

Do *Hermetia illucens* larva substrates affect sensory traits of quail breast meat?



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Introduction

Larvae of the **black soldier fly** (*Hermetia illucens*: HI) can successfully be included in poultry feed formulations, aiming to improve the sustainability of the sector. HI are suitable for mass production and they can recycle organic waste into valuable nutrients. HI have an interesting nutritional profile (rich in protein, fat, minerals and bioactive compounds), but their fat fraction is naturally rich in saturated fatty acids (SFA; mainly lauric, myristic and palmitic) and poor in unsaturated FA. For this reason, when applied into feed formulations for meat-producing monogastric animals, the resulting meat is generally enriched in SFA, thus sub-optimal to satisfy the healthy requirements of modern consumers

Aim

The present research studied the effect of a 10% dietary inclusion of full-fat HI dried larvae, reared on **different substrates** (conventional: **HI1** vs **fish waste rich in n-3 PUFA: HI2**), in quail (*Coturnix coturnix japonica*) diets, on the sensory profile of quail breast meat

Conclusion



HI larvae rearing substrate containing only layer mash (**HI1**) or additional fish waste (**HI2**) **did not influence the sensory characteristics of meat** derived from insect-fed quails



Material and Methods

Experimental Design

Diets	Control	HI1 (10% conventional HI)	HI2 (10% n-3 PUFA HI)
Quails	100	100	100
Cages	5	5	5
Quails/cage	20	20	20

□ After slaughtering, no.=36 quail breasts/dietary treatment were sampled:

a) No.=20 breasts/treatment: Warner-Bratzler Shear Force (WBSF) analysis

b) No.=16 breasts/treatment: descriptive sensory analysis

(2 days of analysis: 8 quail breasts/treatment per session)

a)



Vacuum-sealed breasts were cooked in a water bath (74 °C core temperature): **WBSF was assessed on four cooked meat cores per sample**

b)



Breasts were grilled (74 °C core temperature) and sensorially evaluated by an **eight-member trained panel** using a list of descriptors:

- Samples were scored on **numerical and continuous scales** from 0 to 10 (lowest-highest score for each attribute)
- **Olfactory, gustative and textural aspects** were evaluated
- **Off-odors and off-flavors characterization** was also performed

c)

WBSF data were analyzed by a one-way ANOVA with diet as fixed effect, sensory data by a mixed model with diet and panelist as fixed and random effect, respectively. A χ^2 test was performed on off-odors and off-flavors characterization

Results

Table 1. Sensory scores of broiler quails' breast meat

	Experimental groups			Significance
	C	HI1	HI2	
WBSF, kg/cm ²	11.3	10.9	10.4	NS
Odor:				
Odor intensity	5.10	5.31	5.48	NS
Off-odor intensity	0.90	1.15	1.03	NS
Flavor:				
Flavor intensity	5.13	5.52	5.29	NS
Off-flavor intensity	1.15	1.14	1.11	NS
Texture:				
Juiciness	5.01^A	4.90^A	4.53^B	***
Toughness	4.76	4.53	4.55	NS
Chewiness	6.24	6.22	6.41	NS
Fibrousness	4.79^{Bb}	5.08^{ABa}	5.28^A	***

a,b: A,B Means in a row with different superscripts differ significantly ($p < 0.05$; $p < 0.01$)

Table 2. Off-odors and off-flavors (% on total tested samples) of broiler quails' breast meat

	Experimental groups			χ^2
	C	HI1	HI2	
Off-odors:				
Game meat	18.8	6.25	6.25	0.5926
Metallic	6.25	0.00	0.00	1.0000
Liver	31.3	50.0	31.3	0.5930
Oil/fat	6.25	25.0	31.3	0.2788
Peanut/Hazelnut	12.5	0.00	6.25	0.7650
Rancid	0.00	0.00	12.5	0.3110
Off-flavors:				
Game meat	6.25	18.8	18.8	0.6810
Metallic	18.8	0.00	0.00	0.1000
Liver	37.5	75.0	56.3	0.1152
Oil/fat	6.25	25.0	6.25	0.3342
Peanut/Hazelnut	12.5	12.5	6.25	1.0000
Rancid	0.00	0.00	0.00	-

