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ABSTRACT BOOK

Chair: Prof. Luciano Pinotti
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Feed quality, safety and authentication

DETECTION OF MICROPLASTICS IN FECES OF PIG FED FORMER FOOD PRODUCTS

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Former food products (FFPs) have been authorized as alternative feed ingredients for livestock in Europe. However, recent scientific evidence suggests that in feed produced from FFPs, there was presence of plastic packaging remnants. Accordingly, these contaminants, especially microplastics (MPs), are known to occur in biological matrices including feces. This is of serious animal health and environmental concern as well as food safety issues for consumers. Hence, the aim of this study was to test the effectiveness of the selected method for MPs sampling, digestion, and extraction in pig feces.
A total of 36 fecal samples were collected from growing-finishing pigs fed a control diet or diets containing either 30% sugary FFPs or 30% salty FFPs (n=12 per group). The feces were directly collected from the rectum and placed in an aluminum bag. The sugary FFPs included confectionary products while the salty FFPs were made up of bakery products or pasta. Additionally, in a previously study, MP has been detected in the same FFP sources used in our current trial. In each fecal sample, three replicates of 3 g of feces were obtained from random spots. To digest organic matters in feces, 25 mL of 30% H2O2 was added to 3 g of feces in a beaker for a week at room temperature. An additional three samples were spiked with pieces of blue polypropylene to check if the digestion process can change the color and shape of the plastics. Later, 100 mL of saturated NaCl solution (density: 1.2 g/cm3) was added to the sample for density separation. After settling overnight, the samples were filtered. Then, pretreated feces were inspected under a stereomicroscope to detect possible MPs. The suspected particles found were placed in a petri dish to be analyzed by the Fourier transform infrared spectroscopy for confirmation.
The results from spiked samples showed that neither the color nor the shape of plastics was changed due to the H2O2 digestion. However, with the chosen method, it was not able to detect any MPs in the collected feces, which may be the result of several factors. In the current study, the original MP contamination level in FFPs was relatively low and the inclusion level of FFPs in the pigs' diet was 30%, which led to a dilution effect in the final diet. Considering the feed intake of pigs and the possible retention of MPs in their intestine, the amounts of MPs excreted could be less than ingested. In addition, the distribution of MPs in feces was not even, which made the detection of MPs more challenging. Therefore, more research is needed to clearly understand the fate of MPs in FFPs, whether they remain in animal's intestine or they are excreted via feces or urine as well as the proportion of retention and excretion. Furthermore, as there is currently no standard protocol for MPs extraction in animal feces, other methods can be tested to see their effectiveness and to develop an optimized protocol.