Italian Journal of Animal Science

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/tjas20

ASPA 25th Congress Book of Abstract

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To cite this article: Pasquale De Palo (2023) ASPA 25th Congress Book of Abstract, Italian Journal of Animal Science, 22:sup1, 1-320, DOI: 10.1080/1828051X.2023.2210877

To link to this article: https://doi.org/10.1080/1828051X.2023.2210877

ASPA 25th Congress

Monopoli (BARI – ITALY), June 13–16, 2023

#ASPA2023

ASPA 25th Congress Book of Abstract

The 25th congress of the Animal Science and Production Association

"Animal Production Science: Innovations and sustainability for future generation" is under patronage of Loghi patrocini

Monopoli (BARI – ITALY),

June 13–16, 2023

Venue

Torre Cintola Natural Sea Emotions

Località Capitolo – Monopoli (BARI – ITALY)

Reactive oxygen species (ROS) in living systems induces an imbalance of redox homeostasis and causes oxidative stress which leads to several pathological conditions in humans and pets, including gastrointestinal disorders. Nutritional supplementation with antioxidant substances could be useful to manage these conditions. In this study, we evaluated the total phenolic content (TPC) and antioxidant activity of three natural substances (bromelain, quercetin, and *Lentinula edodes*) and a formulation containing their combination using TPC, DPPH• (2,2-diphenyl-1-picrylhydrazyl), and ABTS•+ (2,2′-Azino-bis(3-ethylbenzothiazoline-6-sulfonic diammonium salt acid)) analyses. We determined TPC and scavenging activity (DPPH• and ABTS•+) by spectrophotometric assays and performed a one-way ANOVA model. The formulation showed the highest ($p < 0.0001$) TPC (4 ± 0.2 mg GAE/g DM (dry matter)) and ABTS$^{•+}$ (125 ± 3 µmol TE/g DM) while, quercitin showed the lowest ($p < 0.0001$) TPC (2 ± 0.2 mg GAE/g DM) and ABTS$^{•+}$ (11 ± 3 µmol TE/g DM). However, quercitin presented the lowest ($p < 0.0001$) DPPH$^{•}$ (EC_{50}: 1 ± 10 µg/mL) followed by the formulation (EC_{50}:138 ± 10 µg/mL), *Lentinula edodes* (EC_{50}: 231 ± 10 µg/mL) and bromelain (EC_{50}: 434 ± 10 µg/mL). These natural products (bromelain, quercetin, and *Lentinula edodes*) may exert their beneficial effects on gastrointestinal health through various mechanisms, including their antioxidant properties, which may help reduce oxidative stress and inflammation in the gut and promote tissue repair. Also, these natural products have been suggested in literature, for their anti-inflammatory and immune-modulating effects that may regulate the immune response and prevent excessive inflammation in the gut. In conclusion, based on the analysis of the antioxidant capacity of the natural substances, it was found that quercetin, bromelain, and *L. edodes* individually demonstrated variable antioxidant capacities. However, the combination of the three ingredients exhibited a promising and strong antioxidant effect. To date, there are no reports of a feed supplement incorporating all three ingredients. Indeed, we have an ongoing *in vivo* trial on healthy dogs to assess the safety and effectiveness of a formulation which includes the three tested ingredients. The current *in vitro* findings suggest that the combination of quercetin, bromelain, and *Lentinula edodes* has the potential to be a valuable addition to current treatments for canine gastrointestinal disorders.

O473

Effect of nutrient self-supply through choice feeding on growth performance, feeding behavior

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This study aimed to compare the growth performance, empty body nutrient deposition efficiency, and feeding behavior of growing pigs fed on a standard two-phase feeding or a choice feeding regime. The experiment was performed with 12 Swiss Large White barrows between 23.2 and 108.0 kg body weight (**BW**). Six pigs assigned to the standard (**ST**) treatment were offered *ad libitum* access to a grower (**ST-G**) and finisher (**ST-F**) diet from 23.2 to 63.4 kg and from 63.4 to 108.0 kg, respectively. The ST-G and ST-F diets were formulated based on the Swiss feeding recommendation for swine for an average BW of 40 and 80 kg, respectively. The other six pigs assigned to the choice (**CH**) treatment had constant *ad libitum* access to both a grower (**CH-G**) and a finisher (**CH-F**) diet formulated for a reference BW of 20 and 100 kg. All diets were isocaloric and differed only in the crude protein and essential amino acid content according to the reference BW used for feed formulation. To determine the empty body nutrient deposition rate, pigs were scanned using dual-energy x-ray absorptiometry at 25.8 and 103.8 kg BW. Individual feed intake and feeding behaviour were monitored with automatic feeders. Changes in BW were determined weekly. Data were analysed with the PROC MIXED (SAS, v9.4) with treatment and litter of origin as main and random effect, respectively. Compared to ST pigs, CH pigs ingested more feed daily (2.49 vs 2.36 kg/d; $p = 0.05$) and grew faster (1.04 vs 0.97 kg/d; $p = 0.02$). Total crude protein consumption tended to be greater (32.87 vs 31.38 kg; $p = 0.08$) in CH than ST pigs due to a numerically greater intake of the protein-rich CH-G diet during the finisher period. A greater crude protein intake in CH than ST pigs was accompanied by a greater (177 vs 159 g/d; $p = 0.04$) daily protein deposition rate but a similar protein efficiency. Regarding feeding behaviour, CH pigs went more often to the feeder, spent less time at the feeder, ate less feed per visit, and had shorter intervals between two meals than ST pigs ($p < 0.01$ for each) in the grower but not in the finisher period. Considering the feeding behaviour traits, the CH pigs with a greater protein deposition potential preferred the protein-rich CH-G over the CH-F diet. In conclusion, these results show that, like the wild pigs, the domesticated modern pigs maintained the ability for an adequate nutrient self-supply according to their nutritional requirements.

