Acta Veterinaria (Beograd), Vol. 60, No. 2-3, 249-256, 2010.

DOI: 10.2298/AVB1003249O UDK 619:618.63:636.4

TEAT SANITATION IN LACTATING SOWS

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(Received 5th August 2009)

Preweaning piglet mortality is a serious source of economic losses in pig production, with enteric diseases as the most common infectious cause of mortality. The aim of this study was to determine the efficacy of teat sanitation in lactating sows in order to reduce the piglet bacterial invasion through contaminated teats leading to outbreaks of enteric diseases. The study was carried out in a farrowing pen with 60 sows divided into three groups of 20 animals. Group 1 animals served as the control group and were left untreated. In group 2, sow teats were treated with water and in group 3 with a commercial antiseptic with potent bactericidal action. Microbiological purity of the teats was determined during 24 days of the piglet suckling period. Study results showed the bacterial count per teat to be significantly lower in both experimental groups as compared with the control group ($p<0.01$). Also, bacterial count was significantly lower in group 3 treated with the antiseptic than in group 2 treated with water alone ($p<0.01$). Accordingly, sow teat sanitation is a potential prophylactic measure during the piglet suckling period as it significantly decreased bacterial count on sow teats, thus reducing the risk of bacterial invasion of the piglet alimentary system.

Key words: bacteria, lactating sows, piglets, sanitation, teat

INTRODUCTION

Piglet mortality is still a source of serious loss in swine industry (Yeske *et al*., 1994; Bowman *et al*., 1996; Koketsu *et al*., 2006) and has been identified as an important animal welfare issue (Alonso-Spilsbury *et al*., 2007). The average rate of piglet survival to weaning is about 80% (Su *et al*., 2008). Furthermore, most preweaning mortality occurs within the first three days of the piglet's life (Tuchscherer *et al*., 2000).

The piglet is immunologically immature at birth and for immune protection depends on early postnatal transfer of maternal antibodies from colostrum.

Therefore, epidemics of certain neonatal diseases can occur and may result in extremely high levels of mortality over limited periods of time (Lay *et al.*, 2002).

Diarrhoea in newborn piglets is a complex problem resulting from the interaction between one or more infectious agents, immunity and management procedures, which can favour the implantation of enteropathogens and/or aggravate their manifestations (Morin *et al.*, 1983). The high proportion of diarrhoea-related mortality in preweaning piglets is commonly exceeded only by stillbirths, trauma and starvation as immediate causes of piglet mortality (Urcelay *et al*., 1984). During the first 3 days of life, enterotoxigenic *Escherichia coli* is the most common causative agent associated with diarrhoea (Dewey *et al*., 1995).

Infections are the major causes of suffering and may be fatal in animals of all ages, including newborns (Mellor and Stafford, 2003). Piglets are very sensitive to environmental microbes. Depending on the piglet individual resistance and number and species of bacteria, excessive bacterial invasion through contaminated teats resulting in enteric diseases can be expected. This raises the question of how to effectively reduce the rate of bacteria entering the body through contaminated teats and their harmful effects.

The aim of the study was to evaluate the effect of sow teat sanitation during the piglet suckling period on bacteria reduction and consequently bacterial invasion of the piglet alimentary system.

MATERIAL AND METHODS

The study was carried out in a modern properly equipped farrowing pen of 337.5 m^2 surface area, with automatic regulation of primary microclimatic conditions (Big Dutchman, Germany). The farrowing pen consists of 3 equal parts, separated from each other by a barrier wall and a sliding door. In each part there are 20 semi slatted farrowing crates of 4.32 m^2 surface area, each with parallel restriction for the sow. Sows were housed in a farrowing pen for 24 days of the piglet suckling period. They were fed with standard diet for lactating sows by an automatic feeder system (Big Dutchman, Germany).

The study included 60 sows, all in their second farrowing, of the Swedish Landrace breed, each with on average 10 piglets. Sows were divided into three groups of 20 animals. Each group was accommodated in one part of the farrowing pen. Group 1 served as the control group. In group 2, sow teats were treated with water and in group 3 with a commercial chlorine-based antiseptic Oxyl® (Aquastel, Croatia) with a potent oxidizing bactericidal action. The antiseptic was used in 1:20 dilution, according to the manufacturer's instructions. Every morning, 1x1 cm swabs were obtained from the surface of one cranial teat in each sow. In the control group, swabs were taken once, and in groups 2 and 3 twice, i.e. before and after teat treatment, using disposable napkins soaked with water or antiseptic. Bacterial count was determined by the standard method of nutrient agar incubation (Columbia agar base, Biolife, Italy) at 37 °C for 24 hours. Results were expressed as colony-forming units (CFU) of aerobic mesophilic bacteria *per* cm^2 of teat.

Statistical analysis was performed using the Statistica 8.0 (Statsoft Inc., 2008) statistical software and methods of variance analysis (one-way ANOVA and ANOVA Repeated Measures).

