

Increasing amounts of sunflower seeds increase CLA and vaccenic acid content in milk fat from dairy cows



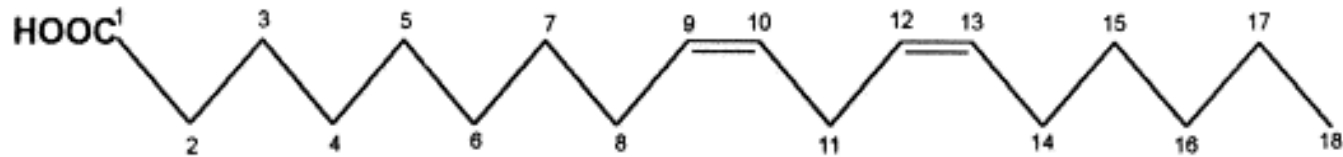
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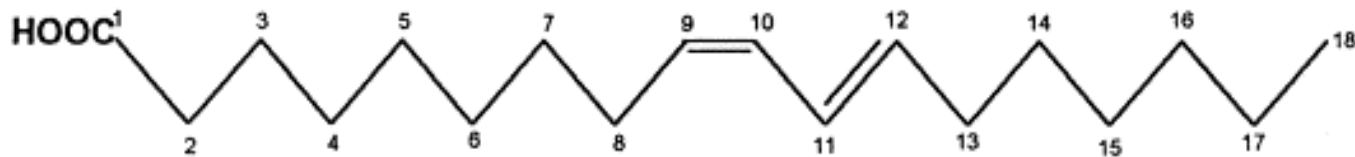


What is CLA ?

cis-9, cis-12, C18:2 (Linoleic acid)



