

Improving Piglets Survivability with Natural Oral Protein and Energy Supplement

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ABSTRACT

Objective: This study was designed to determine the effect of supplementing natural protein, energy supplement, AV/PES/12 (*M/S Ayurvet Limited, India*) in improving newborn piglets survivability and performance.

Method: The study was conducted in two phases: Experiment I was carried out in healthy piglets and experiment II will be conducted in weak piglets. For experiment I (n=30) healthy newborn large White Yorkshire piglets were selected & were segregated into three groups at the time of birth. In the untreated control group T₀, the newborn piglets (n=10) were not offered with any oral supplement. The treatment group T₁, newborn piglets (n=10) and treatment group T₂ newborn piglets (n=10) were supplemented with AV/PES/12 at two different dose regimen (according to experiment design). For experiment II (n=24) weak, small, chilled or scouring White Yorkshire piglets were selected & were segregated into three groups at the time of birth. The untreated control group T₀ (n=6) weak/chilled/scouring piglets were not offered any oral supplement. The treatment group T₁ newborn piglets (n=6) and treatment group T₂ newborn piglets (n=6) were supplemented with AV/PES/12 as per the described regimen. Piglet weight at birth and weight at weaning, the incidence of diarrhoea, the incidence of any other disease and mortality were recorded at weekly intervals.

Result: A significant increase (significant level at 5%) in the body weight was observed after supplementation.

Conclusion: The results showed the beneficial effect of herbal nutritional supplement AV/PES/12 on the growth rate and survivability of piglets.

Keywords- Herbal nutrition supplement, Newborn piglets, Perinatal mortality, Immunodeficiency.

INTRODUCTION

Immature immune system, hypothermia and immature gastrointestinal system at the time of birth are three important challenges for

newborn piglets¹. Weanling piglets are more at risk of retarded growth as well as an increase in both morbidity and mortality in pigs². Piglets during weaning are exposed to a range of stressors like diet composition

changes, environment and bacterial stress, contributing to digestive abnormalities and depressions in growth rate³⁻⁶. Newborn pigs are at risk of disease & a higher rate of pre-weaning mortality since these are born with low body-energy stores and without immunoglobulins. Perinatal mortality in modern pig production herds is relatively high (15 to 25%) compared with values for other production animal species⁷. At birth piglets are immunodeficient and for the supply of specific and non-specific immune factors they depend upon maternal colostrum and milk, this helps in the development and survival⁸. The thermoregulatory capacity is directly related to birth weight. Studies have shown that when the number of piglets increases, i.e. as litter size increases, the mean piglet birth weight decreases^{9,10}. Body surface area of the lighter piglets in relation to its weight is more, and they are, therefore, more prone to hypothermia¹¹. Colostrum provides energy essential for thermoregulation & to prevent hypothermia in piglets. The energy demand of piglets to combat hypothermia and for sustenance in first postnatal 24hrs can be met through external nutrient supplement source and it will allow colostrum to play an essential role in piglet survival. Herbs, Fat & protein rich nutritional supplements during the first 24-48 hrs post farrowing may allow utilization of colostrum to potentiate the immune response in piglets and acquisition of passive immunity¹². This in turn improves vitality in piglets & reduces mortality rate.

Therefore, the objective of the current study was to determine the efficacy of AV/PES/12 (*M/S Ayurved Limited, India*), a natural oral protein & energy supplement enriched with vitamins and minerals in emulsion form for providing a complete nutritional substitute to newborn piglets during crucial first post-natal 24-48 hrs.

MATERIALS AND METHODS

The field study was supervised by an animal ethics committee of the College of Veterinary & Animal Sciences, Maharashtra. The trial was conducted at the pig farm of Shirval.

Experimental design

The present study was conducted on newborn Large White Yorkshire piglets. The field study was conducted in two phases: Experiment I in healthy piglets and experiment II in weak piglets was carried out.

Experiment I

For Experiment I, 30 Healthy newborn Large White Yorkshire piglets were selected & were segregated into three groups at the time of birth. In the untreated control group T₀, the newborn piglets (n=10) were not offered any oral supplement. The treatment group T₁ newborn piglets (n=10) were supplemented with AV/PES/12 (*M/S Ayurved Limited, India*) as per the regimen (AV/PES/12@ 2ml per piglet orally immediately after birth). The dose was repeated after 6 hours, Once). The treatment group T₂ newborn piglets (n=10) were supplemented with AV/PES/12 (*M/S Ayurved Limited, India*) as per the regimen (AV/PES/12@2ml per piglet orally immediately after birth. The dose was repeated after 12 hours, twice). The duration of the trial was up to 4 weeks (birth to weaning).

Experiment II

For Experiment II, 24 week small, chilled or scouring White Yorkshire piglets were selected & were segregated into three groups at the time of birth. The untreated control group T₀ (n=6) weak/chilled/scouring piglets were not offered any oral supplement. The treatment group T₁ newborn piglets (n=6) were supplemented

with AV/PES/12 as per the regimen (AV/PES/12@2ml per piglet orally immediately after birth. The dose was repeated after 6 hours, thrice). The treatment group T₂ newborn piglets (n=6) were supplemented with AV/PES/12 as per the regimen (AV/PES/12@2ml per piglet orally immediately after birth. The dose was repeated after 12 hours, thrice).