RESULTS AND DISCUSSION

Study results are shown in Table 1 and Figure 1. Throughout 24 days, a significantly lower total bacterial count was determined after teat treatment with water or antiseptic, as compared with the control group ($p<0.01$). Also, a significantly lower bacterial count was recorded after teat treatment in the group of sows with antiseptic treated teats than in those with water treated teats ($p<0.01$).

Teat sanitation in lactating sows is not performed as a routine as in dairy farming where appropriate udder hygiene is a basic measure to prevent mastitis and to reduce post-secretion contamination of fresh milk (Pavičić *et al*., 2005b).

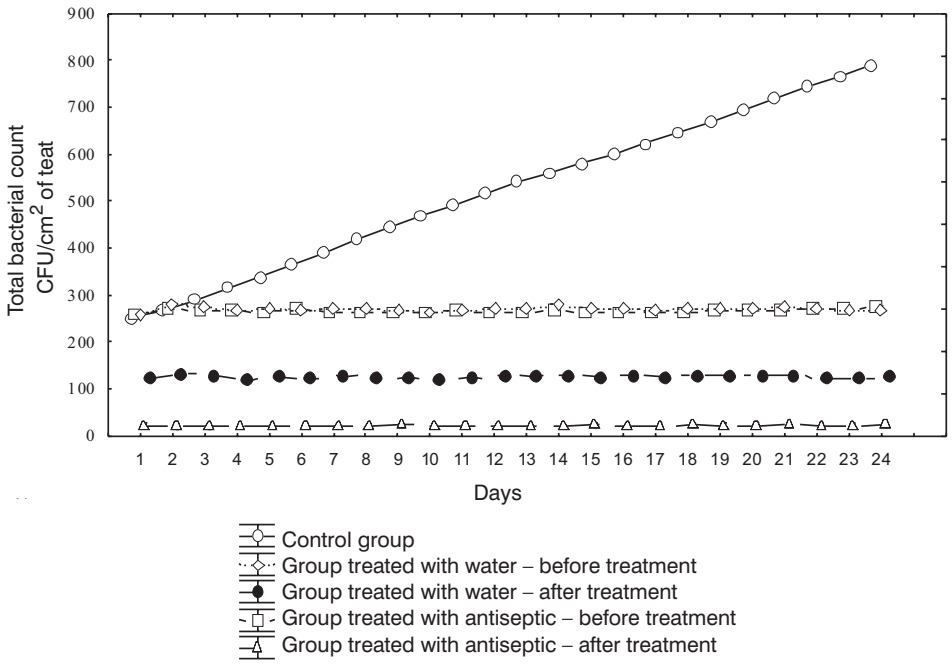

Figure 1. Aerobic mesophilic bacteria *per* cm^2 of sow teat before and after treatment with water or antiseptic during 24 days of piglet suckling period

Our intention was to see whether teat sanitation in lactating sows could significantly reduce bacterial count as the predominant agents of enteric diseases

Table 1. Total bacterial count on sow teat before and after treatment with water or antiseptic

Day	Bacteria, CFU/cm^2				
	Control group	Group treated with water		Group treated with antiseptic	
		Before treatment	After treatment	Before treatment	After treatment
1	251.45^a±11.56	259.08^a±15.06	122.74±8.97	260.64^a±15.76	21.59±5.55
2	267.92^a±12.59	278.18^a±18.57	130.47±11.75	270.09^a±17.18	20.71±4.92
3	290.08±12.67	274.04^a±15.42	129.41±10.18	268.47^a±15.27	20.21±3.43
4	315.27±11.62	269.13^a±14.87	121.18±7.54	266.91^a±12.48	20.94±3.83
5	339.08±11.29	270.57^a±9.01	125.79±7.76	264.49^a±9.64	21.12±3.74
6	364.45±13.84	266.67^a±9.30	125.07±8.39	270.34^a±11.69	22.45±4.02
7	389.70±11.30	272.72^b±9.77	125.99±8.17	264.58^b±10.47	21.44±4.36
8	419.31±13.44	272.23±8.00	124.08±8.06	261.83±11.24	22.07±3.18
9	445.02±16.32	268.33^a±9.46	124.39±9.20	263.52^a±9.75	23.18±3.71
10	467.79±14.34	261.23^a±4.63	120.67±7.15	263.16^a±10.40	22.28±3.92
11	491.89±14.14	268.85^a±9.50	125.03±8.19	265.48^a±11.76	21.87±3.86
12	517.69±13.08	271.17^a±9.83	126.18±9.30	263.73^a±13.61	21.35±4.20
13	540.84±13.63	271.93^a±10.26	125.77±8.42	264.61^a±10.23	22.01±4.25
14	558.65±13.74	277.76±9.76	128.56±6.38	266.03±10.51	21.43±3.60
15	579.55±15.37	273.31^b±9.41	124.81±7.76	264.00^b±9.95	22.90±3.36
16	599.31±17.22	270.90^a±10.09	126.50±8.35	263.76^a±8.82	22.64±3.95

Cont. Table 1.

