Application of spray dried blood plasma as feed additive for the replacement of antibiotics in piglets at the growth and termination phase

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Introduction

Nowadays, there is a demand for the use of antibiotics in the swine sector for better zootechnical and economic parameters. The intensive production systems advocate the use of antibiotics as growth promoters. However, the use of these antimicrobials in swine production has been restricted to meet the worldwide market demand, which increasingly demands quality and safe food (1). Then, it is necessary to discover new bio-based antimicrobials materials (i.e., probiotics, blood plasma, and natural plant extracts) to replace or decrease the use of antibiotics in swine production (2). One of these natural alternatives recently reported is blood plasma produced by spray drying, which is a concentrated protein ingredient for feed supplementation (3). Moreover, swine diet based on feed without antibiotics and with the presence of natural compounds has been widely studied to ensure the health of the swine herd (4). Therefore, this study evaluated the effect of spray dried blood plasma (SDP) as a feed additive for the replacement of antibiotics in piglets at the growth and termination phase.

Materials and Methods

The treatments were used as strategic pulses of either antibiotics and SDP in the feed of swine during the growth and termination phase. The SDP was added in the animals feed in the concentration of 2% for the growing phase, 1% for the growing-1 phase, and 0.8% for the finishing-1 phase. The experimental design was conducted by 4 dietary treatments with 14 repetitions composed of 3 categories of swine initial body weight at housing. A total of 1,456 swine were selected just after leaving the nursery and were evaluated for 122 days until the slaughter. All zootechnical parameters (feed intake, weight gain, feed conversion, daily weight gain, mortality, and drug interventions) were individually checked in the housing (day 0) and at 40, 70, 84 and 122 days of experiment. The sanitary indexes were evaluated throughout the housing period, with weekly intervals, which were classified as *ante-mortem* analyzes (cough and sneeze count and diarrhea score) and *post-mortem* analyzes (gastric ulcer index and pneumonia index). Data were analyzed using the Statistical Analysis System (version 9.4). (5) The experimental design was randomized blocks, and the experimental unit was the pens. Data were submitted to the Shapiro-Wilk normality test at 5% probability and Analysis of Variance (ANOVA).

Results

The results indicated that the feed with addition of the standard medication protocol (antibiotics) and without the inclusion of SDP had the highest feed intake (289.73 kg) and reached a feed conversion of 2.57 kg feed consumed per kg weight gained. The weight gain during the period of 0-122 days for the treatment with three pulses of SDP with (114.12 kg) and without of antibiotics (114.2 kg) were statistically higher than the control treatment (111.46 kg, without antibiotics and SDP). Furthermore, the antibiotic-based treatment associated with SDP showed a 7.76% increase in weight gain when compared to control group. Furthermore, there was non-significant difference in the mortality of animals and in the index for pneumonia and ulcer score.

Discussion and Conclusion

In this study, the association between antibiotics and SDP had a positive effect on weight gain and daily weight gain of pigs, compared with the negative control (without antibiotics). On the other hand, the supplementation of piglets with dehydrated blood plasma on the day of birth and during the performance in the nursery phase, found that there was no effect of the treatment with the inclusion of blood plasma on the total weight gain (6). Regarding health parameters, the treatments had no influence on the index for pneumonia, stool score, cough, and sneeze index, nor on the gastric ulcer score. However, the treatment with the strategic inclusion of antibiotics had a smaller number of injected medications and a smaller number of medicated animals, with non-significant influence on the mortality rate regardless of the treatment evaluated.

In conclusion, the application of SDP as feed additive in piglets at the growth and termination phase, associated with antibiotics, favored feed intake and weight gain, being a promising alternative to upgrade the zootechnical parameters in animal production.

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