Will Hogs Provided with Whey Compensate in Their Feed and Water Intake?

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SUMMARY

Minimizing feed cost is always important for improving profits in swine production and can sometimes be accomplished by utilizing by-products from other agricultural industries. Whey, a product of the dairy processing industry, has well-known beneficial properties as a feed additive and is typically fed to newly weaned pigs in dry form. The drying process however, increases the cost. Swine producers in close proximity to dairy processing plants may have access to liquid whey products.

There has been very little research conducted to determine how inclusion of liquid whey would affect nutrient intake in nursery pigs, which became the objective of this experiment. Overall, when liquid whey was fed to nursery pigs (via their water supply), they decreased feed intake to voluntarily control for total energy intake. Throughout the trial pigs remained in good health and no adverse effects were seen from feeding the whey. This decrease in dry feed intake means lower total feed costs depending on price and availability of the liquid whey.

INTRODUCTION

Whey, a highly digestible lactose product, is the liquid remaining after acidification of milk during the production of cheese and other dairy products. It can be fed to nursery pigs immediately post-weaning, often in a deproteinized, dried form. These processing steps require energy and increase the cost of the whey product and therefore, for producers close to dairy processing plants, liquid whey could be a more viable alternative.

Theoretically, including the whey in the water supply of the pigs should reduce feed costs while maintaining growth. The net benefit will depend on the cost of whey and transportation. This may not be feasible for all producers, but may be an option for some. This project was designed to provide information to producers considering liquid whey as an alternative feed ingredient.

Our overall objective was to determine if the pig maintains a consistent dry matter intake when additional nutrients are supplied in the water.

The specific objectives included: 1) measuring the liquid and dry feed intake of piglets supplied varying whey/water concentrations, 2) determine if pigs maintain caloric intake when receiving whey in the drinking water, and 3) determine the potential feed cost savings associated with feeding liquid whey.

EXPERIMENTAL PROCEDURE

Seventy two newly weaned piglets (26 ± 2 days of age), housed one barrow and one gilt per pen, were allocated to receive either 0%, 8% or 16% whey (vol/vol) in their drinking water. The experiment was completed in 2 cycles each consisting of a 7 day acclimation period followed by a 14 day experimental period for a total of 8 weeks. Piglets were housed in pairs to minimize boredom, which may cause excessive drinking or water wastage. Enrichment was also provided and changed daily in an effort to mitigate boredom (Figure 1).

The water system was adapted using suspended buckets above each metabolism crate to dispense the whey and water mix and allow accurate intake measurements (Figure 2). Pigs began to receive the selected treatment of whey on the third day of acclimation. Each pen also had trays suspended under the water/feeder to collect and measure waste. Liquid waste was weighed and then placed under heat lamps and reweighed to estimate dry matter. Feed and whey-water were monitored to ensure it was available ad libitum and daily health checks were performed. Fecal scores were assessed and recorded also.

During the acclimation period pigs were fed a commercial starter diet that was switched to a pre-grower diet during the 14 day experimental period. No antibiotics were included in the feed but copper sulfate was included at a rate of 0.04%. In the last week on trial, TiO^2 was added to the feed as a non-digestible marker to determine overall diet digestibility.

"Growing pigs provided liquid whey in their drinking water deecreased intake of dry feed, and thus overall nutrient intake was unchanged"

RESULTS AND DISCUSSION

Water and feed intakes were calculated weekly taking into account the waste of each, which was measured daily. The pigs were weighed weekly to monitor growth and performance and during the last week on trial, feed and fecal samples were obtained on a per pen basis to assess for digestibility.. A numerical decline in feed intake and calories from feed was observed; however, there was large variability associated with this measurement and it was not significant (P = 0.18; Table 1, Figure 3). Overall liquid intake increased with increasing whey incorporation in the drinking water, and thus intake of dry matter and calories from whey increased (P < 0.01; Table 1). Despite the increasing energy intake from the whey, total caloric intake remained relatively constant, indicating that pigs compensated for the increasing proportion of caloric intake from whey by decreasing intake of dry feed.

There was no effect of treatment on average daily gain (P = 0.57); however, the combination of a numerical tendency for increased energy intake and decreased growth with increased whey in the drinking water resulted in a reduction in energetic efficiency (DE/gain, P = 0.03; Table 1). This calculation was based on a reported DE content for the whey, a value which may vary depending on the individual processing plant and whey composition. As shown in Table 1, consistency of nutrient intake was well maintained between the 0 and 8% inclusion levels, while liquid (and thus whey intake) increased dramatically between the 8 and 16 % inclusion levels. This requires further investigation.

CONCLUSIONS

Nursery piglets receiving 8 or 16 % whey in their drinking water decreased feed intake in proportion to the nutrients in whey while maintaining growth. Assuming a cost of $100 per tonne of whey DM this would result in cost savings of approximately $2.00 per pig in the nursery (2013 summer feed prices). Actual savings would be farm specific and depend on cost of whey and transportation as well as feed costs.

