Onfarm trial with SilvAir

Workshop at SEGES Innovation
AU-Food, Arla, Cargill & SEGES
8. November 2023

STØTTET AF
Mælkeafgiftsfonden

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Agenda

1. Introduction and update on farm trials /SEGES
2. Introduction to SilvAir-product /Cargill
3. Results of feeding nitrate on nitrate content in milk /AU-Food
4. Concerns on elevated levels of Nitrate in milk /Arla
5. Milk sampling to monitor nitrate in milk /Everybody

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Arla Foods Ingredients

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6. Ration formulation farm1
7. Ration formulation farm2
8. Application of SilvAir on farm

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SilvAir decreases DMI !?

Table 4. Intake of nutrients in dairy cows with different genetic production potential fed diets varying dietary RDP:RUP ratio and with or without nitrate supplementation[1] (48 cows, 185 observations)

		Urea[3]			Nitrate[3]				*P*-value[5]					
Item	Parity[2]	Low	Med	High	Low	Med	High	SEM[4]	Nit[6]	Y[7]	Par[8]	Nit × Par[9]	L[10]	Q[11]
Intake, kg/d														
PMR DMI[12]	Primi	18.6	18.6	18.3	18.2	18.1	18.3	0.28	<0.001	0.01+	<0.001	<0.01	0.82	0.60
	Multi	22.6	23.0	22.6	21.0	21.4	21.4							
GreenFeed bait DM	Primi	1.02	1.01	0.99	1.01	1.01	1.01	0.02	0.04	0.96	<0.001	0.05	0.75	0.11
	Multi	0.87	0.81	0.85	0.90	0.85	0.92							
Total DMI	Primi	19.6	19.6	19.3	19.2	19.1	19.3	0.29	<0.001	0.01+	<0.001	<0.001	0.62	0.85
	Multi	23.5	23.8	23.4	21.9	22.3	22.4							
OM	Primi	18.2	18.1	17.8	17.9	17.7	17.8	0.26	<0.001	0.01+	<0.001	<0.001	0.85	0.87
	Multi	21.8	22.0	21.6	20.4	20.6	20.7							
CP	Primi	2.98	3.06	3.10	2.88	3.00	3.08	0.04	<0.001	0.01+	<0.001	<0.01	<0.01	0.78
	Multi	3.54	3.69	3.74	3.28	3.48	3.57							
RDP	Primi	2.08	2.27	2.42	2.01	2.22	2.40	0.03	<0.001	0.01+	<0.001	<0.001	<0.001	0.96
	Multi	2.50	2.76	2.94	2.30	2.58	2.80							
RUP	Primi	0.82	0.73	0.62	0.79	0.71	0.62	0.01	<0.001	<0.01+	<0.001	<0.001	<0.001	0.27
	Multi	0.98	0.88	0.76	0.91	0.83	0.72							
NDF	Primi	6.06	6.73	7.10	6.00	6.67	7.57	0.10	<0.001	<0.01+	<0.001	<0.01	<0.001	0.36
	Multi	7.28	8.21	8.65	8.86	7.79	8.17							
Starch	Primi	4.15	3.31	2.43	4.04	3.22	2.47	0.05	<0.001	<0.01+	<0.001	<0.01	<0.001	0.16
	Multi	4.93	4.03	2.97	4.64	3.76	2.82							

Wang et al., 2023

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Table 3. Intake and BW change of dairy cows fed the eight PMR diets[1]

	LF				HF							
	UREA		NIT		UREA		NIT					
	BLANK	NOP	BLANK	NOP	BLANK	NOP	BLANK	NOP	SEM[2]	Parity	FAT	NITRATE
No of observations												
Primiparous	18	18	18	17	18	17	18	18				
Multiparous	17	18	18	18	18	16	14	17				
Intake, kg/d												
PMR DM												
Primiparous	19.6	17.4	18.9	17.3	20.2	17.8	17.4	15.9	0.61	<0.01	<0.01*	<0.01*
Multiparous	24.3	20.8	22.4	19.2	24.1	19.1	21.0	16.2				
GreenFeed bait DM												
Primiparous	0.99	0.99	1.03	1.04	0.98	1.06	1.08	1.07	0.042	<0.01	<0.01	<0.01
Multiparous	0.78	0.91	0.89	0.95	0.80	0.96	0.92	1.04				
DM												
Primiparous	20.6	18.3	19.9	18.4	21.2	18.9	18.5	17.0	0.60	<0.01	<0.01*	<0.01*
Multiparous	25.0	21.7	23.3	20.2	24.9	20.1	21.9	17.3				

Maigaard et al., 2023

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SilvAir decreases DMI !?

