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Research Article

EFFICACY OF NATURAL HERBAL FORMULATION "NATURALGUARD" AS AGP REPLACEMENT ON SWINE PRODUCTIVITY IN INDONESIA

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ABSTRACT

A study was conducted to determine the efficacy of the developed Natural Herbal Formulation Natural guard (reg no Ty AM 50106084.8409-2019 in Armenia) to replace the uses of antibiotics and growth promoters (AGP) in the feed. The objective is to improve the overall performance of swine including growth. Naturalguardcontains three natural essential oils, Pine oil, Eucalyptus oil and Lavender oil. Natural guard was mixed into the feed with 0.2% concentration. A total of 80 pigs in two groups were selected for the trial. Dietary of Natural Guard did not affect ($P>0.05$) the blood biochemical parameters. At the end of the experiment, Natural guard group swine gained 7 kg (12.28%) higher body weight compared to control. Feed intake did not differ ($P>0.05$) in both control and Natural guard groups. The feed efficiency data show ED that the dietary Natural Guard achieved lower FCR in swine ($P<0.05$) 19.22% as compared to the control. The current trial outcome showed that the Natural guard has the potential to replace the uses of antibiotics and growth promoters (AGP) in swine feed.

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INTRODUCTION

Excessive utilization of Antibiotic and Growth Promotor (AGP) in animal farming stimulates the bacterial resistance. The AGP residue in animal products (meat, milk, and egg) is harmful to human health. The European Union has banned the utilization of AGP in animal farming since 2006. The government of Indonesia has banned the uses of AGP in livestock feed since 2018. The natural oils are one of the potential agents to replace the uses of antibiotics in the feed.

It is a need of an hour to work on the development of a substitute for AGP in order to increase the productivity and to prevent various types of diseases. Essential oils are generally recognized as safe and recognized by the Food and Drug Administration (FDA). Essential oils can inhibit the growth of pathogen microbes in intestines and improve nutrient digestibility.

Natural guard (reg no Ty AM 50106084.8409-2019 in Armenia) is a feed additive containing three essential oils consisting of *Pine oil, Eucalyptus globules oil, Lavender oil*. The Natural guard acts as an immunomodulator that not only improves productivity but also expected to improve the quality of the pork. The present study was conducted to evaluate the efficacy of Natural guard as a potential agent to replace the AGP in swine feed.

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MATERIALS AND METHODS

Experimental design and animals

A 90-day growth assay was performed to evaluate the efficacy of Natural guard on the productivity and blood parameters of the piglet. A total of 80 crossbred piglets (Yorkshire) i.e. 40 piglets of similar age, weight, and sex in each group, were assigned to two dietary treatments, control with Antibiotics and Growth promoter and without Natural guard supplement and treatment with Natural guard supplement (2 kg/ton feed) and without Antibiotics and Growth promoter. The experiment consisted of a randomized complete block design with two replicates of the dietary treatments.

The piglets were fed twice daily. Throughout the experiment, all piglets had *ad libitum* access to drinking water. Pigs were weighed on monthly (day 0, day 30, day 60 and day 90) basis and feed consumption was determined on a weekly basis. At the end of the experiment, blood samples were collected with a monojet standard hypodermic needle. Blood samples were collected in 3 ml tubes containing ethylenediaminetetraacetic acid (EDTA). Blood samples were used to study the blood biochemical and hematological parameters of experimental swine.

Statistical analysis

Data were analyzed using SPSS software, version 16 (IBM, 2011). Data variables were determined using *the T-test*. All comparisons were done at a 5% level of significance.

RESULT AND DISCUSSION

The effect of dietary Natural guard on the biochemical parameters, body weight, feed intake and feed conversion ratio (FCR) are shown in Table 1. The dietary of Natural guard did not affect (P>0.05) the blood biochemical parameters. The pigs fed on Natural guard feed (2 kg/ton feed) had increased body weight at d 30, d 60 and d 90 (P<0.05; Figure 1). At the end of the experiment, pigs of the Natural guard group increased 7 kg (12,28%) body weight compared to control. Feed intake did not differ (P>0.05) in both control and treatment groups (Figure 2 and Figure 3). Feed efficiency data was shown by the feed conversion ratio (Figure 5). It shows that the dietary Natural guard achieved lower FCR in pig (P<0.05) 19.22% as compared to the control.