Day	Bacteria, CFU/cm^2				
	Control group	Group treated with water		Group treated with antiseptic	
		Before treatment	After treatment	Before treatment	After treatment
17	622.82±17.25	268.76^a±10.37	124.14±7.21	264.96^a±10.56	21.76±3.35
18	644.56±18.63	270.38^a±8.87	125.78±6.99	263.17^a±9.68	23.23±3.11
19	668.65±21.13	272.80^a±9.06	126.80±9.11	265.45^a±7.39	21.66±3.78
20	694.03±23.22	271.48^a±9.30	125.98±8.40	266.20^a±11.11	21.94±3.27
21	719.64±25.44	275.34^a±8.84	126.66±6.59	267.32^a±10.84	23.12±3.36
22	743.10±26.20	273.10^a±8.85	124.77±6.73	270.95^a±9.78	21.82±3.36
23	764.64±26.38	268.97^a±9.68	124.56±7.94	273.45^a±9.01	22.50±4.01
24	790.01±29.12	269.08^a±10.28	126.22±4.61	273.80^a±13.48	23.11±3.52

Colony-forming unit (CFU); values are expressed as mean ± SD; n= 20 *per* daily measurement in each group;
in rows with no common superscript, statistically significant difference in the mean bacterial count on the same day ($p<0.01$);
^{a}statistically significant between-group difference in the means presented in the same row ($p<0.01$), except for values marked with the same letter;
^{b}the means marked with the same letter (in the same row) statistically significantly differed at the level of $p<0.05$.

that pose an economically significant problem in suckling pigs (Fablet *et al*., 2004).

The last decades have seen great improvement in pig production. Better genetics, nutrition, flow management, and building design have helped to improve production efficiency and profitability. However, diseases, infections in particular, remain as a major obstacle to stable and profitable production (Dufresne, 2002). Thus, prevention and treatment of infections are essential to reduce unnecessary production losses and to enhance the food-animal welfare.

Prophylactic measures like disinfection are ever more important in animal husbandry in order to avoid the use of antibiotic additives in feedstuffs and to minimize the need of therapeutic drugs in food producing farm-animals (Böhm, 1998). Disinfection in a wide sense includes procedures of removing, rendering inert and destroying microorganisms. In a limited sense, it includes a procedure that reduces the number of microorganisms below the infective dose and is most often performed by chemical sanitarians (Tofant and Hoić, 1998; Pavičić *et al*., 2003). Various antiseptics are currently available for udder hygiene; however, ecologically acceptable agents with a high degree of biodegradability and free from skin aggressiveness are preferred.

In the present study, disinfection was performed with a healthy and ecologically acceptable, commercial oxidizing chlorine-based antiseptic, with no rinsing needed and with a high efficiency rate, as proved in a previous study of udder hygiene in cows (Pavičić *et al*., 2005a).

CONCLUSION

The study demonstrated the introduction of teat sanitation in sows as a potential prophylactic measure in pig production to significantly decrease bacterial count and consequently their invasion of the piglet alimentary system.

ACKNOWLEDGEMENT
Supported by the Ministry of Science, Education and Sports of the Republic of Croatia (Grant No. 053-0532265-2242, 053-0532265-2238 and 053-0531854-1865).

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SANITACIJA SISA KOD DOJNIH KRMAČA

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SADRŽAJ

Mortalitet prasadi u periodu pre odbijanja, predstavlja ozbiljan uzrok ekonomskih gubitaka u uzgoju svinja, a najčešći uzrok uginuća su infekcije digestiv-

nog trakta. Cilj ovog rada je bio da se utvrdi efikasnost sanitacije sisa dojnih krmača sprovedene radi smanjenja pojave bakterijskih infekcija prasadi. Ispitivanja su izvedena u prasilištu na ukupno 60 krmača podeljenih u tri jednake grupe. Grupa 1 je bila kontrolna i bez tretmana dok su u grupama 2 i 3 sise bile prane vodom, odnosno komercijalnim antiseptikom sa baktericidnim dejstvom. Mikrobiološki nalazi su praćeni tokom 24 dana, za sve vreme perioda sisanja. Postignuti rezultati su ukazali da je u oglednim grupama broj bakterija bio znatno manji nego u kontrolnoj grupi ($p<0.01$). Osim toga, broj bakterija je bio značajno manji u grupi tretiranoj antiseptikom u odnosu na grupu tretiranu samo vodom ($p<0.01$). Smatramo da je sprovođenje higijene sisa značajna profilaktička mera koja smanjuje broj bakterija na sisama a time i rizik od nastanka bakterijskih infekcija prasadi, posebno u digestivnom traktu.