

Use of Acetic Acid at 5% to Prevent the Pig Colibacillosis

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Abstract

In this work, 51 pups of pigs from the crossing between Yorkshire and YL females were studied, forming 2 experimental groups of 3 litters each. Its objective is to assess the effect of acetic acid at 5% in the prevention of diarrhea caused by Colibacillosis, and the productive behavior of pigs at weaning. Weaning weight, average daily gain and incidence of diarrhea, as well as mortality and morbidity in this category were evaluated; obtaining as a result that the use of 5% acetic acid improves the weight indicators at weaning and daily mean gain (DMG), and also decreases the incidence of diarrhea, mortality and morbidity in the piglets compared to the control group. The administration of acetic acid contributes to improve the animal's productive performance.

Keywords: Piglets; Acetic acid; Colibacillosis

Introduction

The production of pork meat is one of the most important items in the economy of many countries of the world, hence the need to achieve adequate levels of health to ensure the intensive breeding of this species with greater efficiency and productivity.

Colibacillosis is a disease characterized by the production of diarrhea in newly born, lactating and weaned piglets, produced by the bacterium *Escherichia coli*; Gram-negative bacillus and facultative anaerobe.

The use of antibiotics has traditionally been used in the prevention and treatment of this disease, however authors such as [1,2] question its use, due to the undesirable effects that can cause in the animal.

The use of acetic acid in place of antibiotics is a convenient option, being tested its effect for several author as [3-5] in addition to recognizing the most organic acids as intermediate products of animal metabolism and in many cases are final products of the fermentation of carbohydrates by microorganisms [6] so that, in appropriate concentrations, they do not represent substances harmful to the animal. The objective of this study is to assess the effect of acetic acid in the prevention of diarrhea caused by Colibacillosis, as well as to study the productive behavior of pigs at weaning.

Materials and Methods

51 piglets from the cross between male and female Yorkshire studied, forming 2 experimental groups of three litters each:

Treated group: 5 mL of acetic acid was administered orally, before consuming colostrum and then every 3 days for 2 weeks.

Control group: He was not given acetic acid

A solution of acetic acid was prepared, at a concentration of 5% with a pH, adjusted in the Cuban Institute for Research on Sugar Cane Derivatives laboratories, between 3, 5-4.

Both groups were controlled clinically every day (rectal temperature and general condition) and were subjected to the same management and feeding conditions.

The indicators studied were birth weight (BW), weaning weight (WW) and daily mean gain (DMG). The birth weight and weaning weight were determined, using a manual scale of 25 kg, with 1 kg of appreciation.

In the statistical program [7] plus version 5.1, simple one-factor ANOVA was performed for birth weight, weaning weight and daily mean gain and in the COMPROP, proportions were compared to verify the existence of significant differences between the groups studied.

Results and Discussion

The following table shows the comparison between birth weights the groups studied, showing that there are no significant differences between them, the average for both groups of 1.2 kg (Table 1).

In the following table, the results of the simple ANOVA of the weaning weights in each group are shown Table 2.

When we compare the results of the weaning weights in each group, we see that there is a highly significant difference between the control group and the treated group. At the end of the thirty days the piglets of the control group had a weight of 5.3 kg on average, much lower than the treated group, where an average weight of 6.4 kg was obtained, coinciding with the results observed by [8].

The lowest weaning weight corresponds to litters of the control group, where there was a higher incidence of sick animals, which manifested diarrhea, which negatively affects the use of food, due to malabsorption syndrome coinciding with what was found by (Table 3) [9].

Groups	Mean (kg)	Sig.	VC
Treated	1.2	NS	0.02
Control	1.2		0.06

Table 1: Analysis of birth weights in the groups studied (kg).

Groups	Mean (kg)	Sig.	VC	Diff. WW
Treated	6.4	p < 0.05	0.06	1.01kg.
Control	5.3		0.26	

Table 2: Behavior of weaning weights in each group (kg).

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The daily mean gain obtained in this study for the treated and control grupos did not comply with the parameters established in [10] which establish 182 h for the category of piglets. Despite this, higher values are observed for the treated group with significant differences with respect to control group. In the following tables it can be observed that the coefficients of variation (VC) of the control group moved widely given the dispersión of the data by the digestive disorders that were presented. In the treated group the variation coefficient, they behaved more stable as a result of a greater uniformity and a better weight at weaning (Table 4).

There are highly significant differences between the groups studied, demonstrating that acetic acid reduces the burden of coliforms and pathogenic bacteria in the gastrointestinal tract, coinciding with [11] which states that this is due to the fact that organic acids develop villi intestinal and improve intestinal absorption. On the other hand, the benefits, in the pre-weaning period, include fewer diarrheas, less arthritis; the mortality of the litter is reduced by half or a little more; improves the size of the litter and makes weaning more homogeneous [12].

The use of acetic acid is more accurate in the first weeks of life of the piglets, because in this period they have not fully developed their digestive capacity, this coincides with [13] which states that in piglets, the acid secretion of stomach does not reach estimable levels until 3 or 4 weeks after weaning.

Week 1	Mean (g)	Sig.	Probability	VC
Treated	84.4	p<0.05	1.16E-05	21.2
Control	74.7			87.7
Week 2	Mean (g)	Sig.	Probability	VC
Treated	119.1	p<0.05	4.86E-10	22.5
Control	107.29			37.6
Week 3	Mean (g)	Sig.	Probability	VC
Treated	134.5	p<0.05	3.77E-14	36.3
Control	116.6			37.7
Week 4	Mean (g)	Sig.	Probability	VC
Treated	149.5	p<0.05	2.24E-16	42.9
Control	126.3			50.5
Week 5	Mean (g)	Sig.	Probability	VC
Treated	165.2	p<0.05	2.29E-17	58.8
Control	135.9			73.6

Table 3: Behavior of the daily mean gain during the study period (g).

	1	2	3	4	5	Total
Mean(g)	94.2	107.3	116.6	126.3	135.9	116.1
SE (±)	1.9	1.2	1.2	1.4	1.7	
SD	9.4	6.1	6.1	7.1	8.6	
VC (%)	93.1	35.1	32.3	40	54.1	

Table 4: Behavior of daily mean gain in the control group for five weeks (g).

Conclusion

The use of 5% acetic acid showed favorable results in the treated group with respect to the control group, since the weight at weaning was higher for the group treated at 1.01 kg with respect to the control group, with significant differences between both groups, as well as the daily mean gain also had a better behavior in the treated piglets, obtaining an average of 18.34 g more with respect to the control group. The presentation of sick and dead was lower in the animals that were treated with acetic acid (2 deaths), in comparison with the control group (19 deaths) with highly significant differences between them. In general, the administration of acetic acid contributes to improve the animal's productive performance.

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