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The effect of diet on mineral composition of *longissimus* of Hungarian Grey and Holstein young bulls

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Objectives

- To analyse the effect of the extensive diet (grass/grass silage and concentrate linseed supplemented) *versus* intensive diet (maize silage and concentrate) on the mineral content of Hungarian Grey and Hungarian Holstein Friesian young bulls.

- To determine the relationship between the altered fatty acid composition and mineral content.

Introduction

The beef consumption has been decreased during the last decades due to negative health images.

Many studies deal with the opportunities of enhancing the beneficial fatty acids[increasing the *n-3 polyunsaturated fatty acids and conjugated linoleic acids (CLA)* and reducing saturated fatty acids (SFA)] in beef, but little is known about the alteration of other nutritional ingredients (such as mineral content) in beef.

Materials

group	breed	n	diet
I.	Holstein-Friesian (HF)	10	INTENSIVE Maize silage,hay, 6 kg concentrate (mean slaughter weight:555 kg)
II.	Hungarian Grey (MSZ)	10	
III.	Holstein-Friesian (HF)	10	EXTENSIVE Grass silage,grass, 2 kg concentrate (in the last month linseed supplementation) (mean slaughter weight: 470 kg)
IV.	Hungarian Grey (MSZ)	10	

Methods

The measurements for mineral analyses had been done at the *longissimus* muscle (11-13 ribs) removed 24 hours after slaughter.

The contents of Ca, Cu, Fe,Mg,Na, K and Zn was determined by using atomic absorption spectrometry (SOLAAR M 6) whilst phosphorous content was analysed by spectrometric method.

The statistical analysis was made by SPSS program package.

Table 1. Mineral composition (mg/100 g) of *longissimus* (MEAN $_{SEM}$)

	Hungarian Grey		Hungarian Holstein				
	extensive	intensive	extensive	intensive	Breed	Diet	Breed x Diet
Ca	$3.27_{0.55}$	$3.89_{0.15}$	$4.99_{0.28}$	$4.17_{0.25}$	0.007	NS	0.010
P	$200.05_{1.38}$	$176.86_{1.18}$	$190.11_{2.42}$	$173.48_{2.19}$	NS	0.000	0.000
Mg	$19.18_{0.47}$	$20.39_{0.37}$	$21.46_{0.46}$	$18.09_{0.62}$	NS	NS	0.000
K	$350.60_{6.13}$	$310.78_{6.13}$	$317.90_{8.54}$	$338.40_{10.18}$	NS	NS	0.004
Na	$55.37_{1.52}$	$62.42_{2.30}$	$58.11_{1.34}$	$73.92_{3.88}$	0.028	0.000	0.000
Cu	$0.08_{0.01}$	$0.13_{0.03}$	$0.09_{0.01}$	$0.14_{0.02}$	NS	0.015	NS
Zn	$3.47_{0.08}$	$3.38_{0.12}$	$3.37_{0.10}$	$3.64_{0.06}$	NS	NS	NS
Fe	$1.82_{0.09}$	$1.42_{0.09}$	$1.56_{0.06}$	$1.47_{0.09}$	NS	0.008	0.009

Results I.

Fatty acids (%)	P	Mg	Na	Cu	Fe
Intramusc fat content	-0.52				-0.34
C16:0 palmitic	-0.63		0.41		-0.50
C18:0 stearic	0.61	0.37	-0.46	-0.41	
C18:2 n-6 linoleic	0.46				0.38
C18:3 n-3 linolenic	0.81		-0.52	-0.33	0.44
C20:3 n-6 eicosatrienoic	0.39				
C20:4 n-6 arachidonic	0.45				
C20:5 n-3 eicosapentaenoic	0.75		-0.42		0.38
SFA					-0.39
PUFA	0.57		-0.32		0.37
n-3 fatty acids	0.81		-0.50		0.43
n-6 fatty acids	0.46				0.37
n-6/*n*-3 ratio	-0.76		0.58		

Table 2. Coefficient of correlation between minerals and fatty acids in *longissimus* muscle

Results II.

Conclusions

- The *longissimus* muscle of extensively fed animals contained a lower level of sodium and copper and a higher level of iron and phosphorous than intensive ones. Hungarian Grey bulls had a lower Ca and Na content in *longissimus* muscle opposite to Holstein counterparts.

- Among minerals the P and Fe content correlated negatively to intramuscular fat content. The closest correlation was determined between P and linolenic as well as *n*-3 fatty acids (r=0.81). Feeding grass and concentrate with linseed supplements (extensive groups) resulted in lower *n*-6 and *n*-3 fatty acid ratio and in higher phosphorous and a lower sodium proportions in *longissimus* muscle.