

- 931 **Duodenal infusion of glutamine does not affect milk protein synthesis in late lactation dairy cows.** G.A.L. Meijer*, and C. J. van der Koelen. DLO-Institute for Animal Science and Health, Lelystad, The Netherlands.

In order to test the hypothesis that glutamine is potentially limiting for milk protein synthesis, four ruminal and duodenal cannulated dairy cows more than 200 d in milk (milk yield 12.7 to 27.5 kg FCM.d⁻¹) were infused intraduodenally for one week with glutamine (300 g.d⁻¹ dissolved in 10 L tap water) or water in a 2 x 2 change-over design. Glutamine infusion increased plasma concentrations of glutamine, citrulline and urea (463 vs 284 $\mu\text{mol.L}^{-1}$, $P < 0.05$, 66 vs 59 $\mu\text{mol.L}^{-1}$, $P < 0.05$ and 4.7 vs 3.6 mmol.L⁻¹, $P < 0.05$, respectively). Other plasma amino acids were not affected. There were no significant effects on milk yield (16.3 vs 16.2 kg.d⁻¹), milk fat (5.44 vs 5.53%) and milk protein (4.00 vs 4.05%). In three cows 60% to 70% of the added nitrogen was excreted as urea, indicating that glutamine was oxidized or used as a glucogenic precursor. In one cow urea excretion was only slightly increased. In this cow free glutamine concentration in muscle biopsy from M. Longissimus increased from 10.7 to 39.4 mmol.kg⁻¹DM, suggesting a large increment of the body pool of glutamine. No explanation for these individual differences was found.

- 932 **Effect of site of starch infusion on the bioavailability of leucine and glutamine in dairy cows.** G.A.L. Meijer*, V.Bontempo, C. J. van der Koelen, J. van der Meulen, and A. M. van Vuuren. DLO-Institute for Animal Science and Health, Lelystad, The Netherlands.

The experiment aimed at quantifying changes in the utilization of leucine and glutamine by the gut wall as a result of starch supply to the duodenum. Starch was infused either in the rumen (600 g.d⁻¹ flaked maize) or in the duodenum (300 g.d⁻¹ flaked maize and 300 g.d⁻¹ maize meal) in four ruminally and duodenally cannulated cows in mid lactation for 5 wk in a 2 x 2 change-over design. In wk 4 and wk 5 of each period absorption and elimination kinetics and the relative bioavailability of leucine and glutamine were assessed. A duodenal bolus infusion of, respectively, 10 g leucine or 50 g glutamine was given. Blood samples were taken through a catheter in the jugular vein directly before and, at half hour intervals, up to 4 h after the bolus infusion, and analysed for plasma concentration of amino acids. Data fitted best to an open one compartment model. Site of starch infusion did not significantly affect any of the kinetic parameters describing the elimination of the duodenally infused amino acids (see Table), partly due to the large variation between cows. Thus, it seems that starch supply to the duodenum does not change the utilization of leucine and glutamine in the gut wall.

Site of starch infusion	glutamine			leucine		
	rumen	duodenum	P	rumen	duodenum	P
Half life absorption (min)	16.6	12.0	.15	13.1	5.8	*
Biological half life (min)	43.1	38.8	.70	68.3	64.6	.83
Bioavailability (%)	83	81	.14	110	146	.38
Clearance (l.min ⁻¹ .kg ⁻¹)	6.0	5.1	.07	2.6	3.3	.50
Distribution volume (l)	326	314	.77	247	205	*

* Not determined due to missing values

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