cis-9, trans-11, CLA



75-90% of
= total CLA
in milk fat

trans-10, cis-12, CLA



Adapted from Bessa et al. (2000)

Why is CLA interesting ?



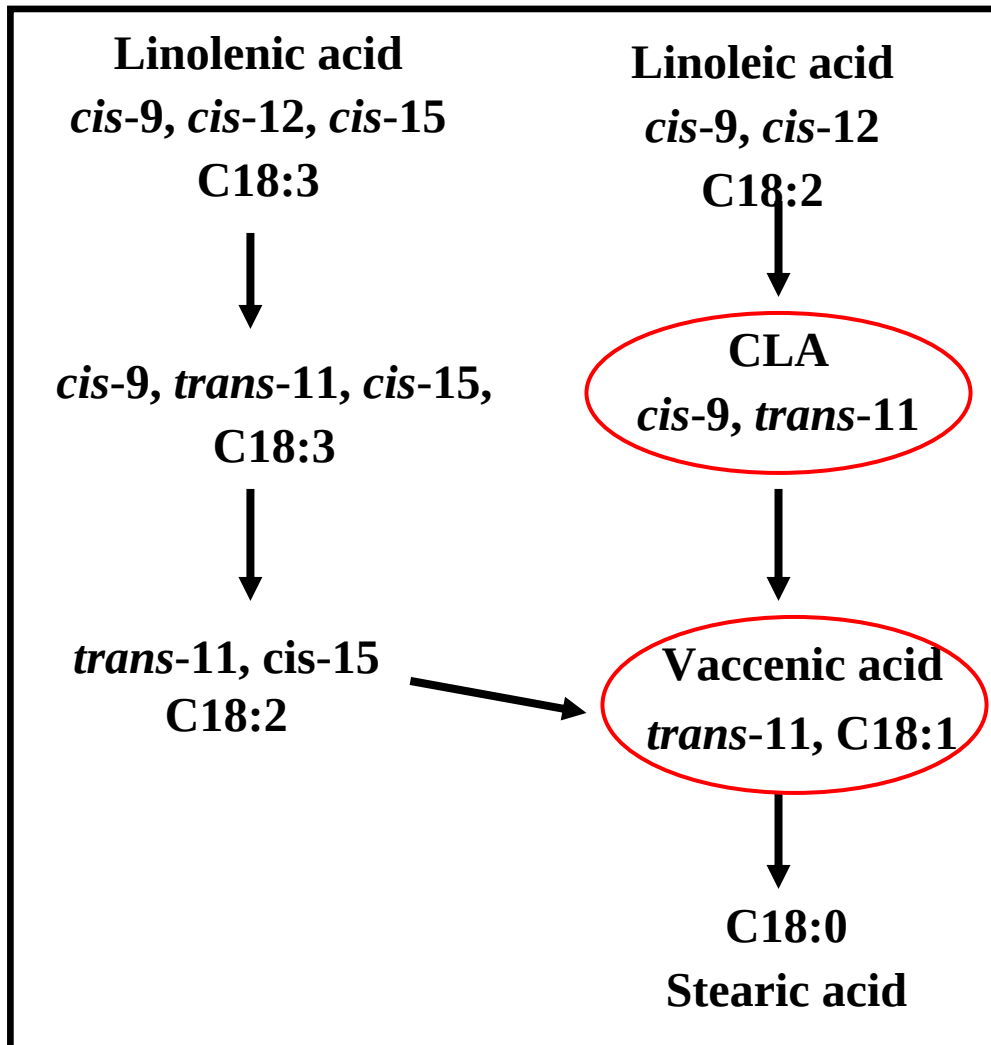
- Anti-carcinogenic
- Anti-atherosclerotic
- Anti-diabetogenic
- Anti-adipogenic
- Bone formation
- Immune function

