Cost of Pork Production with Nonsubtherapeutic Use of Antibiotics

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Summary and Implications

This report has shown that it costs more to produce pork through the nonuse of subtherapeutic antibiotics than through the subtherapeutic use of antibiotics. The report shows that there is a cost increase of $2.16 per hundredweight ($5.39 per pig) for the Nonsubtherapeutic system. It shows that there is an increase of non antibiotic feed costs ($.28), labor costs ($1.20), breeding herd costs ($.49), as well as fixed costs ($2.35). The item having the largest impact was the difference in pigs finished per sow. This impacted labor, fixed costs, and breeding herd costs, as well as a portion of the feed costs.

Introduction

Antibiotics are currently used subtherapeutically, at some level, in much of the pork that is produced within the United States. Consumer issues and the potential for resistant bacteria are causing the industry to closely examine the use of antibiotics subtherapeutically. The objective of this report is to determine the impact on pork production cost without subtherapeutic use of antibiotics.

A low-investment outdoor pork production system is used for the analysis. Two production methods are evaluated, one without subtherapeutic use of antibiotics (Non-STA) and one with subtherapeutic use of antibiotics (W/STA). Production efficiencies are adjusted to reflect the nonuse of antibiotics subtherapeutically. It is further assumed that both production methods have 100 sows and the market hogs are sold at 250 pounds. Results in this report compare the economics of nonsubtherapeutic use of antibiotics to pork production with subtherapeutic use of antibiotics. The economic impacts of production differences such as death loss, and feed efficiency are examined.

Facility and Breeding Herd Investment

Facility and equipment investment for the system is provided in Table 1. The facilities are assumed to be the same for both of the systems with the exception of the finishing phase. Table 1 provides the cost per pig space as well as the annual cost per hog marketed. The facilities are presumed to last for 10 years and are expensed depreciated over a 10-year period. Although both systems had the same total investment cost except for the finishing phase the investment cost, per hog marketed, was less for the W/STA system due to the larger number of hogs that were marketed annually through the system. The finishing phase investment differs due to the increased cost for nonsubtheropeutic finishing space per pig space due to increased feeder space requirements. Finishing also differs due to the fact that the W/STA system requires additional finishing space per year due to the increase in pigs marketed per sow per year. Investment levels were determined through the use of new deep bedded and low cost facilities and equipment, etc., for both systems. The facilities were charged 10% interest on the average total investment (Investment/2 *.1). It should be noted that the facility investment level might be higher than the average for a current operator due to the use of new facility values. Total facility investment, which is expensed over 10 years, is $189,534 for the nonsubthereopeutic system and $192,351 for the W/STA system. Total facility and equipment annual investment is $28,430.12 for the nonsubthereopeutic system and $28,852.62 for the W/STA system (Table 1).

Breeding herd investment is provided in Table 2. Gilt prices are set at $175 each for both systems with boars priced at $750 each. Total investment is $14,613 but when sow and boar costs are reduced by the respective cull revenues, the net annual investment cost is $5,256.50. Annual costs were calculated by dividing the number of sows by the number of years in service and then multiplying by the value of the sows. One-third of the sows were culled per litter with 4% death loss. Boars were culled every 2 years. Boars were calculated at 1 boar per 17 sow to ensure the tightest possible farrowing time. Boar numbers would drop significantly with the use of artificial insemination. Artificial insemination cost would be approximately $10 per litter in semen cost in addition to an increase in labor requirements. Artificial insemination would eliminate that need of bringing in external animals, because all the animals could be home raised. It would reduce the number of boars that are required.

Table 1. Annual Facilities and Equipment Investment.

	NonSubtherapeutic System		Subtherapeutic System	
Area	per Pig Space	per Market Hog	per Pig Space	per Market Hog
Gestation*	$150.00	$1.14	$150.00	$1.00
Breeding*	$250.00	$1.90	$250.00	$1.67
Farrowing*	$265.00	$2.01	$265.00	$1.77
Finishing**	$60.50	$6.05	$55.00	$5.50
Miscellaneous**	$33.00	$3.30	$29.00	$2.90
Annual deprecation	$18,953.41	$14.40	$19,235.08	$12.84
Interest (10% of facilities)	$9,476.71	$7.20	$9,617.54	$6.42
Total facilities	$28,430.12	$21.61	$28,852.62	$19.26

* Per sow space.
** Per finishing space.

