

Effects of different levels of hemp cake (HC) supplementation on *in vivo* and *post mortem* performance and on the health status of the veal calves



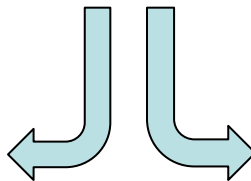
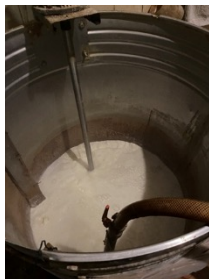
DEPARTMENT OF COMPARATIVE
BIOMEDICINE AND FOOD SCIENCE

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First Experiment

Evaluate the effects of
different levels (0, 3, 6%)
of hemp cake **added to**
milk on performance and
health status of **Belgian**
Blu veal calves.



Second Experiment

Evaluate the effects of
inclusion of 3% hemp
cake **in concentrate** on
performance and health
status of **Friesian** veal
calves.



First Experiment

Animals and diets

Animals: 48 cross breed Belgian Blue calves
Sex: 35 males, 13 females
Pens: 12 pens (balanced according to BW and sex)
Diets: 0% (T0), 3% (T3) and 6% (T6) of hemp cake added in milk
Milk replacer: 30.3% CP, 9.4% lipids, 161 ppm of iron
Solid feed: based on flaked cereals



Experimental controls:

In vivo

Body weight (at 0, 43, 91, 133, 184 d)
Blood samples (at 0, 43, 91, 133, 184 d)
Milk intake (daily) and solid feed intake (weekly)



Post mortem

Carcass: weight, pH, measurements
Meat (longissimus dorsi): pH, color, shear force, cooking loss

Second Experiment

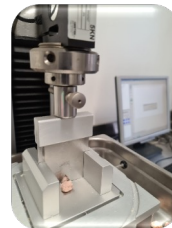
Animals and diets

Animals: 52 Holstein calves
Sex: males
Pens: 10 pens (balanced according to BW)
Diets: 0% (CTRL), 5% (HM) of hemp meal in solid feed
Milk replacer: 23.5% CP, 19.8% lipids, 161 ppm of iron
Solid feed: 2 iso-energetic and iso-proteic solid feed

Experimental controls:

In vivo

Body weight (at 0, 43, 85, 128, 177 d)
Blood samples (at 0, 85, 128 d)
Milk intake (daily) and solid feed intake (weekly)



Hemp variety: Futura 75



**Hemp cake was
obtained by
mechanical cold
extraction of oil**



Hemp cake: chemical composition

DM	92.40
CP	28.17
EE	8.70
NDF	50.91
Ash	6.19
Iron (mg/kg DM)	168.80
Fatty acids (g/100g of FAME)	
C16:0	8.28
C18:0	3.04
C18:1n-9	15.79
C18:2n-6	56.20
C18:3n-3	12.82
Total SFA	13.33
Total MUFA	17.46
Total PUFA	69.21
n-6/n-3	4.4

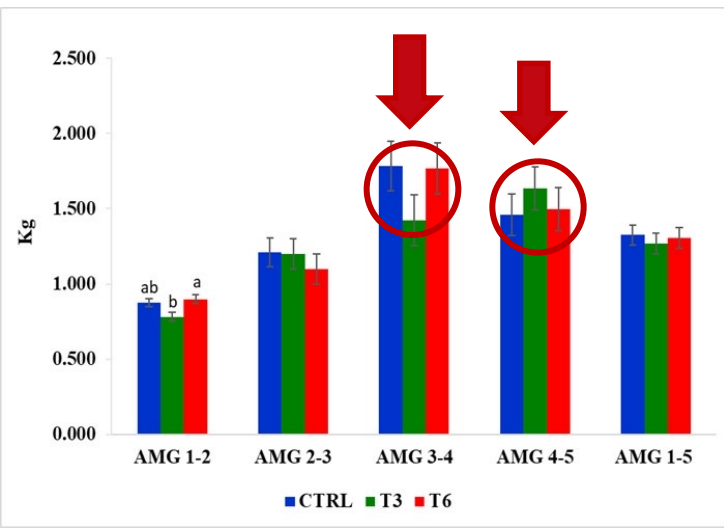
Hemp food and feed

June 22 – Session 3

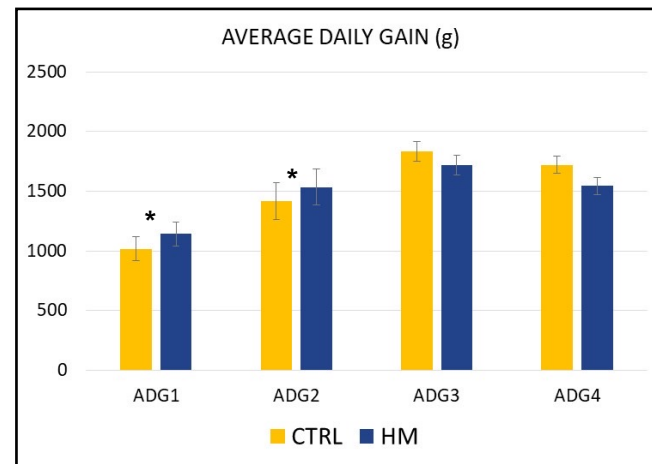
In vivo results

First Experiment

ADG (kg/d)	Diet			P-Value
	CTRL	T3	T6	
ADG 1-2	0.88	0.81	0.90	0.058
ADG 2-3	1.21	1.24	1.10	0.579
ADG 3-4	1.85	1.45	1.77	0.249
ADG 4-5	1.52	1.69	1.50	0.648
ADG 1-5	1.36	1.30	1.31	0.840



Second Experiment



Item	CTRL	HM
Initial BW, kg	59.4	59.3
Intermediate BW, kg	103.6b	171.8a
Final BW, kg	326.2	319.6
ADG, kg/d	1.507	1.471
FEED INTAKE		
Milk, kg DM/d	1.24	1.24
Concentrate, kg DM/d	2.66	2.72
Total intake, kg DM/d	3.90	3.96
Feed efficiency	2.29	2.38

Hemp food and feed

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Post-mortem results

First Experiment

No statistical differences among T0, T3, T6 groups on carcass traits



and on meat quality



Second Experiment

Item	CTR	HM
Carcass weight, kg	162.78	164.55
Dressing, %	49.90^b	51.50^a
pH	5.76	5.69
Lightness (L*)	45.83	47.34
Redness (a*)	7.84	7.77
Yellowness (b*)	14.95	14.90
Hue angle (H*)	62.47	62.62
Chroma (C*)	16.90	16.84
Cooking loss (%)	29.49^b	31.13^a
Shear force (N)	25.79^B	36.18^A
Water content (g/100g muscle)	74.05	74.31
IMF content (g/100g muscle)	3.75	3.67
Protein content (g/100g muscle)	22.78	22.59
Iron (mg/kg muscle)	2.83	2.95

Item	CTR	HM
SFA	45.48	45.07
MUFA	46.81	47.55
PUFA	7.71	7.37
Total n-6	7.06	6.93
Total n-3	0.44^a	0.35^b
n6:n3 ratio	16.06^b	19.71^a



Hemp food and feed

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Conclusion

The addition of hemp cake in the diet of veal calves did not affect **growth performances** of animals. The health status was satisfactory without pathologies and preserving a good plasmatic concentration of iron and HGB.

To obtain an **enrichment of n-3 fatty acids** in meat, it is probably necessary to increase the percentage of inclusion of hemp in the diet.

The continuous increase in the costs of some feeds and the recent supply difficulties could make hemp cake a valid alternative protein source in animal nutrition

