

Effect of age of dairy cows on body composition changes throughout the lactation cycle as measured with deuteriated water

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The changes in body composition of Holstein cows during lactation of (6 + 6) primiparous calving at 2 (P2) or 3 years (P3), with an average growth rate of 700 or 500 g/d from birth, were compared with those of 10 multiparous cows (4 to 6 years old).

During 35 weeks from calving, the animals were fed high DM maize silage *ad libitum*, and concentrates: 1) at a constant and equal level for the first 6 months (5.2 kg DM for P2 and P3 or 6.0 kg DM for M); 2) decreasing according to requirements for the last 12 weeks; protein intake was continuously fitted to individual requirements. Milk yield (6 730 – 7 370 – 8 370 kg for P2 – P3 – M over 44 weeks) and feed intake were registered daily and body weight (BW) weekly. Body composition was measured from deuteriated water space (Chilliard and Robelin, 1983) on day 5, and weeks 12 ± 2 and 35 ± 2 after calving.

At calving, total body lipids % BW were higher in P3 (21.5%) than in P2 (17.6%) and in M (15.2%). In primiparous cows,

decrease in mass of body lipids from calving to week 12 was only slightly less than in M cows in agreement with calculated energy balance (EB). Their subsequent recovery was nil, but complete for M-cows. The amount of body proteins hardly changed in early lactation or later, except for P2 cows (+ 5.1 kg) which were far from their mature size at calving (79%). On a between-cow basis, in early lactation changes in protein mass (but not lipid mass) were correlated with BW changes; in midlactation, the 3 parameters were correlated but BW changes tended to have more lipid and less protein in M than in P cows. Primiparous cows can mobilize substantial amounts of lipids in early lactation, but after peak yield, a strong priority exists for protein deposition, which is all the more important as they are far from mature in size.

Chilliard Y, Robelin J (1983) *Eur Assoc Anim Prod Publ* 31, 2, 195-198

Table I. Body composition and energy balance during lactation.

	At calving			From wk 1 to 12			From wk 12 to 35		
	BW (kg)	Lipid (kg)	Protein (kg)	EB (FU)	Lipid (kg)	Protein (kg)	EB (FU)	Lipid (kg)	Protein (kg)
P2	571 a	96 a	75 a	- 124	- 24	- 0.7	217 a	- 2 a	5.1 a
P3	624 b	129 b	80 b	- 69	- 24	1.1	21 b	- 3 a	0.9 b
M	649 b	99 a	89 c	- 213	- 33	- 0.6	104 a	33 b	1.9 b
rsd	33	25	4.3	100	22.3	3.7	104	26.7	3.5

a, b : In the same column, means with different superscripts differ ($P < 0.05$).