Isomer specific
effect of CLA

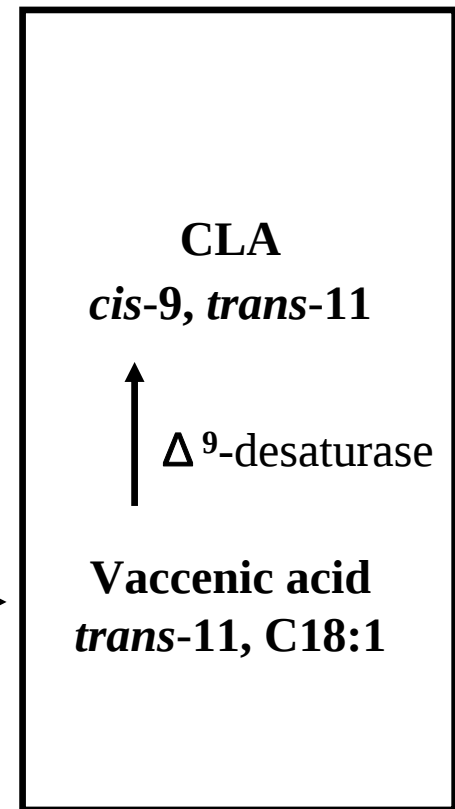
Origin of milk fat CLA



Rumen



Mammary gland

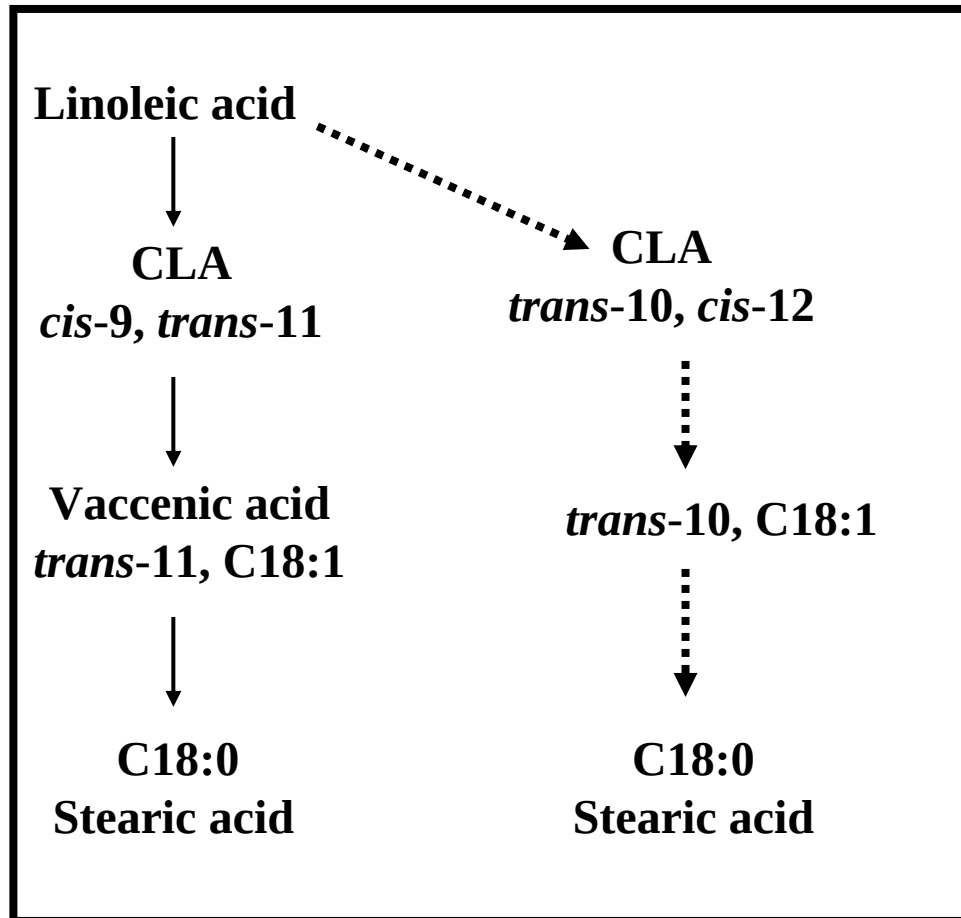


Adapted from Bauman (2003)

Alternative biohydrogenation pathway of linoleic acid under certain dietary conditions



Rumen



Adapted from Griinari & Bauman
(1999)

Objective



Determine the effect of increasing amounts of sunflower seeds in the diet on CLA and vaccenic acid concentrations in milk

Experiment: 24 cows - 5 week study period

	Dietary treatment			
	I (control)	II	III	IV
	% of dry matter			
Sunflower seeds	0	5	10	16
Grass silage	55	55	56	58
FA, g/kg dry matter	12	35	57	81



Fatty acid composition of different fat sources

	Fatty acid, g/100 g FA				
	C16:0	C18:0	C18:1	C18:2	C18:3
Soybeans¹	12	4	23	53	6
Rapeseed cake¹	6	2	59	22	9
Sunflower seeds¹	6	4	26	63	0.3
Peanut oil²	12	3	51	30	-
Linseed²	7	4	23	15	51

¹ Nielsen et al. (unpublished)

