Slaughtering performance and meat quality of medium-growing chicken fed black soldier fly live larvae

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AVAILABLE STUDIES

Animal welfare

Slaughter performance

Growth performance

(Bellezza Oddon et al., 2021; Star et al., 2020; Veldkamp et al., 2019; Tahamtani et al., 2021; Ipema et al., 2020)
CHICKEN REARED

Label naked neck

Medium growing hybrid

82d rearing cycle
120 females + 120 males
28-82d of age
MATERIALS AND METHODS: experimental design

4 experimental groups, 6 replicates, 10 chicken/replicate (60 birds/treatment):

CM control male
CF: control female

LM: larvae male
LF: larvae female

DFI: daily feed intake
HI: *Hermetia illucens*

+10% HI supplementation based on DFI
MATERIALS AND METHODS: growth performance

Weight and feed consumption recorded

❖ Average Weight (AW)
❖ Average Daily Gain (ADG)
❖ Average Daily Feed Intake (ADFI)
❖ Feed Conversion Ratio (FCR)

Periods of age:
❖ 28-35d
❖ 35-82d
❖ 28-82d

(n= 6) → single replicate as experimental unit

Consumption corrected for the DM of larvae
MATERIALS AND METHODS: slaughtering performance

SLAUGHTER (82d, 12 birds/treatment)
Registration of:
- Ready-to-cook carcass weight (RTCCw)
- Organs weight → relative weight (RW) calculation (%LW) of the heart, spleen, bursa of Fabricius (BF), liver, gut, and stomachs
- Cold carcass weight (CCw) after 24h refrigeration
- Carcass (LW%), thigh and breast yields (%CCw)
MATERIALS AND METHODS: meat quality

24h post-slaughter (4°C)

Evaluation of:

- Breast and thigh pH
- Breast and thigh color
- Drip losses
STATISTICAL ANALYSIS

General Linear Model of fixed effects (two-way ANOVA) (SPSS software, P<0.05)
RESULTS: preliminary information

**Live weight**
Males > Females *P*<0.001
RESULTS: preliminary information

Larvae consumption time

Generalized Linear Mixed Model (GLMM, SPSS software, P<0.05)
Time, Gender, Time*Gender


- Males  - Females
RESULTS: slaughter performance

Cold carcass weight

Control group: 1570.91 g
Larvae group: 1592.90 g

P = 0.050

Carcass weight

Control group: 1560.00 g
Larvae group: 1617.23 g

P = 0.072

Ready-to-cook carcass weight

Control group: 1595.57 g
Larvae group: 1617.23 g

P = 0.072
DISCUSSION: slaughter performance

Cold carcass weight

Ready-to-cook Carcass weight  P=0.072

TREATED > CONTROL

Drip losses  P=0.271
RESULTS: slaughter performance

Organs weight

**Spleen relative weight**

- Control group: 0.14
- Larvae group: 0.16

Bursa of fabricius relative weight

- Control females: 0.20
- Larvae females: 0.25
- Control males: 0.22
- Larvae males: 0.19

**Results:**

- LF > CF, P < 0.050
- LF > LM, P = 0.046
DISCUSSION: slaughter performance

Spleen relative weight

♀ > ♂

Bursa of Fabricious relative weight

♀ > ♂

♀ > ♂

(Puvadolpirod and Thaxton, 2000; Bovera et al 2016; Bellezza Oddon et al 2021)
DISCUSSION: slaughter performance

WHY NO SIGNIFICANT DIFFERENCES IN THE TREATED MALES COMPARED TO THE OTHER GROUPS?

BURSA OF FABRICIOUS

age

→

Testosterone production

→

Testicles development

Live larvae provision effect mitigated by the hormonal activity

(Glick, 1956; Puvadolpirod and Thaxton, 2000)
RESULTS: meat quality

Thigh yellowness

Females: 11,3313
Males: 10,7554

P < 0.050
RESULTS: meat quality

Thigh yellowness

<table>
<thead>
<tr>
<th></th>
<th>Control females</th>
<th>Larvae females</th>
<th>Control males</th>
<th>Larvae males</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10.87</td>
<td>11.80</td>
<td>11.13</td>
<td>10.39</td>
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LF > CF
P < 0.050

CM > LM
P = 0.074
DISCUSSION: meat quality

Thigh yellowness

TREATED > CONTROL
- Higher fattiness of treated females
- High deposition of pigments in treated females

FEMALES > MALES
- Higher fattiness of females than males
- Lipophilic pigments stored in fat

TREATED < CONTROL
- Less feed consumed by treated males
- Low deposition of pigments in treated males

(Fletcher, 2002; Schiavone et al., 2019)
CONCLUSIONS

Live larvae provision

- No negative effects on the slaughter performance and meat quality of birds
- Immune system stimulation
- Affection of thigh meat yellowness $\rightarrow$ fat content $\rightarrow$ meat juiciness
Research in Progress

Animal welfare

Hystological analyses

Microbiota analysis

Meat chemical composition
THANK YOU FOR THE ATTENTION