

# Reducing crude protein in broiler diets can improve bird welfare

Reducing the crude protein (CP) content of broiler diets has the potential to significantly reduce nitrogen (N) excretion and consequently improve litter quality, flock health and bird welfare while maintaining growth performance.

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Recent experiments showed that reductions of dietary CP by 30g/kg (-165g/kg CP) did not affect growth or carcass parameters while improving litter quality in male broilers from 10-35 days.

Similarly, in a larger broiler trial with 5,000 broilers, growth performance was not affected with reductions of dietary CP to -180g/kg while N utilisation and footpad quality were improved, and litter volume was reduced ( $P < 0.05$ ).

These findings confirm that dietary CP levels can be reduced while balancing the amino acid (AA) profile without impairing performance.

This is further accompanied by improved litter/waste management and overall flock health and welfare.

However, there appears to be a threshold where further CP reductions negatively influence performance, especially in terms of feed conversion ratio (FCR) and increased fat deposition.

Attempts to further reduce the 'CP

threshold' have focused mainly on AA limitations such as addition of a specific, or a combination of non-essential AA (NEAA), modifying the EAA:NEAA ratio and increased ratios of essential AA, for example, threonine, arginine and branched chain amino acids.

Reductions in CP levels in iso-energetic conditions are also accompanied with considerable changes in dietary factors such as:

- Soybean meal content is reduced (leading to lower phytate, crude fibre and K+ levels, and to higher lysine HCl supplementation levels.
- Inclusion level of grains is increased (thus, higher levels of starch in the diet).
- Inclusion level of oils is reduced (leading to lower levels of dietary crude fat and changes in the starch:lipid ratio).

The influence of these factors has not been extensively investigated. In this context, the following factors

were assumed to have impact on the utilisation of reduced-CP diets and therefore were tested in a trial conducted in collaboration with The Poultry Research Foundation at The University of Sydney, Australia:

- Increased Met+Cys:Lys ratio.
- Pre-pellet inclusion of whole grains to potentially improve gizzard functionality and thus AA and nutrient utilisation.
- Inclusion of a source of 'rapid protein' (whey protein concentrate) to potentially improve the starch and protein digestive dynamics.

## Experiment conclusions

- Reduction of dietary CP from 210 to 180g/kg had no adverse effect on weight gain or FCR in 14 to 35-day-old male broilers. An additional reduction from 180 to 165g/kg increased feed intake by 2% and impaired FCR by 5%.

- Water intake (813 vs. 628g/bird) and water to feed ratio (2.19 vs. 1.83) decreased linearly and N retention (55 vs. 69%) increased linearly with the reduction of dietary CP from 210 to 165g/kg.

- Efficiency of energy utilisation (AME:GE ratio), AMEn values, and abdominal fat-pad weights increased linearly along with the reduction of dietary CP.

- The different strategies tested did not significantly improve the utilisation of the 165g/kg CP diet.

- Dietary CP can successfully be reduced by 30g/kg (-180g/kg) in 14 to 35-day-old male broilers without affecting growth performance and additional benefits such as reduced water intake and water:feed ratio can be expected.

The results from this experiment demonstrate that dietary CP can be successfully reduced by 30g/kg (-180g/kg) while maintaining optimal levels of essential AA, with the inclusion of supplemental AA without affecting growth performance, whilst significantly reducing water intake and the water:feed ratio in male broilers from 14-35 days.

None of the three strategies tested were successful in counteracting the performance depression observed at a CP level of 165g/kg. ■

References are available from the author on request