

# Changes in milk production and milk fatty acid composition of cows switched from pasture to a maize silage based-total mixed ration

Rego, O.A.<sup>1</sup>, Rosa, H.J.D.<sup>1</sup>, Cabrita, A.R.J.<sup>2</sup>, Borba, A.R.<sup>3</sup>, Fonseca, A.J.M.<sup>2</sup>, Bessa, R.J.B.<sup>4</sup>



<sup>1</sup> CITAA - Departamento de Ciências Agrárias, Universidade dos Açores, 9701-851 Angra Heroísmo, Açores-Portugal

<sup>2</sup> REQUIMITE-ICBAS, Universidade do Porto, 4485-661 Vairão, VC, Portugal

<sup>3</sup> Secretaria Regional de Agricultura e Florestas, Açores, Portugal

<sup>4</sup> CIISA, Faculdade de Medicina Veterinária, 1300-477, Lisboa, Portugal

(Session 5; oreo@uac.pt)



## OBJECTIVES

The objective of this study was to investigate the change in milk FA composition, including the CLA, during transition of dairy cows from pasture to a TMR diet and vice versa.

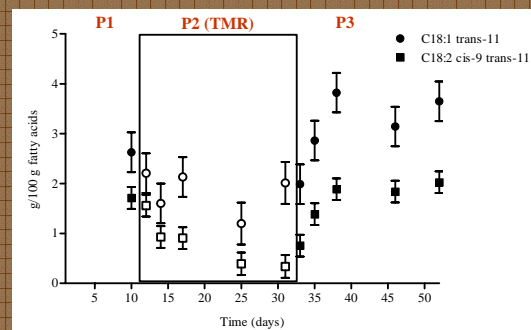
## MATERIAL AND METHODS

Eight lactating Holstein cows (562±50kg BW; 24.3±3.8kg daily milk yield; 179±76DIM) were used in a 52-d experiment to study the changes in fatty acid composition after transition from and to pasture. Experiment was divided into 3 periods. In the first 10d cows grazed a pasture supplemented with 5 kg d<sup>-1</sup> of concentrate (P1). In the next 21d, cows fed a TMR (60% corn silage and 40% concentrate) (P2). In the last 21d cows were turned out to pasture and supplemented with 5 kg of concentrate (P3). Milk samples were collected on day 10 of P1, and on days 2, 4, 7, 15 and 21 of P2 and P3.

## RESULTS AND CONCLUSIONS

Table 1 - Effect of treatments on the milk fat FA profile (g/100 g FA)

Fatty acids	P1	P2 (TMR)	P3	SEM	Effects		Contrasts	
					Diet	Diet×Time	TMR vs P1, P2	P1 vs P2
12:0	3.39	4.60	2.64	0.178	<0.001	<0.001	<0.001	0.001
14:0	10.88	12.23	9.39	0.330	<0.001	<0.001	<0.001	<0.001
16:0	22.32	26.41	23.19	0.489	<0.001	<0.001	<0.001	0.147
18:1 cis-9	22.25	19.10	26.24	0.737	<0.001	<0.001	<0.001	<0.001
18:1 trans-11 (vaccenic)	2.63	1.85	3.09	0.298	<0.001	0.004	<0.001	0.242
18:2 n-6	1.48	2.37	2.02	0.117	<0.001	<0.001	<0.001	<0.001
18:3 n-3	0.72	0.49	0.73	0.029	<0.001	<0.001	<0.001	0.885
cis-9,trans-11 CLA (rumenic)	1.71	0.85	1.58	0.219	<0.001	<0.001	<0.001	0.562
Total Saturated (SAFA)	53.11	56.35	50.15	1.196	<0.001	<0.001	<0.001	0.002
MUFA	33.22	31.27	37.64	0.886	<0.001	<0.001	<0.001	<0.001
PUFA	4.70	4.16	5.02	0.303	<0.001	<0.001	<0.001	0.150
PUFA/SAFA	0.09	0.08	0.10	0.008	<0.001	<0.001	<0.001	0.038
n-3	0.91	0.64	0.89	0.032	<0.001	<0.001	<0.001	0.719
n-6	1.85	2.81	2.48	0.140	<0.001	<0.001	<0.001	<0.001
n-6/n-3	2.12	4.94	2.88	0.159	<0.001	<0.001	<0.001	0.001
hypcholesterolemics	24.29	22.05	28.88	0.820	<0.001	<0.001	<0.001	<0.001
Hypercholesterolemics	36.85	43.37	35.09	0.802	<0.001	<0.001	<0.001	0.046
h/H	0.66	0.51	0.84	0.035	<0.001	<0.001	<0.001	<0.001



TMR feeding significantly increased DM intake and milk production and decreased milk fat content. Treatments had no effect on solids production and milk protein content. TMR significantly increased the concentration of saturated short and medium chain FA (6:0 to 16:0) and decreased the concentration of branched chain FA, MUFA and PUFA, excepting 18:2 n-6 and 18:2 t10-c12, which increased. Mean milk fat concentration were 0.77, 0.49 and 0.73 % for linolenic acid, 2.63, 1.85 and 3.09 for vaccenic acid and 1.71, 0.85 and 1.58 for rumenic acid respectively in P1, P2 and P3. Concentration of rumenic acid was 1.7% in P1, decreased gradually until day 21 on P2 (TMR diet) when reached a minimum of 0.44%. After turnout to pasture (P3) its concentration increased gradually until the 7th day and stabilized thereafter until day 21 when reached the maximum of 2.16%. Therefore, rumenic acid increased 5 fold from last day of TMR to the last day of grazing P3. The concentration of vaccenic acid decreased from 2.63% in P1 to a minimum of 1.32% on day 14 of P2 and after turnout to pasture (P3) increased to a maximum of 3.82% on day 7, reaching a plateau thereafter. Milk from pasture had a higher nutritional value.