O121

Mulberry leaf meal as alternative feed ingredient in rabbit nutrition: preliminary results about productive performance and meat quality

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Mulberry (*Morus alba*) leaf meal (MLM) can be used as an alternative raw material in rabbit feeding, especially in small production systems. However, data about its applicability under commercial conditions are still scarce. This study aimed to evaluate the productive performance and meat quality of rabbits fed diets containing MLM. A total of 140 weaned, 42-days-old, crossbred rabbits (Hycole × Grimaud, initial live weight [LW]: 1335 ± 48 g) were allotted to 2 isonitrogenous and isoenergetic dietary treatments (5 multifunctional cages/diet with 14 animals/cage) in a commercial farm: C (control group, commercial diet without MLM meal) and MLM10 (commercial diet with 10% of MLM inclusion as a partial replacement of alfalfa meal). Two feeding phases were considered: post-weaning (42–63 days of age) and fattening (64–90 days of age), with MLM being included in the fattening phase only (C and MLM10: crude protein of 15.04% and 15.11%; crude fiber of 16.21% and 15.29%). Growth performance and mortality rates were recorded at 63 and 87 days of age, and 3 rabbits/cage were selected to be slaughtered at 90 days of age. At slaughtering, the LW, caecal pH, hot carcass weight (HCW) and chilled carcass weight (CCW) were registered, and dressing percentage and relative organ weights (liver, spleen, kidneys [%CCW] and gut [%HCW]) calculated. After 24 h, the pH and colour of the *Longissimus thoracis et lumborum* (LTL) and thigh were registered. Data were analyzed by Student's *t*-test (IBM SPSS software, $p \leq 0.05$). Growth performance and mortality rates were not affected by dietary MLM inclusion ($p > 0.05$). Relative organ weights were also similar between MLM- and C-fed animals ($p > 0.05$). Differently, the caecal pH was higher in MLM10 than in C rabbits (6.12 ± 0.39 vs 5.82 ± 0.31; $p < 0.05$). The MLM-fed rabbits also displayed lower slaughter LW, HCW and CCW than C animals (3064.1 ± 115.37 vs 3157 ± 81.55 g, 1902 ± 69.28 vs 1973 ± 85.07 g and 1875 ± 54.64 vs 1942 ± 96.19 g, respectively; $p < 0.05$) – potentially attributable to less fat deposits. Furthermore, LTL a* (redness index) of MLM10 rabbits was higher when compared to C group (0.19 ± 0.67 vs −0.42 ± 0.91; $p = 0.05$) – reasonably related to the higher iron content of mulberry leaves than alfalfa. In conclusion, MLM can be used in rabbit diets without negatively affecting growth performance. Further research characterizing the caecal microbiota and fermentative activity are recommended to better contextualize the pH changes.

O357

Different formulations of benzoic acids as strategy to replace therapeutic dose of ZnO on health and performance of weaned pigs

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This study aimed to evaluate the effects of two diets supplemented with an acidifier or with a mix of three acidifiers in comparison with a basal diet supplemented with a pharmacological dose of zinc oxide (ZnO) on health and growth performance of weaned pigs. At weaning (26 ± 3 days, d0), 540 piglets were weighed and divided into three groups (52 litters, 3–4 piglets from each litter/group, six replicates/group): (i. basal diet supplemented with a pharmacological dose of ZnO (2400 ppm) (CO); ii. basal diet supplemented with pure benzoic acid at 5 kg/ton of feed (BAC); iii. Basal diet supplemented with a mix of acidifiers at 4 kg/ton of feed (BAC+). Feed intake (FI) was registered from each replicate weekly. Mortality was daily recorded. Cumulative mortality was calculated and expressed as percentage considering the pigs in the box. At d14 and d28, piglets were individually weighted and lesion measures were assessed on the ears and tail. The lesion index (LSI) was calculated. The statistical analysis was performed in R v4.1.1 using car and lme4 packages. Data on BW and ADG were analyzed using an ANOVA model considering the group (CO vs BAC vs BAC+), box and litter of origin as factors and the piglets as experimental unit. Data on FI, feed to gain (F:G) and LSI were analyzed using an ANOVA model considering the group as factor and the box as experimental unit. During the period d0-d14, the CO had a higher ADG compared with BAC and BAC + groups ($p < 0.001$). Considering the whole experimental period (d0-d52), BAC had a lower ADG compared with CO ($p = 0.05$) and a significantly lower ADG compared with BAC+ ($p = 0.001$), while no difference between CO and BAC + was observed. Piglet's cumulative mortality was higher in BAC and BAC + compared with CO for the periods d0-d14 ($p = 0.03$; $p = 0.01$ respectively) and d14-d28 ($p = 0.02$; $p = 0.01$ respectively). Piglet's mortality was never different between BAC and BAC + groups. At d28, BAC had a higher LSI for the ear compared with BAC+ ($p = 0.05$) and CO ($p = 0.03$), while no difference was observed between BAC + and CO. In addition, LSI for the tail was higher in BAC compared with BAC+ ($p = 0.02$) and CO ($p < 0.0001$), and BAC + had a higher LSI for the tail compared with CO ($p < 0.01$). Overall, the substitution of a pharmacological dose of ZnO with pure benzoic acid during piglets' weaning was not beneficial in terms of growth performance; while if combined with other acidifiers it seems to be able to replace ZnO, maintaining the growth performance of piglets.