

EFFECT OF 2 DIFFERENT DIETS ON GENERAL CONDITION AND BIOCHEMICAL PROFILES ON A GROUP OF THREE-DAY EVENTING HORSES: A FIELD STUDY.

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AIMS

Assess effects of a change in concentrate on overall health, body condition score, and specific biochemical profiles in three-day eventing horses.

METHODS

10 three-day eventing horses were studied, trained and competed over a 6 months period. Two successive periods of 3 months each with 2 different feeds from the same manufacturers. (Period 1= Concentrate A1=standard feed; Period 2 = Concentrate 2 =high fat). Parameters were assessed over 6 months: daily health-checks , monthly body weight and BCS , early and late hematology profiles, and weekly biochemical profiles. Statistical analysis used non parametric tests (Wilcoxon rank analysis, and median tests).

RESULTS

No changes in overall health or body weight during that study, except an improvement in hoof and hair quality during period 2. Biochemical parameters classically linked to nutrition (TG, cholesterol): results indicated significant ($p < 0.05$) variations compatible with increased fat content in concentrate 2. Urea, protein and albumin concentrations were significantly lower ($p=0.01$) during period 2 (decreased protein intake and decreased degradation products). Biochemical parameters linked to muscle integrity: CK showed significant trends ($p < 0.05$) towards lower values in period 2. Significant variations were detected for all electrolytes (Ca & K higher in period 1; Na, Cl, Mg higher in period2), some differences being directly linked to variations of intake (Ca, Mg, K).

CONCLUSION : Both nutrition regimen were very well tolerated. Lower CK and Urea levels may indicate benefits of the high fat/lower protein diet .

MATERIALS & METHODS

- Study of 9 competition horses over 6 months (26 weeks): healthy, dewormed, BCS stable Hematology WNL
- Study period : 2 three-month periods:
- Ad lib Hay + either FEED1/ or FEED 2
- Both rations were adapted for comparable energy
- Weekly clinical follow-up + BCS estimate
- Weekly blood sampling (every tuesday)
- Biochemical analysis : parameters pertaining to muscle and kidney function, and nutrition. (albumin/ protéins/urea/ TG, cholesterol, glycemia, β OH) as well as nutrition.

STATISTICAL ANALYSIS

Determination of the mean value for each parameter and for each feed
Comparision of the mean using non paramétric tests for small numbers \rightarrow Wilcoxon test of ranks with $p < 0.05$. Software: R®



Jupiter de Bros on a CCI *

TWO 3 MONTHS PERIODS	PERIOD 1 = Master Compétition	PERIOD 2 = Master King
LIPIDS	3.2%	12%
Oméga 3	10 g/kg brut	20 g/kg brut
Oméga 6	16 g/kg brut	60 g/kg brut
MADC (PROTEINS)	96 g/kg brut	95 g/ kg brut
UFC (ENERGY)	0.96 UFC/kg brut	1.13 UFC/kg brut
MADC/UFC	100 g	84 g
FIBERS	11.5%	9%
Vitamine E	120 U.I./kg brut	400 U.I./kg brut
Sélénium	0.22 mg/kg brut	0.3 mg/kg brut
L-carnitine	0 mg/kg brut	42 mg/kg brut

QUALITATIVE RESULTS

- Very good health .
Good compliance of subjects and owners
Observations noted with Feed 2:
- ✓Improvement in stool quality
 - ✓Lesser production of a less frothy sweat
 - ✓Increased consumption of salt block
 - ✓Increased growth of hoof / hair coat more shiny
 - ✓More stable / calm behaviour.

QUANTITATIVE RESULTS

- Overall stable body weight and BCS: No difference
Blood parameters:
- ✓Very few erratic values
 - ✓Some significant differences : (*see comparison table below*)
 - ✓Preliminary work on : β -OH. Overall values WNL (≤ 0.3 mmol/L). But lower ranking values during period 2 (values ≥ 0.2 mmol/L ($p < 0.05$; \downarrow aliment 2))

DISCUSSION

PROS of this field study

- Excellent rider/ owner compliance
- Competition horses in full work
- All samples analysed by 1 same laboratory
- Overall supervision of diet by 1 same feed company.

Difficulties linked to field study

- More invasive methods not allowed (urine / repeated sampling/ muscle biopsy)
- Time lag between sampling and analysis: 4- 12h
- Study group: not homogenous relative to age and competition level.

CRITICAL ANALYSIS

- Electrolytes : variations ccorrelated with feed intake (K, Mg, Ca). Na & Cl :Intake via salt block not quantifiable enough to conclude. \rightarrow Urinary & sweat losses needed to assess
- Enzymes : CK variations: are they linked to feed or training levels? \rightarrow cross-over study
- Total protéins, albumine, urea:variations linked to lower intake with Feed2
- Cholestérol, TG : similar variations are found in other publications.

CONCLUSION

- Very good tolerance of a 12% fat feed over a 3 months period.
- Feed 2 appears to provide ideal protein intake according to former requirements study (MADC/UFC is close to target (65-70) values
- Interestingly lower CK values with feed2 but cross-over study needed
- Preliminary study : to additional work on sweat & urine production / endocrine balance / muscle health changes with high er fat diet

Comparison Master COMPETITION (Feed1) vs. MASTER KING (Feed2)

Electrolytes		P	Enzymes		P
Ca	\downarrow	<0.01	ALKP	\emptyset	
Mg	\uparrow	ASAT	ASAT	\emptyset	
K	\downarrow	<0.05	CK	\downarrow	<0.05
Na	\uparrow	<0.05			
Cl	\uparrow	<0.05			
Urea	\downarrow	<0.01	Glycemia	\emptyset	
Creatinine	\emptyset		Cholestérol	\uparrow	<0.01
			Triglycérides	\downarrow	<0.05
Total Protéins	\downarrow	<0.01			
Albumine	\downarrow	<0.01			

