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Particle size evaluation of total mixed rations in intensive beef production systems

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ABSTRACT

Samples of total mixed ration (TMR) were collected periodically in 15 beef cattle farms and submitted to a nutritional and particle size evaluation. Samples of faeces were taken and analysed for pH, consistency, colour and visually ranked for corn residues (Corn Residue Index) from 4 (totally digested) to 0 (very high presence of maize residues). Dry matter (DM), crude protein (CP), and ash content of TMR for Limousine were higher than that for Charolaise while an opposite situation was observed for crude fiber (CF). Particle size analysis of TMR showed an higher content of small (<1.8 mm) and large (>19.0 mm) particles in Charolaise than in Limousine TMR. From May to September a general increase of larger fractions and a reduction of the smaller ones were observed, as a consequence of empirical practices of TMR formulation during summer. Faeces characteristics did not show any difference between breeds (overall mean pH: 6.00 *vs* 6.13; Corn Residue Index: 2.90 *vs* 3.24, respectively for Charolaise and Limousine). A minimum value for pH was observed in November. Corn Residues Index decreased from May to September and then increased reaching values comparable with those observed at the beginning of the trial. These data would indicate a worsening of digestibility for non-fibrous carbohydrates, leading to an increase in the excretion of undigested corn and an increase of starch intestinal fermentation, in particular during summer. Such observations suggest to better standardize the feeding strategy in intensive beef production systems in order to optimize digestibility and productive performances. Further investigations are necessary in order to assess an optimal large/small particle size ratio of TRMs. Our findings highlight the usefulness of TMR particle size evaluation and visual/chemical analysis of faeces as a simple diagnostic methods also for beef cattle production management.