Table 5. Milk production parameters of dairy cows fed the eight PMR diets[1]

	LF				HF									
	UREA		NIT		UREA		NIT			*P*-values				
	BLANK	NOP	BLANK	NOP	BLANK	NOP	BLANK	NOP	SEM[2]	Parity	FAT	NITRATE	3-NOP	FAT × NITRATE
No of observations														
Primiparous	18	18	17	17	18	17	18	17						
Multiparous	17	18	18	18	18	16	14	17						
Yield, kg/d														
Milk														
Primiparous	26.5	24.3	26.3	24.4	29.2	26.5	27.1	26.0	1.12	<0.01	<0.01	<0.01	<0.01*	0.01
Multiparous	34.7	31.1	34.4	30.3	38.0	33.0	35.9	30.4						
ECM														
Primiparous	27.9	25.9	27.8	26.3	29.8	27.8	27.3	27.0	0.10	<0.01	<0.01	<0.01	<0.01*	<0.01
Multiparous	35.1	31.8	34.7	31.5	37.4	33.4	35.6	30.9						
Fat														
Primiparous	1.08	1.02	1.09	1.06	1.13	1.09	1.05	1.07	0.041	<0.01	<0.01	0.23	<0.01*	<0.01
Multiparous	1.33	1.23	1.34	1.26	1.40	1.33	1.37	1.25						
Protein														
Primiparous	1.03	0.94	1.01	0.94	1.09	0.99	0.99	0.95	0.038	<0.01	0.64	<0.01	<0.01*	0.01
Multiparous	1.32	1.18	1.28	1.13	1.37	1.17	1.28	1.05						

Maigaard et al., 2023

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SilvAir decreases DMI by 5% and 13% with fat!

Morten Maigaard,1* Martin R. Weisbjerg,[1] Marianne and Peter Lund[1]
[1]Department of Animal and Veterinary Sciences, AU Viborg – Research Ce
[2]DSM Nutritional Products, Animal Nutrition & Health, 4002 Basel, Switzerl

ABSTRACT

The objective of the present study was to investigate the effect of individual and combined use of dietary fat, nitrate and 3-nitrooxypropanol (3-NOP) on dairy cows' enteric methane (CH_4) emission and production performance. Twenty-four primiparous and 24 multiparous Danish Holstein cows (111 ± 44.6 d in milk; mean ± SD) were included in an incomplete 8 × 8 Latin square design with 6 21 d periods. Dietary treatments were organized in a 2 × 2 × 2 factorial arrangement aiming for 2 levels of FAT (30 or 63 g crude fat/kg of DM; LF or HF, respectively), 2 levels of NITRATE (0 or 10 g nitrate/kg of DM; UREA or NIT, respectively) and 2 levels of 3-NOP (0 or 80 mg/kg of DM; BLANK or NOP, respectively). Treatments were included in ad libitum fed partial mixed rations in bins that automatically measured feed intake and eating behavior. Additional concentrate was offered as bait in GreenFeed units used for measurement of gas emission. For total DM intake (DMI), a FAT × NITRATE interaction showed that DMI, across parities and levels of 3-NOP, was unaffected by separate fat supplementation, but reduced by nitrate with 4.6% and synergistically decreased (significant 2-way interaction) with 13.0% when fat and nitrate were combined. Additionally, 3-NOP decreased DMI by 13.4% and the combination of 3-NOP with fat and nitrate decreased DMI in an additive way (no significant 3-way interaction). The decreasing effects on DMI were more pronounced in multiparous cows than in primiparous cows. For treatments with largest reductions in DMI, eating behavior was altered toward more frequent, but smaller meals, a slower eating rate and increased attempts to visit unassigned feed bins.

Maigaard et al., 2023

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SilvAir decreases ECM !? (Wang et al, 2023)

Table 7. Milk yield, milk composition, and ADG in dairy cows with different genetic production potential fed diets vary supplementation[1] (184 observations)

		Urea[3]			Nitrate[3]				
Item	Parity[2]	Low	Med	High	Low	Med	High	SEM[4]	Nit[6]
Yield, kg/d (unless otherwise noted)									
Milk	Primi	32.5	31.9	30.6	32.4	31.9	30.8	0.75	0.20
	Multi	39.6	39.4	37.6	38.7	38.6	37.1		
ECM[12]	Primi	32.0	31.6	30.9	31.8	31.7	30.8	0.64	0.07
	Multi	39.3	39.1	37.6	38.3	38.4	36.7		

