

EFFECTS OF HEAT DENATURED MILK PROTEINS ON THE PERFORMANCE OF YOUNG PIGS

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Irreversible damage to the whey proteins of milk, brought about by heat treatment during processing, results in milks which exhibit a poor clotting ability by rennin. The feeding of heated milks to young calves is associated with depressed growth rates, reduced utilization of food, and an increased incidence of digestive disturbances and mortality.

In experiment 1, fresh cow's milk (FM) was compared with a severely heated milk (SHM) in which over 90% of the whey proteins were denatured. Both milks were homogenised prior to feeding, supplemented with minerals and vitamins and offered ad lib. to pigs of 24 to 36 h of age. From 2 to 7 d of age the SHM caused a reduction in performance and an increase in the incidence of diarrhoea compared to the FM, but had little effect from 7 to 21 d (Table 1).

In experiment 2 a mildly heated milk (50% of whey proteins denatured) was compared with the two treatments used in experiment 1. The performance of all animals was poor (Table 1) and no significant differences between the milks could be demonstrated.

TABLE 1
Performance of baby pigs fed non-heated and heated milk

	Age (d)	Non- Heated Milk	Severely Heated Milk	Mildly Heated Milk
EXPERIMENT 1				
No. pigs		5	5	
*UDWPN as % of PN		11.70	0.04	
Wt. gain (g/d)	2-7	120 ^a	57 ^b	
	7-21	306 ^a	274 ^a	
FCR (g DM/g gain)	2-7	0.68 ^a	1.02 ^b	
	7-21	0.64 ^a	0.60 ^a	
No. pigs died		0	1	
EXPERIMENT 2				
No. pigs		10	10	10
*UDWPN as % of PN		11.71	0.04	6.46
Wt. gain (g/d)	2-7	26 ^a	26 ^a	29 ^a
	7-21	118 ^a	82 ^a	137 ^a
FCR (g DM/g gain)	2-7	1.71 ^a	1.63 ^a	1.47 ^a
	7-21	0.91 ^a	0.99 ^a	0.89 ^a
No. pigs died		4	4	4

*UDWPN, undenatured whey protein nitrogen; PN, protein nitrogen

There is evidence for prolonged clotting time and reduced gastric retention of dry matter with ingestion of heated milk. At birth, the level of activity of some of the digestive enzymes is low and if their capacity is exceeded then diarrhoea and poor utilization of food may result. The stomach of the milk-fed pig may be important in regulating the flow of chyme so that the capacity of the intestinal enzymes is not exceeded. Efficient clotting of milk may be essential if the stomach is to function correctly, particularly in the very young pig.