**Title: Age influenced the apparent metabolisable energy and true metabolisable energy of selected cereal grains in commercial turkey**

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**Application:** Young turkeys metabolise cereal grains more efficiently than older turkeys. Applying this knowledge can improve how we feed turkeys and benefit the poultry industry and the environment.

**Introduction:** Dietary energy is the main factor influencing feed intake in poultry birds (Classen, 2017). Dietary energy is conventionally measured using metabolisable energy values derived from adult cockerels as a standard. Studies have documented variations in metabolisable energy values across various poultry species and age groups. Consequently, relying on metabolisable energy values from adult cockerels for formulating turkey diets at different ages may introduce inaccuracies. Inaccurate metabolisable energy matrices can increase feed costs and nutrient waste in the environment. Cereal grains have been used to feed animals for centuries and they constitute the major source of energy in poultry (Poutanen *et al*., 2022). This study aims to provide information on the metabolisable energy values of acha, wheat, maize, and sorghum and to determine the effect of the age of turkeys on these values.

**Materials and Methods:** One-day-old (n=360) starter; nine-week-old (n=300) grower and 17-week-old (n=240) finisher Nicholas turkeys were randomly allotted to five treatments (acha, wheat, maize, sorghum and dextrose (control)) in a completely randomised design. Each treatment had six replicates and each phase lasted eight weeks. Commercial turkey diets (starter: ME=2900.00kcal/kg, CP=26%; grower: ME=3100.00kcal/kg, CP=24.05%; finisher: ME=3250.00kcal/kg, CP=18.5%) were supplied *ad libitum* for the first seven weeks of respective phase. At week 8 of each phase, four turkeys per replicate were randomly allotted to metabolic cages and intubated with respective feedstuff to determine Apparent Metabolisable Energy, nitrogen-corrected Apparent Metabolisable Energy, True Metabolisable Energy and nitrogen-corrected True Metabolisable Energy. Data were analysed using descriptive statistics and ANOVA (SAS, 2013) and means were separated using Duncan’s Multiple Range Test α0.05.

**Results:** Apparent metabolisable energy for acha decreased from 3459.15 Kcal/kg at 8 weeks to 3345.24 Kcal/kg at 16 weeks, slightly increasing to 3367.62 Kcal/kg at 24 weeks. The age of turkeys did not influence the nitrogen-corrected apparent metabolisable energy, True Metabolisable Energy and nitrogen-corrected true metabolisable energy of acha. All the metabolisable energy values of wheat were influenced by turkey age; apparent metabolisable energy decreased from 3312.93 Kcal/kg at 8 weeks to 3196.33 Kcal/kg at 16 weeks, with a slight increase to 3249.40 Kcal/kg at 24 weeks; nitrogen-corrected apparent metabolisable energy, True Metabolisable Energy and nitrogen-corrected true metabolisable energy followed the same trend as AME. The age of turkeys did not influence the metabolisable energy values of maize and sorghum.

**Conclusion:** Turkey age significantly influenced wheat's metabolisable energy values, decreasing from 8-16 weeks with a minor rebound at 24 weeks. Notably, acha's AME was also influenced by the age of turkeys while other metabolisabe energy values remained unaffected by age. In contrast, for maize and sorghum, age had no significant effect on these metabolisable energy parameters. This study emphasises the crucial role of age in wheat-based feed formulations and the results provide valuable reference metabolisabe energy values for these grains, enabling precise feeding strategies for turkeys across their life stages.

**Table 1: Influence of turkey age on the apparent metabolisable energy and true metabolisable energy of acha****, wheat, maize and sorghum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameters (kcal/kg) | 8 weeks | 16 weeks | 24 weeks | SEM | p-value |
| ACHA |  |  |  |  |  |
| AME | 3459a | 3345b | 3367ab | 34.84 | 0.050 |
| AMEn | 3406 | 3327 | 3337 | 24.63 | 0.116 |
| TME | 3577 | 3487 | 3476 | 32.14 | 0.154 |
| TMEn | 3505 | 3458 | 3414 | 26.45 | 0.182 |
| WHEAT |  |  |  |  |  |
| AME | 3312a | 3196b | 3249b | 33.70 | 0.000 |
| AMEn | 3226a | 3171b | 3175b | 17.56 | 0.006 |
| TME | 3431a | 3338b | 3358b | 28.30 | 0.009 |
| TMEn | 3325a | 3302ab | 3252b | 21.60 | 0.025 |
| MAIZE |  |  |  |  |  |
| AME | 3451 | 3370 | 3370 | 27.10 | 0.286 |
| AMEn | 3377 | 3333 | 3324 | 16.35 | 0.612 |
| TME | 3570 | 3512 | 3479 | 26.71 | 0.364 |
| TMEn | 3476 | 3454 | 3409 | 19.69 | 0.552 |
| SORGHUM |  |  |  |  |  |
| AME | 3406 | 3282 | 3308 | 37.83 | 0.100 |
| AMEn | 3327 | 3275 | 3262 | 20.04 | 0.455 |
| TME | 3525 | 3424 | 3417 | 34.81 | 0.197 |
| TMEn | 3427 | 3406 | 3338 | 26.74 | 0.341 |

a.b.c Means with different superscripts on the same row are significantly different (P<0.05)

AME = Apparent Metabolisable Energy

AMEn = Apparent Metabolisable Energy corrected for zero nitrogen retention

TME = True Metabolisable Energy

TMEn = True Metabolisable Energy corrected for zero nitrogen retention

**References**

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