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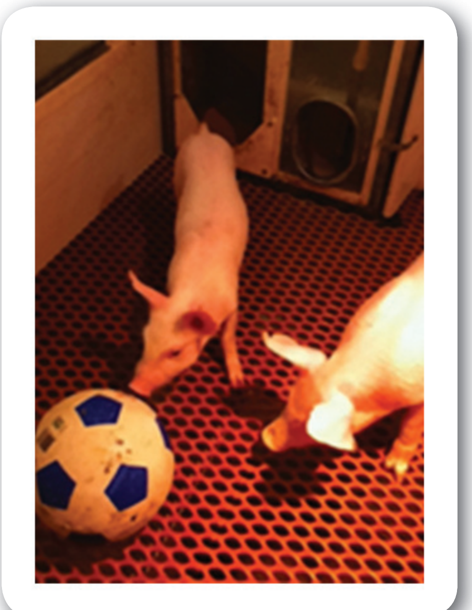

Figure 1. Two pigs per pen playing with the toys used as enrichment to prevent boredom and water waste

Figure 2. Modification with whey feeding buckets above the metabolism crates

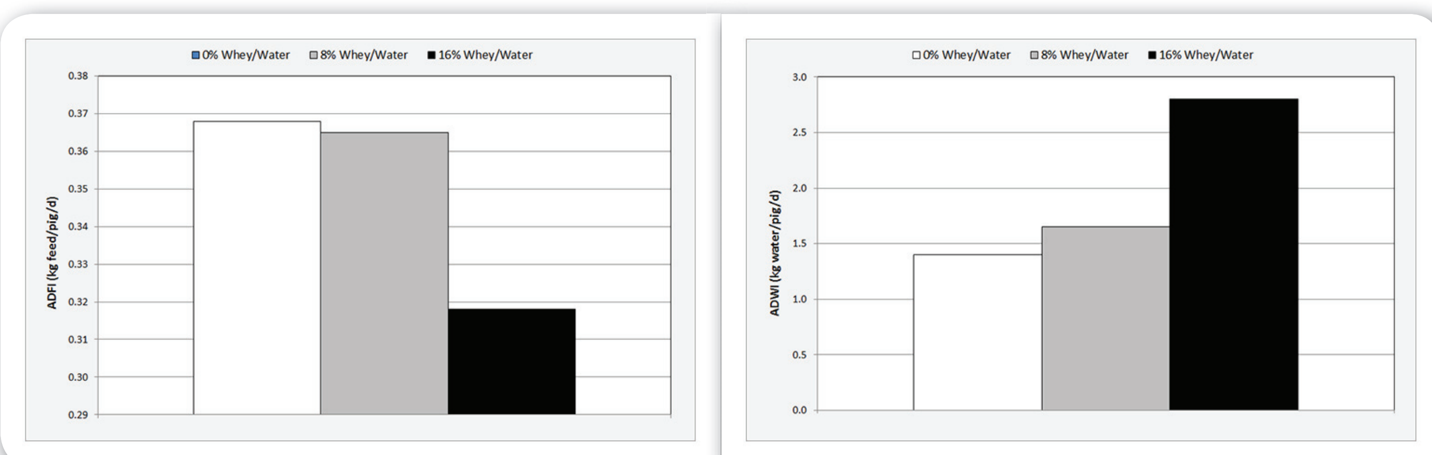

Figure 3. Comparison of whey treatment to the average daily intake of feed and water per pig

Table 1. Feed and whey-water intake[a]

	% whey (by volume)			SEM	P < (linear)
	0	8	16		
Intake					
Feed, kg	10.33	10.25	8.91	0.88	0.18
Feed, Mcal	35.72	35.45	30.82	3.04	0.18
Liquid, kg	39.01	49.59	80.01	7.09	<0.01
Whey DM, kg	0.00	0.61	1.96	0.13	<0.01
Whey, Mcal DEb	0.00	2.10	6.78	0.46	<0.01
Mcal DE, Total	35.72	37.55	37.60	3.34	0.57
Calories from whey, %	0	6	18		
Mcal DE/day	2.55	2.68	2.69	0.24	0.57
Body weight and growth, pen averages (per pig)					
Initial BW, kg	5.99	5.96	6.27	0.43	0.40
Final BW, kg	10.61	10.77	10.23	0.54	0.57
ADG, kg/pig day^{-1}	0.33	0.34	0.28	0.04	0.25
Energetic efficiency (Mcal/gain)					
Mcal DE intake/kg gain	3.92	3.98	5.06	0.49	0.03

[a] Except where indicated data is per pen (2 pigs) for the 14 day experiment.