Table 1 Effect of Natural Guard on biochemical parameter in swine

Treatment	Glucose (mg/dL)	Protein (g/dL)	Albumin (g/dL)	Creatin (mg/dL)	Uric Acid (mg/dL)	Phosphat (mg/dL)	Phosphorus Acid (mg/dL)	Cholesterol (mg/dL)	Triglycerid (mg/dL)
Control	88.34	6.79	4.00	1.43	2.92	7.81	2.55	175.02	36.19
Naturalguard	86.07	6.63	4.12	1.37	1.78	8.84	2.94	161.81	35.43
P Value	0.774	0.553	0.488	0.764	0.470	0.331	0.263	0.260	0.916
Significant	ns	ns	ns	ns	ns	ns	ns	ns	ns

The application of antibiotics in pigs increases the resistance problem of the pathogen which is dangerous for human health. In early 2018, the Indonesian government has banned the application of antibiotics in the livestock industry. Therefore, it's high time to introduce phytogenic compounds that have many antimicrobial properties with high potential to replace antibiotics.

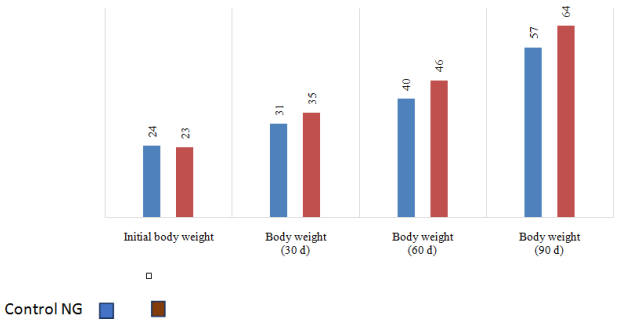

Figure 2 Effect of Naturalguardon swine body weight (kg)

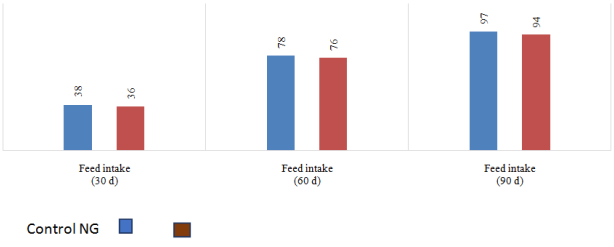

Figure 3 Effect of Naturalguardon swine feed intake (kg)

Antibiotics are commonly added to swine diets to increase growth rate and feed efficiency and for disease prevention. The response to feeding antibiotics is greater in nursery pigs than in finishing pigs and in the unhygienic environment than in a hygienic environment. With widespread uses of antibiotics, health officials are concerned about antimicrobial resistance when humans consume meat from livestock that have been fed on antibiotics. The uses of antimicrobials in livestock feed is being debated as a public health issue (NRC, 1998; Gorbach, 2001).

Neill *et al*. (2006) and Ragland (2007) have found that the pigs were fed a diet containing orenago essential oil, have better ADG and FCR compared to control. Natural oregano oil contains many components. Two of these, carvacrol and thymol, have been shown to have the strongest antimicrobial activity. Evaluation of 50 essential oils placed thymol among the 10 with the greatest antimicrobial activity. Antimicrobial activity of laurel, sage, rosemary, oregano, and coriander oils were performed and found that the microbial growth inhibition of the microorganisms tested was greatest for the oregano oil (Ragland *et al*., 2008).

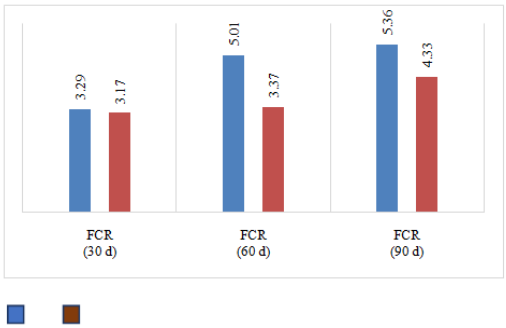

Figure 4 Effect of Naturalguardon swine feed conversion ratio (FCR; kg)

The bioactive component of essential oils can reduce *the Escherichia coli* population in the intestine and increase of villus height that improve the nutrient utilization (Zeng, 2015). Yan *et al*. 2010, reported that the supplementation of essential oils increased digestibility in the pig. Improved nutrient utilization might be due to enhanced small morphology or increased secretion of digestive enzymes (Jang *et al*., 2004).

CONCLUSIONS

Supplementation of Natural guard at the rate 2 kg/ ton of feed increased body weight and efficiency of feed by not affecting the feed intake. The Natural guard is proven to be an ideal candidate to replace the Antibiotics and Growth Promoter in the swine feed.

Acknowledgments

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