During the study period parameters: Piglet weight at birth, mortality from birth to weaning (per group record), Piglet weight at the time of weaning, the incidence of diarrhoea and incidence of any other disease^{13, 14} were recorded at weekly intervals, from birth upto weaning.

Statistical analysis

Statistical analysis of the scientific data collected during the experiment was done with the method described by Snedecor and Cochran¹⁵. Results obtained from the present investigation are presented herewith in the form of Mean \pm SE and significant level at 5%.

RESULTS AND DISCUSSION

Positive dietary treatment effects were observed in AV/PES/12 supplemented groups in comparison to an untreated control group.

Experiment I

The data on average weight gain before and after the treatment in all experimental groups of experiment I was presented in table 1.

In untreated control group T₀, the average weight gain from the time birth to 4th week of age was recorded to be 3804.60 g (n=10). In treatment group T₁, the average weight gain from the time birth to 4th week of age was recorded to be 4312.60 g (n=10). This gain in weight was 508 g more than the average weight gain observed untreated control group T₀. Similarly In treatment

group T₂, the average weight gain from the time birth to 4th week of age was recorded to be 4304.10 g (n=10) and this gain in weight was recorded to be 499.5g more than the average weight gain observed untreated control group T₀. The increase in the weight gain in treatment groups in comparison to untreated control was observed because of herbal natural essential proteins, vitamins, minerals and energy sources present in AV/PES/12. The similar growth, improvement findings on supplementation with herbal growth-promoters^{16,17} were observed by Basmacioglu *et al.* (2004) and Mao *et al.* (2005). No incidence of diarrhoea/mortality was recorded in experiment I.

Experiment II

The data on average weight gain before and after the treatment in all experimental groups of experiment II was presented in table 2.

In untreated control group T₀ two pigs out of six were dying within three days after birth. One case of prolapse of rectum was recorded in treatment group T₂, which was diagnosed due to hereditary condition; was removed from the group and one piglet died on the fifth day, as crushed under the body of the mother. In untreated control group T₀, the average weight gain from the time birth to 4th week of age was recorded to be 2684.84 g (n=6). In treatment group T₁, the average weight gain from the time birth to 4th week of age was recorded to be 3320 g (n=6). This gain in weight was 635.16 g more than the average weight gain observed untreated control group T₀. Similarly In treatment group T₂, the average weight gain from the time birth to 4th week of age was recorded to be 2815.5g (n=6) and thus gain in weight was recorded to be 130.66 g more than the average weight gain observed untreated control group T₀. The similar findings regarding the improvement in the performance of piglets on different herbal

supplements¹⁸⁻²⁰ like herbal extracts (containing cinnamon, thyme and oregano extract), Ruchamax® (a blend of herbal extracts from *Adrographis paniculata*, *Phyllanthus emblica*, *Curcuma longa*, *Zingiber officinale* and *Allium sativum* M/S Ayurved, India) were observed by Namkung *et al.* (2004), Matysiak *et al.* (2012) and Lipiński *et al.* (2014). No incidence of diarrhoea or any other disease incidence was recorded during the experiment II.

CONCLUSION

Positive dietary treatment effect on growth performance was observed in pre weaning piglets. Supplementing the piglets during crucial first post natal 24-48 hrs with AV/PES/12 (*M/S Ayurved Limited, India*) had a beneficial effect on the growth rate and survival of piglets. The results confirm the natural oral protein & energy supplementing activity of AV/PES/12.

