-Mass Spectrometry", Chemical Research in Toxicology/ July 15, 2019

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