

Dietary supplementation of 3-hydroxy-3-methylbutyrate improves catch-up growth in underfed lambs

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Leucine is transaminated to α -ketoisocaproate then partially metabolized in 3-hydroxy-3-methylbutyrate (HMB). Leucine and its metabolites are potential stimulators of growth rate (May and Buse, 1989). The purpose of this study was to assess the effect of dietary supplementation of HMB on catch-up growth in underfed lambs.

Twelve male lambs (Ile-de-France x Romanov) weighing about 22 kg were individually housed in crates in a temperature and humidity controlled environment. They were fed once a day a ground concentrate (17% protein) and a hay. After 1.5 week adjustment period, half of the animals received a dietary supplement of Ca-HMB (0.1% DM of the concentrate for 2 weeks followed by 0.35% for 7 weeks). Since HMB is stable in the rumen its salt was directly mixed with the concentrate. The control group was fed a diet with CaCO₃ (the same supply of Ca as in the Ca-HMB diet). During the 9 weeks of experiment the level of feeding was as follows: 2 weeks of feeding semi-*ad libitum* (concentrate 3% of live body weight, hay *ad libitum*), 9 d of strong food restriction

(concentration 2.2%, hay 0.6%), 5.5 weeks of moderate restriction (concentrate 2.8%, hay 0.7%).

The growth rate of lambs fed semi-*ad libitum* was not modified by the 0.1% supplementation of HMB (table I). After the strong food restriction, the increase in food intake led to a period of catch-up growth in both groups, lasting about 1 week. This rise in growth rate was 102% higher in the group of animals fed the diet supplemented with HMB (0.35%) than in the control group (table I). Despite the lack of any further effect of HMB, the overall body weight gain was 26% higher in the group of animals receiving HMB than in the control animals.

Our data indicate that the HMB supplementation enhanced the catch-up growth rate in underfed lambs. This is of interest in animal production.

May and Buse (1989) *Diabetes, Metab Rev* 5, 227-245

Table I. Growth response to different dietary regime supplemented with Ca-HMB.

	CaCO ₃	Ca-HMB
Initial body weight (kg)	22.4 ± 0.6	22.5 ± 0.7
Average daily gain (g)		
Feeding semi- <i>ad libitum</i>	333 ± 22	304 ± 15
Profound food restriction	48 ± 30	48 ± 15
Catch-up phase	240 ± 19	486 ± 35**
Post-catch-up phase	200 ± 13	207 ± 9
Final body weight (kg)	35.9 ± 0.8	37.0 ± 0.8
Weight gain since the beginning of the catch-up phase (kg)	7.3 ± 0.5	9.2 ± 0.3*

* $P < 0.01$; ** $P < 0.001$.