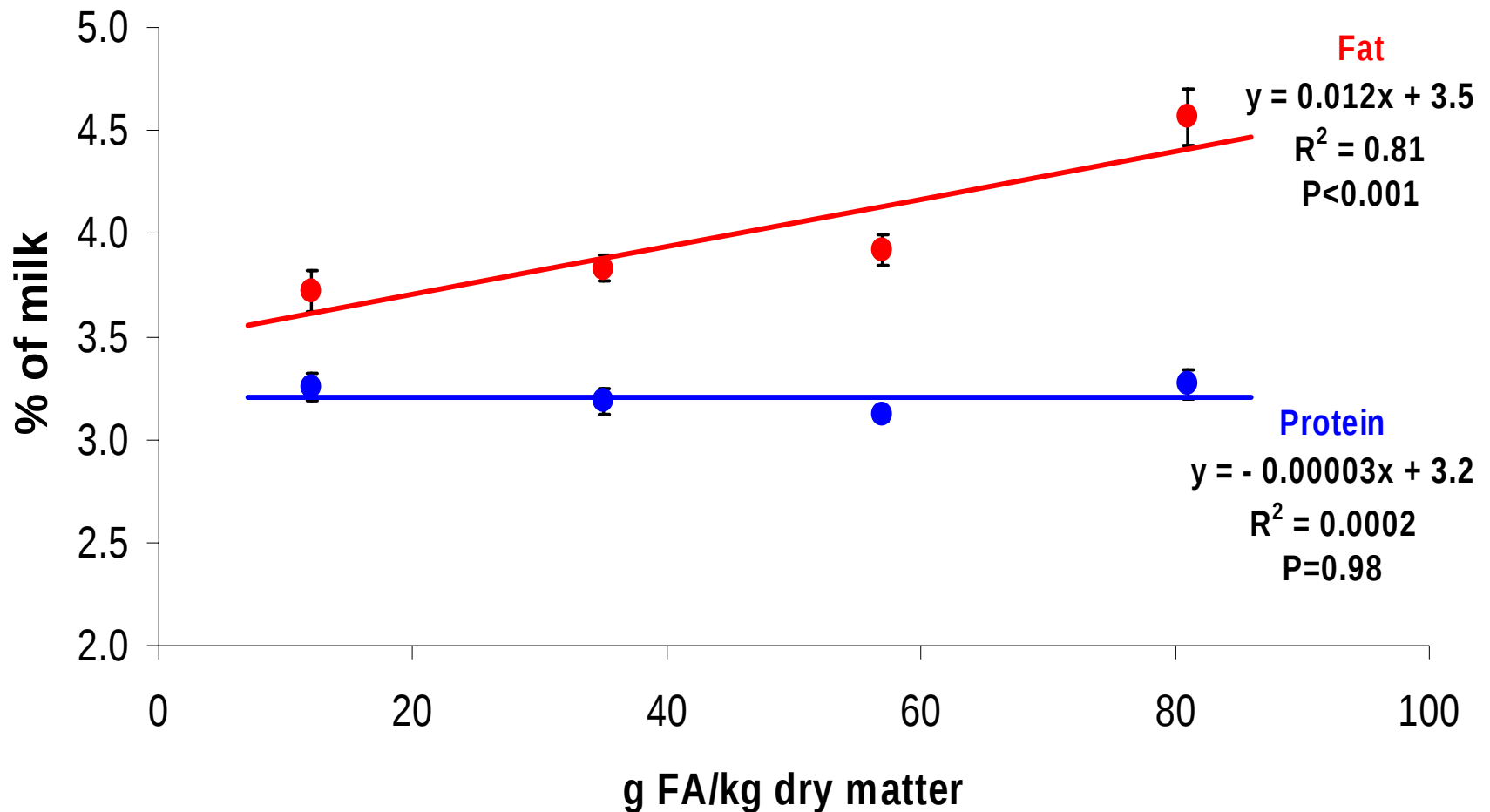
² Kelly et al. (1998)