2. Annual Breeding Herd Investment.

Item	Number	Value	Years in Service	Annual Costs
Sows	100	175	1.5	$11,666.67
Boars	6	750	2	$2,250.00
Sub total				**$13,916.67**
Interest	10%			**$695.83**
Total				**$14,613.00**

Breeding herd cull revenue

	Number	Weight	Revenue	Total Revenue
Sows	64.00	400	$0.35	$8,960.00
Boars	2.88	550	$0.25	$396.00
Total				**$9,356.00**

Breeding herd net				**$5,256.50**

Production Efficiency Assumptions

Production efficiency information is based on a report prepared by Hayes et al. (2000). Production efficiency changes, as outlined in that report, are based on experiences observed in Sweden and Denmark as subtherapeutic use of antibiotics was removed from the industry. The resulting changes, which were observed, were as follows.

- The weaning age increased by 1 week because early weaning is based upon subtherapeutic antibiotic use.
- Weaning weight for nonsubtherapeutic pigs were assumed to be 7 pounds heavier than for the W/STA system due to the weaning age difference. They are a week older.
- Feed efficiency for the nursery system was 1.77 for the nonsubtherapeutic and 1.63 for the W/STA system (3).
- Feed efficiency for the grow-finish phase (50–250 pounds) declined by 1.5% for the nonsubtherapeutic system (5).

- Mortality in the nursery phase increased by 1.5 percentage points for the nonsubtherapeutic system (4).
- Mortality in the grow-finish phase increases by 0.4 percentage points for the nonsubtherapeutic system (5).
- 3.6% of the hogs in the nonsubtherapeutic are culled, due to necessary treatment, at 100 pounds and sold for $.25 per pound.
- Per sow production in terms of pigs weaned declines by approximately one piglet per year (1). This is shown through a decrease in litters per year production of .1 per sow and an increase in pre wean mortality of 2%.
- Net veterinary and therapeutic costs for the nonsubtherapeutic system are increased by $.25 per pig (2). This is based on estimates from Sweden (5). This is represented by an additional $1.47 in health costs being required for the non-subtherapeutic system and $1.22 subtherapeutic antibiotics used per pig in the W/STA system.

Feed is the largest cost item in pork production. This is even more the case for nonsubtherapeutic production as feed requirements increase further. Table 3 provides information on the ration costs for both systems. The rations are assumed to be the same with the exception of the antibiotics in the W/STA system. The total feed costs include an additional $8.00 per ton for processing and are calculated using $2.00/bu corn and $200/ton soybean meal. The total average price per pound is $.0593 for the nonsubtherapeutic system and $.0613 for the W/STA system after adjusting for antibiotic use and efficiencies.

Total feed usage and efficiency for each stage of production is provided in Table 4. The feed efficiencies discussed above are used to calculate the levels of feed usage. These numbers vary between the two systems due to the effects of antibiotics on the W/STA system. The lactation feed is lower for the W/STA system because the lactation period is shortened by a week. The overall feed efficiency is 3.34 for the W/STA system and 3.48 for the nonsubtherapeutic system. Table 5 summarizes the pigs per litter and death loss for the various production phases, for the two systems. The W/STA system has an increase of 1.82 pigs finished per sow per year

Table 3. Diet Costs.

Diet Phase	Base Ration $ per Ton	Non-STA $ per Pound	Antibiotic $ per Ton	W/STA $ per Pound
Nursery diet(LC8-S3)	$254.71	$0.127	$10.00	$0.132
Grower diet (LC25-S8)	$116.89	$0.058	$ 5.00	$0.061
Finish diet (LC25-S10)	$108.24	$0.054	$2.00	$0.055
Gestation diet (LC26)	$101.89	$0.051	$ -	$0.051
Lactation diet(LC27)	$116.54	$0.058	$5.00	$0.061
Weighted average costs	$118.64	$0.0593		$0.0613

* Diet costs include $8/ton mixing and delivery cost.
* Diets from Life Cycle Swine Nutrition.

Table 4. Feed Use and Cost by Production Stage and System.

