

Maximizing Water Utilization

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SUMMARY

Water conservation is a growing concern in intensive swine operations (ISOs) for both financial and environmental reasons. The water usage of a grower-finisher room in an ISO was measured using dry and wet/dry feeders. The major source and sink of water was at the drinker and in the manure, respectively. In addition, water disappearance and manure volume were reduced from 9.3 to 6.2 and from 8.9 to 5.4 kg water/pig-day, respectively, when wet/dry feeders were used in place of dry feeders.

INTRODUCTION

To address water conservation in intensive swine operations the significant sources and sinks of water need to be identified to know where to focus future research efforts. Previous studies have shown that use of wet/dry feeders in place of dry feeders has potential water savings. The objective of this study was to systematically measure and report the water usage of grower-finisher swine using dry and wet/dry feeders.



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EXPERIMENTAL PROCEDURES

Six separate grower-finisher cycles were followed and the parameters of water usage, including water from the drinkers, in the feed, metabolic reactions, within the pig, ventilated from the room and in the manure, were measured for each cycle.

RESULTS

Table 1 presents a summary of the average values for the water balance measured over the six cycles. The significant source and sink of water was at the drinker, at 72% of the total water source, and in the slurry, at 64% of the total water sink, respectively. The use of wet/dry feeders compared to dry feeders significantly reduced both the water disappearance at the drinker by up to 34% ($p < 0.05$), as seen in Fig. 1, and the volume of the slurry by up to 29% ($p < 0.05$).

The pig performance was not significantly different for pigs on dry and wet/dry feeders ($p > 0.05$), although by the end of the finisher phase the pigs on wet/dry feeders were generally 5% larger than the pigs on the dry feeders. The feed conversions (FC) were similar for pigs on both dry and wet/dry feeders, with the FC being slightly higher for pigs on wet/dry feeders.

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Table 1. Summary of average water balance over three grower-finisher cycles.

Water Usage Components	Parameters	Water (kg/pig-day)			
		Grower		Finisher	
		Dry*	Wet/Dry**	Dry	Wet/Dry
<i>Inputs</i>	Water Disappearance	6	5.4	9.3	6.2
	Feed Water	0.3	0.3	0.5	0.5
	Metabolic Water	1	1	1.6	1.6
<i>Outputs</i>	Manure Water	-5.5	-4.4	-8.9	-5.4
	Pig Water	-0.4	-0.4	-0.7	-0.7
	Ventilated Water	-2.6	-2.7	-4.1	-3.4
<i>Error</i>		1.3	0.8	2.2	1.3

*Dry: dry feeders; **Wet/Dry: wet/dry feeders.

IMPLICATIONS

Future research on water conservation in an ISO should focus on the drinker and on the manure. Use of wet/dry feeders versus dry feeders generally resulted in less water being used and less manure to handle, decreasing the water usage and storage and handling costs.

FINANCIAL IMPLICATIONS

If an average 600 sow farrow-to-finish operation produced 4,000,000 gal of manure annually. Incorporation of wet-dry feeder would reduce this volume by 1,160,000 gal annually. With average manure application cost of \$0.01/gal this would result in a \$11,600 annual savings or \$0.86/pig marketed.

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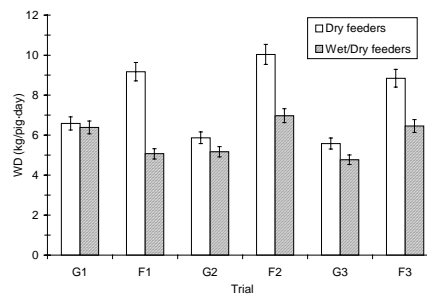


Figure 1. Average water disappearance (WD) for all grower (G1, G2 and G3) and finisher (F1, F2 and F3) trials.



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