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Short Communication

Effect of Deep Litter System and Effective Microbial Technology on the Occurrence of Diseases and Immunity in Pigs

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Abstract | A total of 24 Large White Yorkshire pigs of 2-3 months age were randomly grouped into three treatments (T_1, T_2, & T_3).In each group there were eight pigs of four replicates. Animals in T_1 were kept in fermented deep litter housing system and fed with fermented feeds. Animals of T_2 were kept in fermented deep litter housing system and fed with conventional concentrate rationand animals of the T_3 groups were under conventional housing along with conventional concentrate feeding system. Feeds and litter materials were fermented with *Lactobacillus acidophilus.* The data on symptoms of diseases were recorded upto 24 weeks of age. Common symptoms of diseases viz., diarrhea, skin infection, fever was less in T_1 and T_2 compared to those of T_3 group, and mortality was not recorded in any treatment groups during the experimental period. But there was no significant difference observed between the treatment groups regarding the occurrence of symptoms of diseases as well as the antibody titre in pigs vaccinated against Classical Swine Fever.

Keywords | Deep litter housing, Disease, Probiotics, Pigs, Immunity.

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INTRODUCTION

Successful use of Effective Microbial (EM) reduce stress factors in animals, enhanced immunity and fecundity and lower the requirements of regular medicines and increase the quality and shelf life of pork products (Karanja and Ouma, 2005). There are reports of successful use of EM in poultry and pig farming in many countries (Konoplya and Higa, 2000). Scientists from different parts of the world reported that upon use of EM technology there were greater physiological activity in animals and better feed conversion efficiencies (Safalaoh and Smith, 2001; Konoplya and Higa, 2000). EM contained many naturally occurring beneficial microorganisms, which are both oxybiotic and anaerobic in nature. After ingestion through the medium of feedstuffs, these microbes multiply rapidly and check the growth of other pathogenic microbes but also formed the normal microbiota within the host body system to produce main vitamins for the host, provided nutrients and prevent attack of the pathogens (Li Wei-Jionge, 1994). The present experiment was designed to study the effect of EM technology and deep litter housing system on occurrence of diseases and immunity status of the pigs.

MATERIALS AND METHODS

A total of 24 Large White Yorkshire pigs of 2-3 months age were randomly selected from the stock maintained at Instructional Livestock Farming Complex, College of Veterinary Sciences & AH, Selesih, Mizoram. The animals were put into three treatment groups (T_1, T_2, & T_3) with eight pigs per group.In each group there were four

replicates with two pigs. Animals in T_1 were kept in deep litter housing system where the deep litter being fermented with *Lactobacillus acidophilus* and laid hours before introduction of the animals. They were given conventional concentrate ration fermented with *L. acidophilus*. Animals of T_2 were also kept on *L. acidophilus* fermented deep litter housing system and were given conventional concentrate ration. Animals of the T_3 groups were kept in conventional housing system and were given conventional concentrate feeds. The experimental animals in all the groups were given anthelmintic which was repeated for every 3 months during the study.

The health status of the animals were observed for various diseases like fever, diarrhoea, skin lesions, nasal discharge,etc. For immunological assay, the experimental pigs were vaccinated at the start of the research with lapinized Classical Swine fever virus vaccine. Serum antibody titre was recorded on 0 day followed by 28th, 56th, and 120th day by indirect ELISA (Sarma and Sarma, 1995) with slight modifications. Antibody titres were being compared among the groups for accessing humoralimmune status of the animals. All the data obtained were analyzed using WASP 2.0 (ICAR GOA) developed by Jangam and Wadekar.

RESULTS AND DISCUSSION

The symptoms of diseases viz., diarrhoea and skin infections were comparatively less in pigs of T_1 and T_2 in which pigs were maintained in deep litter housing with fermented feed (T_1) and without fermented (T_2) feed (Table 1). The statistical analysis reveals that there were no significant differences (p> 0.05) among the treatments. But the numbers of prevalence of symptoms were reduced in the T1 and T2 as compared to T3. LAB culture in feed might have acted as probiotic to help foster a healthy gut flora and enhanced their immune systems (Corcionivoschi et al., 2010; Farjardo et al., 2012). Lactic acid bacteria might have inhibited pathogenic bacteria by lowering the gut pH or competing for nutrients in the gut or for binding sites on the intestinal epithelium (Malago et al., 2011). Intestinal pathogens could not adhere to the intestinal epithelium to colonize in the intestine and therefore could not produce diseases viz., diarrhea. The incidence of diarrhea was less in T_1 and T_2 compared to T_3 (Walker, 2000). The low incidence of diseases might also be due the production of numerous antimicrobial products viz., organic acids, ethanol, H_2O_2, diacetyl, reuterin and bacteriocins (Phumkhachorn and Rattanachaikunsopon, 2010). This positive effect on health of pigs was enhanced due to keeping pigs in deep litter housing system in which pigs were provided with litter materials with sufficient floor space for normal movement. The environment was replenished with many stimuli which motivated pigs for doing activities in T_1 and T_2 (Gutzmirtl, 2009). This might have reduced the stress level in pigs. The bonding between pen-mates was very strong as aggressive behavior in pigs belonging to T_1 and T_2 was less compared to pigs in T_3. All these factors coupled with feeding of fermented feeds had given good immunity to combat diseases in pigs of T_1 and T_2 compared to T_3 group.

The antibody titre in pigs vaccinated against Classical Swine Fever was maintained up to 120 days after inoculation (Table 2). However, effect of deep litter and EM technology on antibody titre was inconsistent and found to be non-significant (p> 0.05) in the statistical analysis in the present study. This might be due to small numbers of animal in the experiment.

Table 1: Mortality and Symptoms of diseases observed in pigs during experimental period.

Parameters	T_1	T_2	T_3	Total
Symptoms of diseases				
Diarrhoea (Freq.)	1 (25.00)	3 (18.75)	5 (21.00)	9
Inappetance (Freq.)	1 (25.00)	2 (12.50)	2 (40.00)	5
Skin infection (Freq.)	2 (50.00)	7 (43.75)	7 (35.00)	16
Eye infection (Freq.)	-	3 (18.75)	2 (40.00)	5
Fever (Freq.)	-	1	-	1
Total	4	16	16	36
Mortality				
No. of pigs died	Nil	Nil	Nil	-

N.B. Figures in parentheses -% of symptoms. Differences were nonsignificant between the groups.

Table 2: Mean antibody titre of pigs in different housing systems against Classical Swine Fever vaccination.

Days	0 day	28 days	56 days	120 days
T_1	0	1.505	1.806	1.605
T_2	0	1.454	1.805	1.806
T_3	0	1.304	1.806	1.605

N.B. Differences were nonsignificant between the groups.

CONCLUSION

It could be concluded that deep litter housing with fermented feeding might be an effective technology in reducing occurrences of diseases and also increasing the immunity of the pigs.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

AUTHORS CONTRIBUTION

All authors contributed equally.

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