Concurrent Session 12: Animal Nutrition

Performance and digestive tract development effects of green tea supplementation in broiler starters fed wheat-based diets

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Background - Green tea has been shown in rodent studies to modify intestinal microflora, which may impact upon the digestibility of nutrients, and may affect performance and digestive tract development in young, growing broiler chickens.

Objective - To determine the effect of green tea supplementation on the performance and digestive tract development of the newly hatched broiler chick.

Design – Three wheat-based diets, containing 0, 0.5 or 1% green tea, were formulated and each diet was fed ad libitum to six replicate groups (8 birds/replicate) from day 1 to 21 post-hatch. Body weights and feed intake were recorded at weekly intervals. On day 21, two birds per replicate were euthanased and digestive tract traits were measured.

Outcomes – Green tea supplementation significantly (P<0.05) reduced feed intake on days 7 and 21, and improved feed efficiency on days 7 and 14. Green tea supplementation had no effects (P>0.05) on the relative weights of digestive organs and intestinal tract, but intestinal length was reduced (P<0.05) in birds fed diets containing 0.5% green tea.

Conclusion – Green tea supplementation improved feed efficiency in broiler starters fed wheat-based diets.

Apple polyphenols and protein bioavailability in growing rats

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Background - Polyphenols (flavonoids, phenolic acids, tannins) are found in fruit and vegetables and are being added to dairy products to provide additional nutritional benefit, extend shelf-life, or improve functionality. However, the binding and precipitation of polyphenolic compounds to macromolecules such as dietary protein, carbohydrate, and digestive enzymes have been implicated in reduced food digestibility.

Objective – To determine the effect of apple extract rich in polyphenols on the digestion and absorption of protein from skim milk powder using the rat as a model of the mammalian digestive system.

Design – Twenty-four weanling Sprague Dawley male rats were housed individually in metabolic cages and a nitrogen (N) balance study was carried out to measure weight gain, dry matter intake, dietary N intake, biological value, true faecal digestibility, net protein utilisation, and apparent and true N balance. Apple extract was included in the diet at 10 g kg\(^{-1}\). The study was carried out with approval from the AgResearch Grasslands Animal Ethics Committee (#10368).

Outcomes – Biological value was significantly higher when apple extract was included in the diet. Weight gain, dry matter intake, dietary N intake, true faecal protein digestibility, net protein utilisation, and apparent and true N balance were significantly (P≤0.002) reduced in the presence of apple extract.

Conclusions – The high (>81%) overall utilisation and retention of dietary N in rats indicate that the effects of apple extract are not of significance unless dietary N intake is not sufficient to meet physiological requirements. However, where there is a physiological need for increased dietary N requirement and appetite is reduced such as for the elderly, the very young, the immune-compromised, or the unwell, care must be taken to ensure dietary polyphenols are not consumed in quantities that could reduce dietary protein bioavailability.