



Short communication

The effect of calcium hydroxide and urea treatment of barley straw on chemical composition and digestibility in vitro

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Abstract

An experiment was conducted to investigate the effectiveness of calcium hydroxide ($\text{Ca}(\text{OH})_2$) and urea treatment of straw. Chopped barley straw was treated with mixtures of $\text{Ca}(\text{OH})_2$ (0, 30 and 60 g kg^{-1} straw dry matter, DM) and urea (0, 30 and 60 g kg^{-1} straw DM) dissolved in 0.8 l water kg^{-1} straw DM and 'ensiled' in a polythene bag (1.0 kg per bag) at 15°C or 25°C for 60 days. Control treatment at each temperature involved untreated straw and treatment with 30 or 60 g NaOH kg^{-1} straw DM dissolved in 0.8 l water kg^{-1} straw DM. Ensiled straws were examined for mould, chemically analysed and assessed for organic matter digestibility (OMD) in vitro.

Mould occurred in $\text{Ca}(\text{OH})_2$ -alone and water-alone ensiled straw, but other ensiled straws were apparently mould free. In the presence of $\text{Ca}(\text{OH})_2$ with urea treatment, the nitrogen content of ensiled straw increased more than urea-alone treatment. Analysis of variance of OMD in vitro results showed that $\text{Ca}(\text{OH})_2$, urea and temperature interact significantly ($P < 0.01$). Interactions were found to be non-significant for other parameters (nitrogen, acid detergent fibre and hemicellulose). However, straw ensiled at 15°C with 30 g urea + 60 g $\text{Ca}(\text{OH})_2$ kg^{-1} straw DM, 60 g urea + 60 g $\text{Ca}(\text{OH})_2$ kg^{-1} straw DM or 30 g NaOH kg^{-1} straw DM had similar OMD in vitro (67%). Untreated straw OMD was 48.5%. It can be concluded that mixtures of $\text{Ca}(\text{OH})_2$ and urea would be the alternative chemicals to NaOH or ammonia for improvement of the nutritive value of straw.

Keywords: Barley; Straw; Calcium hydroxide treatment; Urea treatment

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