Stage	Pigs Numbers	Gain per Pig lb	Feed per lb of Gain	Pounds of Feed	Total Cost	Cost per Pig
Nursery stage						
W/STA	1592.5	35	1.63	90,852	$12,025	$8.03
Non-STA	1479.6	28	1.77	73,330	$9,339	$7.10
Grower stage						
W/STA	1560.7	50	2.35	183,376	$11,175	$7.46
Non-STA	1427.8	50	2.39	170,627	$9,972	$7.58
Finisher stage						
W/STA	1498.2	150	3.39	761,847	$41,994	$28.03
Non-STA	1315.9	150	3.44	678,990	$36,748	$27.93
Gestation			Feed/sow/yr.			
W/STA	100		1545	154,500	$7,871	$5.25
Non-STA	100		1475	147,500	$7,514	$5.71
Lactation						
W/STA	100		615	61,500	$3,737	$2.49
Non-STA	100		730	73,000	$4,254	$3.23
Total						
W/STA	1498.2	250	3.34	1,252,075	$76,802.61	$51.26
Non-STA	1315.9	250	3.48	1,143,447	$67,826.85	$51.55

Table 5. Production Efficiency Information.

Item	W/STA	Non-STA
Total feed efficiency	3.34	3.48
Pigs per litter	8.75	8.75
Pre wean mortality, %	9%	11%
Pigs weaned per litter	7.96	7.78
Nursery mortality, %	2.00%	3.50%
Grow/fin. Cull, %	0.00%	3.60%
Grow/fin. mortality, %	4.00%	4.40%
Pig finished per litter	7.491	6.926
Litters/sow/yr	**2.00**	**1.90**
Pigs Finished/Sow/Year	**14.98**	**13.16**

over the non-STA system. This impacts the facility costs, reproduction costs, and labor costs.

Production Costs

Information from Table 6 summarizes the total production cost for the W/STA and the non-STA System. Costs reflect a year around outdoor farrowing system and are adjusted to reflect the differences from the W/STA production system. Bedding use reflects use levels as shown in current research on hoop buildings at the Iowa State University Rhodes Research Farm with bedding costs added for farrowing. The health costs were $1.47 per pig higher for the non-STA

System. The costs of antibiotics for the non-STA System are included in the feed cost. The antibiotic cost is $1.22 per head. This is $.25 under the incremental health cost for the non-STA System. This is the difference reflected in the Swedish Studies. Annual repairs were set at

10% of the initial facility price. Labor was set at $10.00 per hour and was set at 11 hours per litter. The breakeven production cost per hundred pounds was $44.52 for pigs from the nonsubtherapeutic system as compared to $42.36 for the subtherapeutic system system; a difference of $2.16 per hundred pounds or $5.39 per pig marketed.

Table 6. Cost of Production.

Non-Subtherapeutic System			Subtherapeutic System			
Variable Costs	Total	Per Head	Variable Costs	Total	Per Head	Difference
Feed	$67,826.85	$51.55	Feed	$76,802.61	$51.26	$0.28
Health costs	$6,545.76	$4.97	Health costs	$5,250.00	$3.50	$1.47
Bedding	$6,579.36	$5.00	Bedding	$7,491.12	$5.00	$0.00
Repairs	$1,895.34	$1.44	Repairs	$1,923.51	$1.28	$0.16
Fuel/utilities	$2,631.75	$2.00	Fuel/utilities	$2,631.75	$1.76	$0.24
Subtotal	$85,479.06	$64.96	Subtotal	$94,098.99	$62.81	$2.15
Interest	$4,273.95	$3.25	Interest	$4,704.95	$3.14	$0.11
Labor	$20,900.00	$15.88	Labor	$22,000.00	$14.68	$1.20
Breeding herd	$5,256.50	$3.99	Breeding herd	$5,256.50	$3.51	$0.49
Marketing	$3,289.68	$2.50	Marketing	$3,745.56	$2.50	$0.00
Total	$119,199	$90.59	Total	$129,805	$86.64	$3.95
Fixed costs	$28,430	$21.61	Fixed costs	$28,852	$19.26	$2.35
Cull revenue	$1,184.29	$0.90				$0.90
Total	$146,445	$111.29	Total	$158,658	$105.9	$5.39

Table 6. continued…

Total hogs sold	1315.87	Total hogs sold	1498.22	
Total weight sold	328968	Total weight sold	374556	
Break even (per cwt)	$44.52	Break even (per cwt)	$42.36	$2.16

References

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