

Fatty acids contents in NEFA, in triglycerides and in red cells in horses offered linseed oil

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Introduction

■ Horses diet

Hay or straw
+
concentrate



Introduction

- Concentrate
 - Mainly cereals
 - Oat
 - Maize
 - Barley
 - Spelt
 - = Starch



Introduction

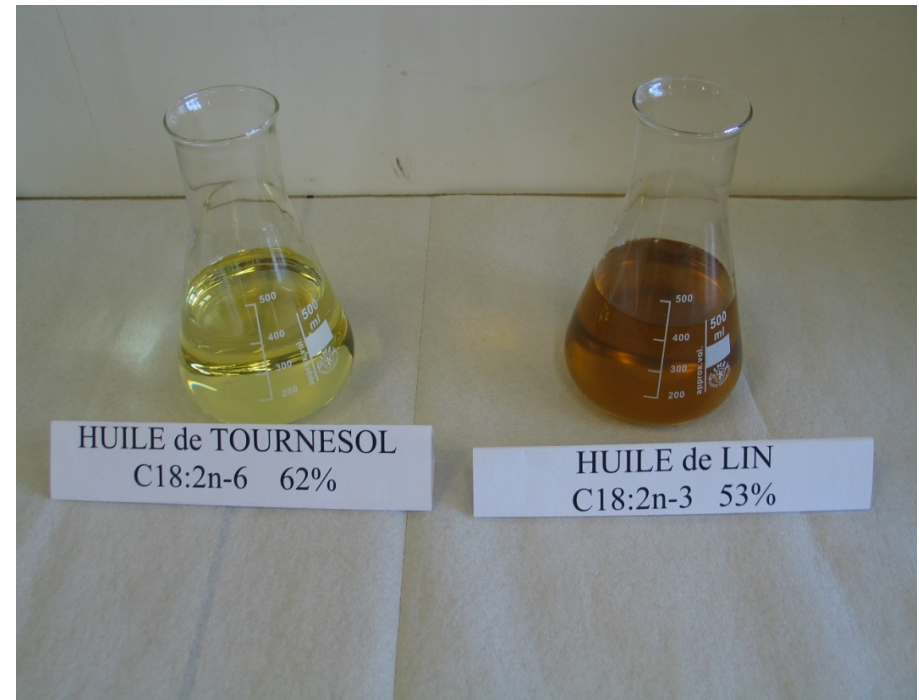
- Heavily exercised horses
 - Large amounts of cereals
 - Associated disturbances
 - Gastrointestinal disorders
 - Laminitis



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Introduction

- Fat, an energy alternative to:
 - Reduce starch
 - Increase energy
- Usual fat:
 - Maize oil
 - Soja oil
 - Coconut oil
- Aims:
Study of linseed oil



Materials and Methods

- 8 adult horses
during 4 months
trained 4 times a week
remained healthy
- Diet: 50% grass hay
 50% concentrate



Materials and Methods



Concentrate

Composition

	Control	Linseed oil
Whole spelt %	48	48
Rolled barley %	48	40
Molasses %	3.0	3.0
Oil %	-	8.0
Mineral mixture %	1.0	1.0
Ethoxiquin g/kg	-	0.5

Materials and Methods

- Blood samples - every 20 min
 - 4 before the morning feed
 - 19 after the morning feed



Materials and Methods



- Determination of individual fatty acids in :
 - NEFA
 - Triglycerides
 - Red cells

by high performance liquid chromatography

Results



- NEFA

	Treatment		SEM	Significance level	
	Control	Linseed oil			
C16:0	0,32	0,34	0,04	0,77	NS
C18:0	0,26	0,30	0,21	0,41	NS
C18:1 n9c	0,14	0,18	0,20	0,39	NS
C18:2 n6c	0,34	0,29	0,27	0,65	NS
C18:3n3	0,06	0,22	0,20	0,00	***
Σ	1,13	1,32	0,33	0,43	NS



- Triglycerides

	Treatment		SEM	Significance level	
	Control	Linsed oil			
C14:0	0,74	0,39	0,03	<0,0001	***
C16:0	24,95	18,79	0,95	<0,0001	***
C17:0	0,92	0,67	0,04	<0,0001	***
C18:0	22,70	31,57	1,62	<0,0001	***
C20:0	0,80	0,88	0,04	0,097	+
C16:1	1,49	0,80	0,14	<0,0001	***
C18:1n9	18,20	14,00	0,80	<0,0001	***
C18:1n7	1,52	1,33	0,08	0,045	+
C20:1n9	0,70	0,56	0,03	0,001	**
C18:2n6	80,65	94,81	4,17	0,004	**
C20:2n6	0,42	0,40	0,02	0,462	NS
C20:3n6	0,74	0,44	0,02	<0,0001	***
C20:4n6	1,80	1,10	0,06	<0,0001	***
C18:3n3	2,62	7,47	0,52	<0,0001	***
Somme	158,24	173,21	7,86	0,092	+
SFA	50,11	52,30	2,61	0,453	NS
MUFA	21,90	16,69	0,94	<0,0001	***
∑ w6	83,61	96,75	4,22	0,007	**
∑ w3	2,62	7,47	0,52	<0,0001	***
PUFA	86,23	104,22	4,50	0,0007	***

- Red cells

	Treatment		SEM	Significance level	
	Control	Linseed oil			
C14:0	0,19	0,13	0,01	<0,0001	***
C16:0	16,02	13,08	0,49	<0,0001	***
C17:0	0,55	0,43	0,02	<0,0001	***
C18:0	16,00	20,27	0,63	<0,0001	***
C20:0	0,54	0,36	0,05	0,005	**
C14:1	0,14	0,09	0,01	<0,0001	***
C16:1	1,88	1,16	0,06	<0,0001	***
C18:1	25,77	25,23	0,49	0,329	NS
C20:1	0,60	0,48	0,05	0,037	*
C18:2w6	33,39	33,62	1,02	0,844	NS
C20:2w6	0,25	0,28	0,01	0,089	+
C20:3w6	0,31	0,22	0,01	<0,0001	***
C20:4w6	1,78	1,09	0,12	<0,0001	***
C22:4w6	0,11	0,09	0,01	0,185	NS
C18:3w3	1,67	2,65	0,13	<0,0001	***
C20:3w3	0,18	0,20	0,01	0,251	NS
C20:5w3	0,19	0,21	0,02	0,351	NS
C22:5w3	0,31	0,33	0,04	0,661	NS
C22:6w3	0,09	0,07	0,01	0,005	**
SFA	33,31	34,27	0,99	0,393	NS
MUFA	28,39	26,96	0,54	0,025	*
∑ w6	35,84	35,30	1,12	0,671	NS
∑ w3	2,46	3,46	0,19	<0,0001	***
PUFA	38,30	38,77	1,26	0,738	NS

Conclusions and perspectives

- Inclusion of linseed oil
 - Well eaten → energy supply
→ less starch
 - Improved metabolic pathways
 - Healthier horses



Thanks for your attention