Daily feed intake and milk production

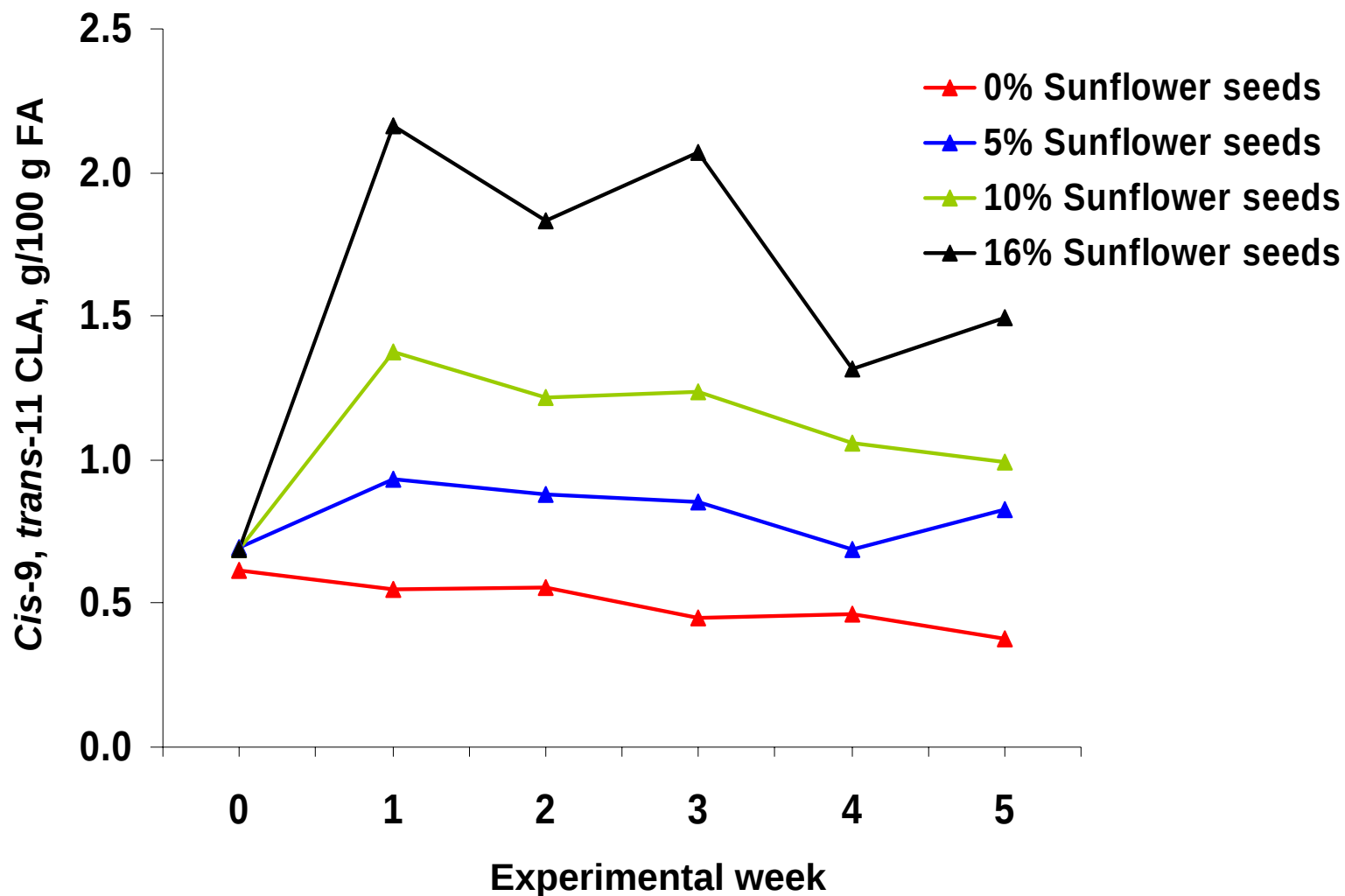


	Treatment group				P-value
	I	II	III	IV	
Feed intake, kg DM	16.8 ^a	16.0 ^a	13.4 ^b	13.5 ^b	**
Milk, kg	27.6 ^a	26.5 ^a	24.0 ^b	21.8 ^b	**
ECM, kg	26.2 ^a	25.4 ^a	23.6 ^b	22.3 ^b	***
Fat, %	3.79 ^a	3.81 ^a	4.00 ^{ab}	4.41 ^b	0.05
Protein, %	3.29	3.27	3.10	3.17	0.12

