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# Impact of low-density polyethylene microplastic on ruminal degradability of feeds

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The primary plastic utilized in farms is low-density polyethylene (LDPE), often identified as a foreign object in the rumen of slaughtered cattle and in the form of microplastic (MPs, <5mm) both in ruminant feeds and their body tissues. Despite its widespread presence in farms, there is a notable absence of studies examining its potential impact on the ruminal degradability of feeds.

This research endeavored to examine the influence of LDPE as MPs, on the *in vitro* rumen degradability of feeds.

In 3 farms, 3 most used feeds were collected: mixed hay (Hy), corn silage (Cs), and concentrate (Cn). Feeds, dried at 60°C for 24h and ground (1mm sieve), were prepared in bags containing 0.5g on dry weight of feed, and incubated in a rumen fluid derived from Piemontese bulls. Three runs were performed. Four jars were added with 4 levels of LDPE (0, 0.5, 0.9, and 1.4% on rumen-buffer solution). Each jar contained 3 bags for each feed and each farm, for a total of 27 bags. They were incubated for 48h in the Ankom Daisy<sup>II</sup> with 400mL of filtered rumen fluid, and 1600mL of buffer solutions for jar.

Results showed that LDPE at all levels did not affect feed degradability. Ruminal degradabilities (%), for 0 to 1.8% of LDPE, were: 47.6±8.92, 47.7±8.96, 49.2±8.72, and 48.5±8.76% in Hy; 59.1±3.97, 59.1±5.13, 59.1±4.86, and 59.7±4.24% in Cs; 69.2±5.80, 70.0±4.38, 71.6±5.28, and 71.6±6.35% in Cn. These results provide valuable insights into the resilience of the rumen degradation process in the face of exposure to LDPE. Future studies are needed to investigate the effects of other MP polymers to provide a deep understanding of the impacts of MPs pollution on ruminant nutrition.