

UTILIZATION OF A DIETARY FAT BLEND BY LACTATING DAIRY COWS.

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The inclusion of fat in rations for dairy cattle has received considerable attention but production responses have been variable and are known to be influenced by type and nature of the fat fed (Palmquist and Jenkins 1980). In a recent experiment Banks et al. (1984) reported production increased when dairy cattle were fed "fat prills", i.e. free fatty acids, compared to similar fatty acids fed in the form of triglyceride. Our experiment studied the effects of a supplement comprising a blend of free fatty acids (Unilever Australia Pty. Ltd) on the productivity of dairy cows.

Twenty-three dairy cows in mid-lactation were individually fed ad-libitum, a mixed balanced ration (10.2 MJ ME/kg DM; crude protein 16.5%) comprising maize silage, rolled wheat, lucerne hay, cottonseed meal and urea. Varying amounts, up to 1200 g/day, of a fat blend (gross energy 38 MJ/kg; mainly palmitic, stearic and oleic free fatty acids) were mixed into the ration for 35 days of treatment. The treatment period was preceded by 21 days uniform feeding of the mixed balanced ration. Measurements included milk production, milk composition, feed intake, in-vivo digestibility of DM and fatty acids, change in liveweight, rumen pH and NH₃ and blood acetate and betahydroxybutyrate from jugular samples collected four hours after feeding.

Yield of milk, butterfat and protein were significantly ($P < 0.05$) and positively related to fatty acid intake. In addition, butterfat test was increased ($P < 0.01$) whereas protein test declined ($P < 0.05$). Other measured factors were not significantly affected. Maximum daily intake of fatty acid was 1320 g/cow which comprised 330 g from feeds in the basal ration.

Influence of total fatty acid intake (TFAI; g/cow/day) on change in productivity (kg/cow/day) and milk composition (%). Also presented are initial levels of productivity (ILP; mean \pm SD).

Variable	Equation	RSD	r ²	ILP
milk yield	$-2.4 + 3.4(\pm 1.0)TFAI$	1.53	0.35	22.0 ± 4.4
butterfat yield	$-0.36 + 0.59(\pm 0.11)\sqrt{TFAI}$	0.10	0.56	1.04 ± 0.24
protein yield	$-0.10 + 0.13(\pm 0.06)\sqrt{TFAI}$	0.05	0.18	0.75 ± 0.14
butterfat test	$-0.55 + 1.36(\pm 0.42)\sqrt{TFAI}$	0.38	0.34	4.99 ± 0.76
protein test	$0.33 - 0.35(\pm 0.16)\sqrt{TFAI}$	0.14	0.19	3.59 ± 0.31

Milk production increased by 15% and yield of butterfat by 34% for the addition of 1 kg of supplement. These responses were without any change on intake of the basal ration. Presumably, the supplement had minimal effects on rumen fermentation. The high energy content of this supplement offers potential to significantly increase energy intake and productivity of dairy cows in early lactation when they are in negative energy balance.

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