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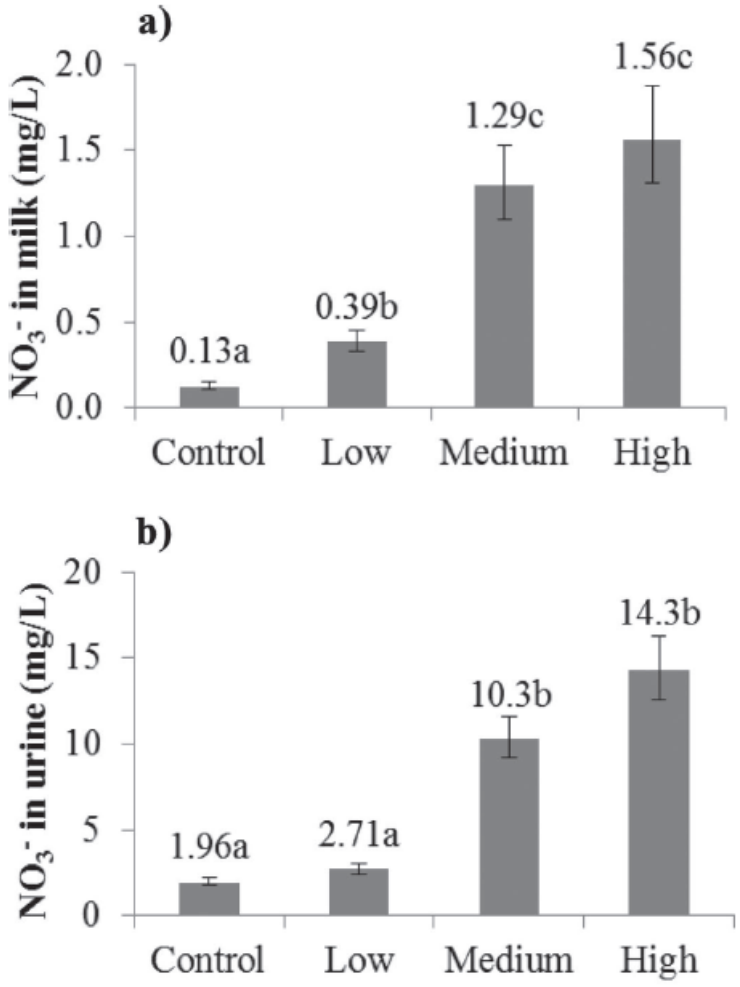
SilvAir decreases ECM !? (Wang et al, 2023)



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Northern Farm

			Malkende	
Tildeling pr. dyr pr. dag			195-196	196-197
Fodermiddel	Enhed	Øre/kg	Tildelt	Tildelt
Hvede AMS	Kg TS	**190,0**	**2,5**	**2,5**
Hvede, valset til foderbord	Kg TS	**190,0**	**1,1**	**1,7**
Rapsskråfoder, 4% fedt	Kg TS	**207,0**	**1,2**	**0,5**
Rapsskråfoder i ROBOT	Kg TS	**207,0**	**1,3**	**1,3**
Majsensilage, middel FK	Kg TS	**34,6**	**7,5**	**7,5**
Hvedehalm	Kg TS	**30,0**	**0,3**	**0,3**
3. slæt 2023 silo 5	Kg TS	**43,1**	**7,5**	**7,5**
Kridt	Gr TS	**100,0**	**195**	**195**
Natriumbikarbonat	Gr TS	**290,0**	**95**	**95**
Vand	Kg TS	1,0	**0,0**	**0,0**
Nitrat	Gr TS	0,0	**0**	**247**
SilvAir	Gr TS	380,0	**0**	**0**
Danrapskager 11,5% fedt	Kg TS	**211,0**	**2,4**	**2,4**
Lipitec Bovi LM, mættet fe	Gr TS	**1270,0**	**259**	**259**
Vilomin 9942651 køer	Gr TS	**0,0**	**253**	**253**

Rationsparameter	Enhed	Opt.	Tildelt	Tildelt
Pris	kr./dag	☐		
Planlagt EKM-ydelse	kg/dag	☐	35,0	35,0
Foderoptagelse	kg TS/d	☐	24,7	24,8
Kraftfoder	kg TS/d	☐	9,3	9,5
Energioptagelse	MJ/dag	☐	162,2	161,9
Energi	MJ/kg T	☐	6,57	6,52
Energibalance	%	☑	103,5	103,4
Råprotein	g/kg TS	☑	166	170
AAT til mælk	g/MJ	☑	16,2	15,7
AAT i foder / NEL i foder	g/MJ	☐	14,5	14,2
PBV	g/kg TS	☑	18	27

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