Level of dietary fat and milk fat and protein percentage

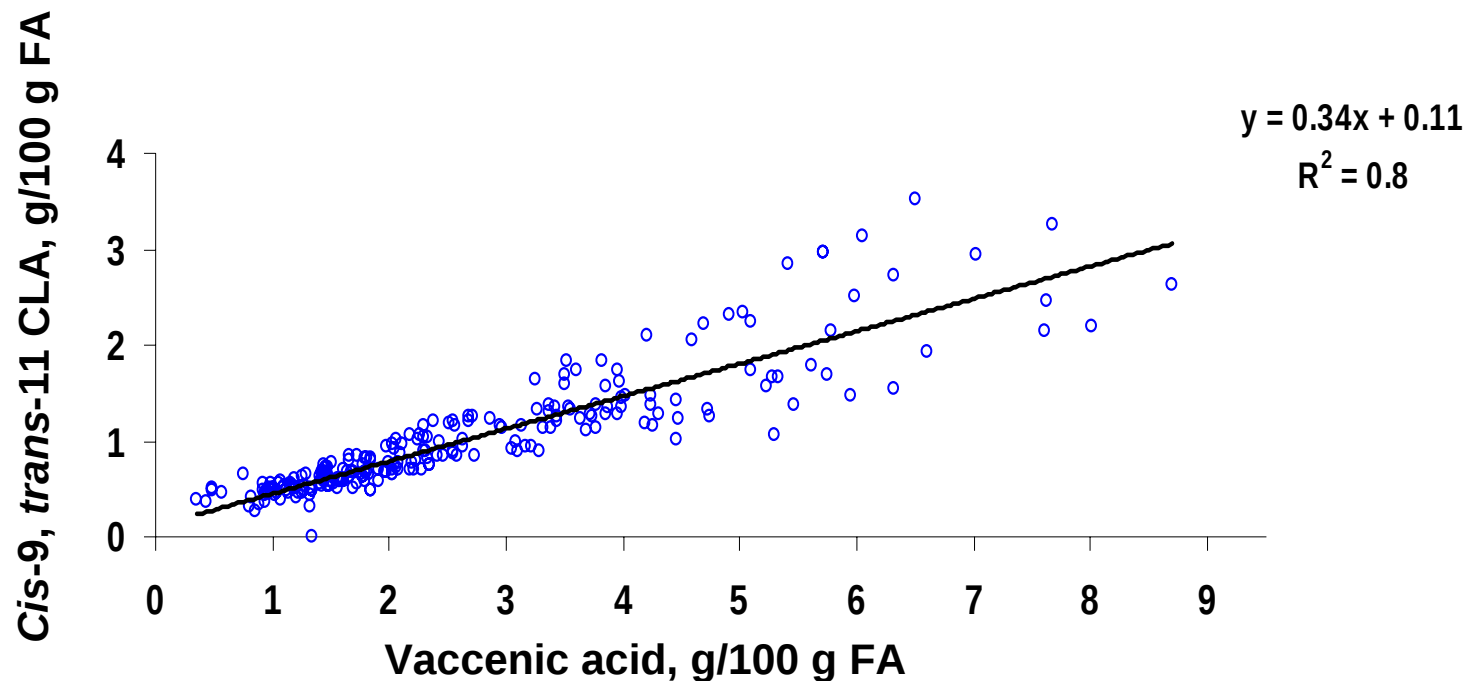


Temporal pattern of milk fat CLA

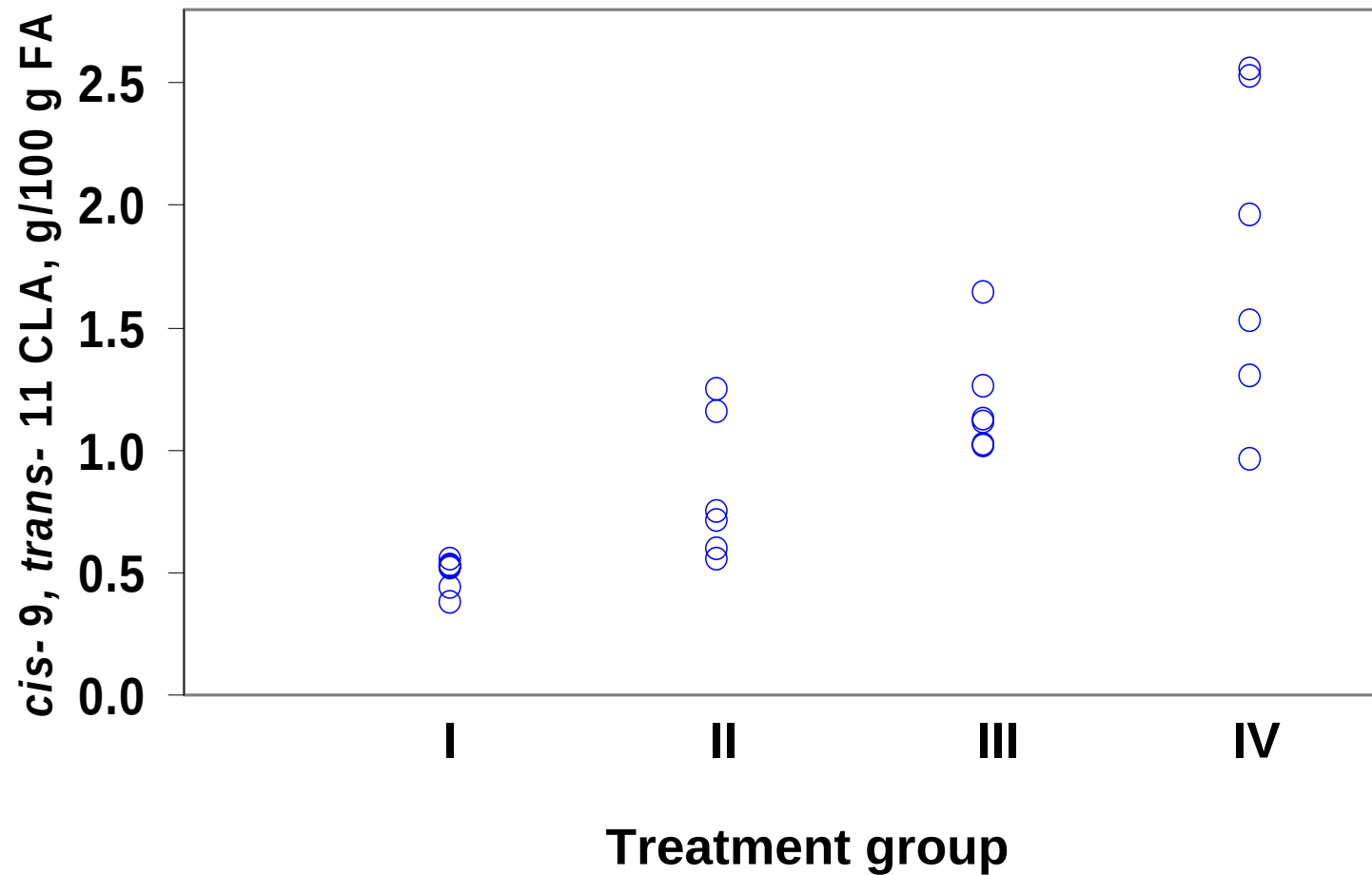




	Treatment group				P-value
	I	II	III	IV	
g/100 g FA					
<i>Cis</i> -9, <i>trans</i> -11 CLA	0.49 ^a	0.84 ^{ab}	1.20 ^b	1.81 ^c	***
Vaccenic acid	1.07 ^a	2.13 ^b	3.47 ^c	4.79 ^d	***



Individual variation among cows



Conclusions



- The effect of sunflower seeds on milk fat CLA and vaccenic acid was dose dependent
- CLA and vaccenic acid concentration in milk can be enhanced more than 3 times by adding high levels of sunflower seeds to the diet
- High levels of sunflower seeds in the diet was not associated with milk fat depression – grass silage effective forage source in maintaining normal rumen function and biohydrogenation of PUFA
- Feed intake, milk production and milk protein may be compromised by high levels of sunflower seeds

Thank you for your attention !!

