

## Alfalfa (*Medicago sativa*) meal in low energy diets of organic broiler production

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### Abstract

*Erhöhte Anteile an Luzernegrünmehl in Futtermischungen (ME-niedrig: 11 % (Periode I) bzw. 12 % (Periode II) Luzerne; ME-mittel: 2.85 % bzw. 0 % Luzerne) wurden auf die Mast- und Schlachtkörperleistung sowie auf die Fleischfarbe von Broilern in ökologischer Erzeugung geprüft. Futtermischungen mit hohen Luzerne-Gehalten zeigten einen positiven Einfluss auf das Schlachtkörpergewicht und die Brustmenge. Die Fleischfarbe wurde weder durch das Luzerne-Niveau noch durch die Freilandhaltung (zusätzliche Grünfutteraufnahme) beeinflusst.*

### Introduction and objectives

Organic diets with low energy and amino acid contents were studied (Bellof, et al. 2005) with positive effects on growth and carcass performance of broilers. Alfalfa is moderately rich in protein, pigments and saponins and limited content of energy (AME). This event could benefit the design of low energy diets. Also alfalfa was able to produce healthy broiler meat (low fat and cholesterol) with a special flavour (Ponte *et al.*, 2004). In the conventional production the results are controversial. A trial with 6 % of alfalfa diet found reduced performance of broilers (Tkáčová *et al.*, 2011), and a long raising study (56 d) found high and low carcass yield with 17 and 45 g/d of alfalfa intake respectively (Ponte *et al.*, 2004). This fact could be attributed to the different fiber contents of the alfalfas used by the above mentioned authors (25.7 % vs. 21.8 % respectively). The aim of the trial was to study the impact of high levels of alfalfa in low energy diets on production parameters of slow-growing broilers.

### Methods

A total of 240 one-d-old ISA JA-757 chicks from an organic flock were used. The trial consisted of 2 periods (I: 1-21 d; II: 22-56 d), 2 energy levels in diets (AME-medium and AME-low; Tab. 1) and both sexes. Organic ingredients (soya and sun flower cake, peas, wheat, triticale, corn, soya oil and alfalfa meal) were used for the feed mixtures. The alfalfa (protein 15.1 %; fiber 15.1 %; lysine 0.77 % and methionine 0.24 %) was present in period I (AME-low 11 %; AME-medium 2.85 %) and in period II (AME-low 12 %, AME-medium 0 %). For period I (air-conditioned stall) the birds were randomly distributed into 8 pens (30 birds (15 each sex)/pen; 6m<sup>2</sup>/pen) and for period II 128 birds (average body weight/pen) were moved to mobile stalls, half of which with outdoor access. Broilers and feed were weighed at day 21 and 56 and were slaughtered at day 56. Carcass performance was analyzed; 24 h after slaughtering the color of the breast meat was measured (Minolta photometer).

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**Table 1: Experimental design: energy (AME), lysine and methionine content of feeding mixtures (target/analyzed)**

Period	Energy	AME MJ/kg	Lysine g/kg	Methionine g/kg	Meth/AME g/MJ	Lys/AME g/MJ
P I (1-21 d)	Medium	12.00/12.00	10.2/9.8	3.7/3.9	0.31/0.32	0.85/0.82
	Low	11.00/11.07	9.4/9.9	3.4/3.6	0.31/0.33	0.85/0.89
P II (22-56 d)	Medium	12.40/12.25	8.9/9.4	3.4/3.4	0.27/0.28	0.72/0.77
	Low	11.20/11.60	8.1/9.3	3.0/3.3	0.27/0.28	0.72/0.80

## Results and discussion

Male broiler had significant higher final body weight because of the progressive sexual dimorphism (Tab. 2). Only in period I low energy diet birds were lighter than their counterparts, despite their high feed intakes. The slow increase of feed intake came to its maximum in period II. This fact led them to reach a significant high final body, carcass and breast weight. In contrast to Ponte *et al.* (2004) and Tkáčová *et al.* (2011), the high alfalfa intake (AME-low: period I 4.6 g/d and period II 17.3 g/d) did not affect adversely growth performance and carcass and breast yield of the birds. This fact could be attributed to the low energy diets (Belof *et al.*, 2005) and the low fiber content in the alfalfa (15.1 %), compared with the ones studied by the above mentioned authors. The intake of pigments from alfalfa (low energy diets) as well as from grass (outdoor access) did not alter significantly the meat color. Therefore high levels of alfalfa in diets of slow-growing broilers are possible. Further research on whether the fiber level of alfalfa is the main factor for impact growth and meat quality is necessary.

**Table 2: Growth performance, carcass yield and breast meat color of broilers according sex, energy level and outdoor access**

Item		Sex			Energy			Outdoor <sup>2)</sup>		
		Male	Fem.	Sig.	M <sup>1)</sup>	L	Sig.	Yes	No	Sig.
Weight (g)	Start	38	37	NS	38	39	NS	-	-	-
	Period I	538	528	NS	541	519	*	-	-	-
	Period II	2840	2437	***	2689	2836	*	2709	2808	NS
Feed intake (g/d)	Period I	-	-	-	39	42	*	-	-	-
	Period II	-	-	-	129	144	*	134	139	NS
Carcass weight (g)	-	-	-	-	1898	2069	**	-	-	NS
Breast (g)	-	-	-	-	579	673	*	591	626	NS
Color of breast meat (b*) <sup>3)</sup>	-	-	-	-	2.9	3.2	NS	3.4	2.9	NS

<sup>1)</sup> M: medium energy level; L: low energy level. <sup>2)</sup> Outdoor access in period II; <sup>3)</sup> Yellowness index

## Literature

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