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REFERENCES

1. Sangild PT, Thymann T, Schmidt M, Stoll B, Burrin DG and Buddington RK. The preterm Pig as a Model in Pediatric Gastroenterology. *J Anim Sci* 2013; 91: 4713-4729.
2. Wilson AD, Stoke CR, Boure J. Effect of age on absorption and immune responses to weaning or introduction of novel dietary antigens in pigs. *Res Vet Sci* 1989; 46:180-186.
3. Le Dividich J, Herpin P. Effects of climatic conditions on the performance, metabolism and health status of weaned piglets: a review. *Livest Prod Sci* 1994; 38: 79-90.
4. McCracken BA, Gaskins HR, Ruwe-Kaiser PJ, Klasing KC, Jewell DE. Diet-dependent and diet-independent metabolic responses underlie growth stasis of pigs at weaning. *J Nutr* 1995; 125: 2838-2845.
5. McCracken BA, Spurlock ME, Roos MA, Zuckermann FA, Gaskins HR. Weaning anorexia may contribute to local inflammation in the piglet small intestine. *J Nutr* 1999; 129: 613-619.
6. Fraser D, Milligan BN, Pajor EA, Philips PA, Taylor AA, Weary DM. In, Wiseman JM, Varley A, Chadwick JP (ed). Progress in pigs science. Nottingham University Press; 1997: 121-140.
7. Rootwelt V, Reksen O, Farstad W, Framstad T. Postpartum deaths: Piglet, placental, and umbilical characteristics. *J Anim Sci* 2013; 91: 2647-2656.
8. Jean-Paul Lalle's, Paolo Bosi, Hauke Smidt, Chris R. Stokes. Nutritional management of gut health in pigs around weaning. *Proc Nutr Soc* 2007; 66: 260-268.
9. Johnson RK, Nielsen MK, Casey DS. Responses in ovulation rate, embryonal survival, and litter traits in swine to 14 generations of selection to increase litter size. *J Anim Sci* 1999; 77: 541-557.
10. Quiniou N, Dagorn J, Gaudre D. Variation of piglets birth weight and consequences on subsequent performance. *Livest Prod Sci* 2002; 78: 63-70.
11. Herpin P, Damon M, Le Dividich J. Development of thermoregulation and neonatal survival in pigs. *Livest Prod Sci* 2002 78: 25-45.
12. Leonard SG, Sweeney T, Bahar B, Lynch BP, O'Doherty JV. Effect of maternal fish oil and seaweed extract supplementation on colostrum and milk composition, humoral immune response, and performance of suckled piglets. *J Anim Sci* 2010; 88: 2988-2997.
13. Cho JH, Zhang S, Kim IH. Effects of Anti-diarrhoeal Herbs on Growth Performance, Nutrient Digestibility, and Meat Quality in Pigs. *Asian-Aust J Anim Sci* 2012; 25: 1595-1604.
14. Nimmo S, Pepper TA, Taylor DJ. Measurement of daily live-weight gain of piglets at weekly intervals in the

- investigation of poor growth performance. *Vet Rec* 1981; 108: 160-3.
15. Snedecor GW, Cochran WG. Statistical methods. 6th ed., Ames Iowa: The Iowa State University Press; 1991: 1-503.
 16. Basmacioglu H, Tokusoglu O, Ergul M. The effect of oregano and rosemary essential oils or alpha-tocopheryl acetate on performance and lipid oxidation of meat enriched with n-3 PUFAs in broilers. *S Afr J Anim Sci* 2004; 34: 197-210.
 17. Mao FX, Piao FX, Lai CH, Li DF, Xing JJ, Shi BL. Effects of beta glucan obtained from the Chinese herb *Astragalus membranaceus* and lipopolysaccharide challenge on performance, immunological, adrenal, and somatotropic responses of weanling pigs. *J Anim Sci* 2005; 83:2775-2782.
 18. Namkung H, Li M, Gong J, Yu H, Cottrill M, de Lange CFM. Impact of feeding blends of organic acids and herbal extracts on growth performance, gut microbiota and digestive function in newly weaned pigs. *Can J Anim Sci* 2004; 84: 697-704.
 19. Matysiak B, Jacyno E, Kawęcka M, Kołodziej-Skalska A, Pietruszka A. The effect of plant extracts fed before farrowing and during lactation on sow and piglet performance. *S Afr J Anim Sci* 2012; 42: 15-20.
 20. Lipiński K, Skórko-Sajko H, Antoszkiewicz Z, Purwin C, Kucman E. A note on the effect of dietary supplementation with herbal extracts on sow and litter performance. *S Afr J Anim Sci* 2014; 44: 110-113.

Table 1. Average birth weight (g), average body weight at 4th week (g) and average weight gain in healthy piglets exposed to different dietary treatments

Groups	Healthy piglets			
	Average birth weight (g)	Average weaning weight AT 4 th week (g)	Average weight gain (g)	Average weight gain /piglet compared to control (g)
T ₀ Control	1309.9±24 ^a	5114.5±32 ^a	3804.60	--
T ₁ (two dose treatment)	1299.7±18 ^b	5612.3±46 ^b	4312.60	508g
T ₂ (three dose treatment)	1274.2±33 ^c	5578.30±13 ^c	4304.10	499.5g

No mortality was recorded in any of the groups which may be attributed to the good managerial practices in planned experiment.

^{abc} Rows with different superscripts depicts significant difference at 5% level of significance.

Table 2. Mortality, average birth weight (g), average body weight at 4th week (g) and average weight gain in weak piglets exposed to different dietary treatments

Groups	Weak piglet				
	Mortality	Average birth weight (g)	Average weaning weight AT fourth week (g)	Average weight gain (g)	Average weight gain /piglet compared to control (g)
T ₀ Control	2/6 = 33.34 %	758.66±15 ^a	3443.50±23 ^a	2684.84	---
T ₁ (4 dose treatment at 6 hourly interval)	---	772.50±18 ^b	4092.50±27 ^b	3320	635.16
T ₂ (4 dose treatment at 12 hourly interval)	2/6 = 33.34 %	738.83±9 ^c	3554.33±18 ^c	2815.5	130.66

^{abc} Rows with different superscripts depicts significant difference at 5% level of significance