

System Model in Animal Nutrition and Dietary Energy

Alie Hepburn*

Department of Veterinary and Agricultural Sciences, The University of Melbourne, Parkville, Australia

*Corresponding author: Alie Hepburn, Department of Veterinary and Agricultural Sciences, The University of Melbourne, Parkville, Australia,

E-mail: hepburn_a@gmail.com

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Description

In many countries, the nutrition of dairy cows has largely changed during the last decades, away from grazing towards indoor housing with feeding preserved forages like silages. Ensiling offers the opportunity to preserve forages for times when pasture growth is insufficient or climatic conditions do not allow preservation through field drying.

Due to its dominant use in cattle feeding, the quality of silages is of concern as a transfer of putative toxic components to cow's milk could occur. This includes a number of secondary plant metabolites such as colchicine, tropane or Pyrrolizidine Alkaloids (PA). Several flowering plants can produce PA, but due to their wide distribution, senecio is particularly important for feed safety in Europe. To date more than 1200 species of senecio are recognized. In plants, several PA occur as a combination of a tertiary base form, in this study termed as PA, and their corresponding N-oxide. The latter represent the major fraction in the plant with around 90%.

Analyses of chemical composition

Analyses of contents of DM, crude ash, CP, NDF and ADF were conducted with NIRS. Determination of organic acids, ethanol and ammonia-N (NH₃-N) was performed in aqueous silage extracts, which were prepared by blending 50 g of the frozen material with 400 ml deionized water and 1 ml toluene. Extracts were kept at 4°C overnight and then filtered through MN 615 filter paper, followed by micro-filtration. The pH was analyzed potentiometrically by using a calibrated pH electrode. Lactic acid was detected by High-Performance Liquid Chromatography (HPLC) using Refractive Index (RI) detection. Along with the detection of lactic acid, inulin-type fructans were analyzed. Volatile organic acids and ethanol were determined by Gas Chromatography (GC) using a free fatty acid phase column and flame ionization detector. The limit of detection for each parameter was 0.01% of fresh matter.

For the analyses of samples were thawed and dried overnight at 40°C. Samples were comminuting to a particle size below 1 mm using a knife mill. From the pre-ensiling material, three samples per treatment were randomly selected for analyses. The present study was conducted to evaluate whether the de-acetylation degree of chitosan and its dietary level would affect

laying performance, faces viscosity, egg quality and egg and serum biochemistry of layers. For the experimental feeding period of 8 weeks, 140 four weeks old layers were divided into 10 treatment groups, comprising 14 birds each. The birds were housed in individual cages in a complete randomized design. Performance was assessed by recording feed intake, egg weight, daily egg production, and egg quality and egg biochemistry. Serum biochemistry parameters were determined at the beginning and end of the experiment and faces viscosity at the end of the experiment. Feed conversion ratio and faces viscosity were deteriorated by increased level of chitosan. Lightness of egg yolk was significantly increased in animals receiving high-degree de-acetylated chitosan compared to low-degree de-acetylated chitosan. Yellowness of egg yolk was affected by interaction of de-acetylation degree and level of chitosan. Yolk cholesterol concentration was lower in groups receiving high de-acetylated chitosan by increasing chitosan level, while laying hens fed low de-acetylated chitosan had a higher level of yolk cholesterol. A significant interaction between degree of de-acetylation and chitosan level was determined for serum glucose and calcium concentration. Serum total antioxidant content increased with higher levels of dietary chitosan. In conclusion, dietary level or different degrees of de-acetylated chitosan may reduce yolk cholesterol and improve serum antioxidant status. However, feed conversion ratio and faces viscosity were impaired by increasing levels of chitosan supplementation, and lightness of yolk was increased by supplementation of chitosan with a high degree of de-acetylation.

Histomorphological Changes

In the colon content, a higher pH and a lower dry matter content were observed in this group. Caecal contents of 40-d old rabbits showed lower total SCFA, acetate and propionate and higher i-vale rate and L-lactate concentrations after feeding diets with high lignocellulose contents. The diet did not influence the acetate-2-propionate ratio. No histomorphological changes were observed in the jejunum, while crypt depth and width were reduced in the caecum of weaned rabbits fed diets with lignocellulose addition. It can be concluded that different proportions of lignocellulose to cellulose addition to rabbits' diets have an impact on health and performance with differences between does and weaned rabbits. While a high

lignocellulose inclusion proved beneficial for does, for weaned rabbits, a lower addition should be preferred.

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