

Linseed oil or sunflower oil as essential fatty acids supplements in horse compound feedstuffs: first results on fatty acids content in plasma triglycerides.

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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

- Alternative use of fat to:

- Reduce starch
- Increase energy

- Usual fat:

- Maize oil
- Soja oil
- Coconut oil

- Aims:

Study of linseed oil and sunflower oil



Materials and Methods

- 8 adult horses

3 x 3 Latin squares

8 weeks periods

trained 4 times a week



- Diet: 50% grass hay
50% concentrate

Materials and Methods



Concentrate	Composition		
	Control	Sunflower oil	Linseed oil
Spelt %	48.0	48.0	48.0
Barley %	48.0	40.0	40.0
Molasses %	3.0	3.0	3.0
Oil %	-	8.0	8.0
Mineral mixture %	1.0	1.0	1.0
Ethoxiquin g/kg	-	0.5	0.5

Materials and Methods

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



Materials and Methods

■ Measurements in blood plasma

■ Glucose

Non esterified fatty acids

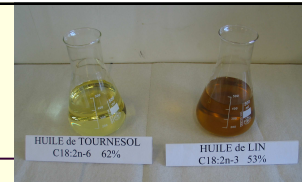
Triglycerids

Insulin

■ Individual acids from esterified fatty acids before and 2 hours after feeding



Results



molar %	Oils	
	Sunflower oil	Linseed oil
C16:0	8.5	4.7
C18:3	3.2	3.4
C20:0	0.3	0.1
C16:1 n-7	0	0.1
C18:1 n-9/7	24.6	15.8
C18:2 n-6	61.8	15.6
C18:3 n-3	1.5	52.8

Results



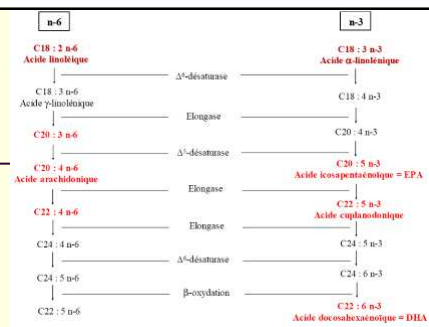
Diets

Chemical composition

g/kg	Control	Sunflower oil	Linseed oil
Crude protein	108.3	100.7	100.7
ADF	109.5	103.6	103.6
NDF	274.2	255.4	255.4
Ether extract	15.4	94.1	94.1
Ca	8.0	7.9	7.9
P	3.3	3.1	3.1
C18:2 n-6 ⁽¹⁾	436	2427	904
C18:3 n-3 ⁽¹⁾	52	52	1536

⁽¹⁾ mg/100g

Results



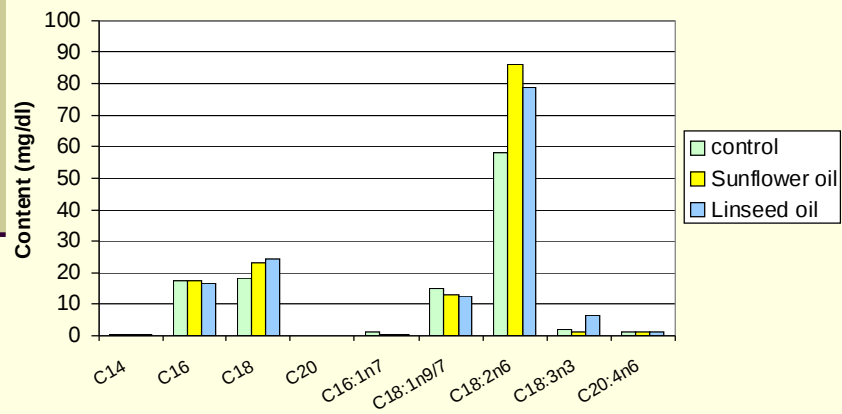
Triglycerides (before + after)

mg/dl	Control	Sunflower oil	Linseed oil	P>F
C18:1 n-9/7	15.1	12.9	12.6	0.10
C18:2 n-6	57.9	89.5	78.9	0.001
C18:3 n-3	2.1	1.4	6.0	0.001
C20:4 n-6	1.13	0.93	1.08	0.001

Results



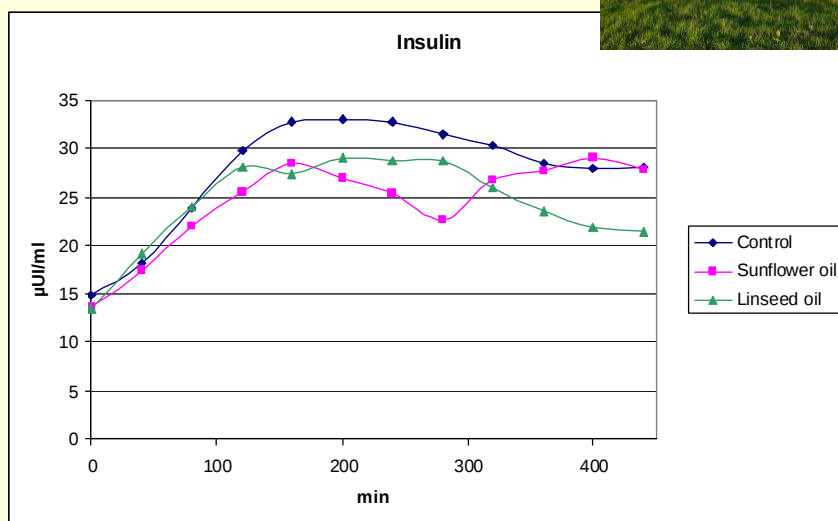
Fatty acids in plasma triglycerides



Results

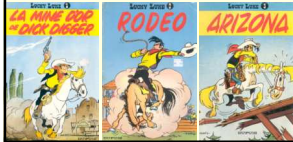


Insulin



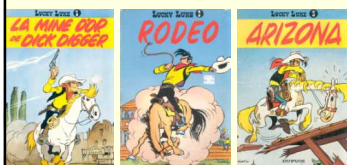
Conclusions and perspectives

- Inclusion of sunflower oil or linseed oil
 - well eaten → energy supply
→ less starch
 - less insulin → GH, IGF →
developmental disease
 - increase in C18:3 n-3
reduction in C20:4 n-6
 - less proinflammatory reactions
 - healthier horses



Conclusions and perspectives

- Linseed oil 8%
 - ESVCN 2006 insulin
 - BSAS 2007 fatty acids
- Linseed oil 8% or sunflower oil 8%
 - EAAP 2008
- NEXT : linseed oil and sunflower oil



Thanks for your attention

