

EFFECT OF CARBOHYDRATE SOURCE AND FEEDING FREQUENCY ON PROTEIN AND ENERGY RETENTION BY THE GROWING PIG

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Carbohydrate source has been shown to affect the time interval over which digestion products are absorbed by the pig. Rerat et al. (1984) found that blood glucose levels peaked rapidly following ingestion of simple sugars (c. 800 g/d, once daily) and suggested that this may affect the retention of dietary protein and energy. In contrast, starch ingestion provided a more continuous glucose supply.

The aim of this experiment was to determine i) whether carbohydrate source (sucrose, starch or dextrose) affected energy and protein retention by the growing pig and ii) whether frequency of feeding affected the response to carbohydrate source.

Three diets were formulated containing either sucrose, starch or dextrose with soya-bean meal as the protein source (0.85 g lysine/MJ DE). Each diet was given restrictively (3 x maintenance) to 20 pigs from an initial liveweight of 20 kg and they were slaughtered at 50 kg. Ten pigs on each diet were fed once daily and 10 were fed frequently at 3-hourly intervals. Samples of carcass and viscera (blood and empty viscera combined) were collected and analysed for gross energy and nitrogen contents by near infra-red spectrophotometry.

Carbohydrate source did not affect daily gain, feed conversion ratio, protein or energy retention ($P > 0.05$). Once-daily feeding decreased liveweight gain, increased feed conversion ratio (FCR) and decreased protein and energy retention.

	Feeding regime		SEM	Statistical significance
	Once daily	Frequent		
Liveweight gain, g/d	597	704	8.6	$P < 0.01$
Feed intake, kg/d	1.20	1.34	0.016	$P < 0.01$
FCR	2.03	1.93	0.036	$P < 0.05$
Protein deposited, g/MJ DE intake	5.00	5.48	0.074	$P < 0.01$
Energy retention, MJ/MJ DE intake	0.347	0.393	0.0053	$P < 0.01$

The results indicate that once-daily feeding significantly decreased the utilisation of protein and energy in semi-synthetic diets. It is possible that the efficiency of protein deposition decreased because the absorption of energy and amino acids was not synchronised. Dietary energy was in a highly digestible form which would have been rapidly digested and absorbed. However, the peak absorption of amino acids would be delayed by the digestion of soya-bean meal.

The lower energy retention with once-daily feeding was possibly due to the slower rate of liveweight gain. Total energy needed for maintenance would increase since more time was needed to achieve the same liveweight gain. This would decrease the efficiency of energy retention.

It appears that the absorption of glucose from starch is not slow enough to reduce the affects of once-daily feeding.

RERAT, A. A., VAISSADE, P. and VAUGELADE, P. (1984). *Br.J.Nutr.* 51:505.

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