Deep intrauterine insemination in sow: results of a field trial

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Deep intrauterine insemination in sow:
results of a field trial

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ABSTRACT

Traditional insemination techniques in pigs deposit a high number of spermatozoa (2 to 3x10^9 spermatozoa) in a large volume of liquid (80-100 ml) into the cervix channel. The dose can be reduced markedly by depositing it directly into the uterine horn. Previous studies showed that fertility rate and litter size were not significantly different with 5 or 15x10^7 spermatozoa in 10 ml into the uterus. The goal of this study was to determine the on-farm application and the reproductive performance of the deep intrauterine insemination (Firflex® probe, MAGAPOR, Spain) in sows. Experiments were conducted under field conditions in 4 commercial pig farms in the North of Italy (September 2003 and March 2004). A total of 166 crossbred multiparous sows were randomly selected after weaning and assigned to one of the following groups: Group 1 – traditional insemination with 3x10^9 sperm./dose, two insemination per oestrus (n=94) and Group 2 – deep intrauterine insemination with 15x10^7 sperm./dose, one insemination per oestrus (n=72). Different technicians in each farm performed the inseminations. Fertility rate was verified by transcutaneous ultrasonography; the total number of born and the number of alive born were counted at farrowing. Analysis of variance using the GLM procedure of SAS (SAS/STAT, 2000) was used to determine the effect of insemination technique, parity, period, farm and their interaction on the main effects of fertility rate and litter size. Fertility rate of Group 2 (50.5%) was significantly lower (P≤0.01) than those achieved after a traditional insemination (77.8%). The interaction between the insemination group and the period of trial was significant (P≤0.01), pointing out increasing results during the second period for deep intrauterine insemination. Prolificacy was significantly lower (total born, P≤0.05, and born alive, P≤0.01) for Group 2. In conclusion, the results indicate that deep intrauterine insemination might realize suitable results with respect of fertility, even if the adverse effects on prolificacy will need to be further tested. The potential advantage for the pig industry occurs if technicians acquire the specific practice.
Effects of *Galega officinalis* L. and *Foeniculum vulgare* P. Miller on performance of lactating sows

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ABSTRACT

Excessive fatness and extreme thinness in breeding sows can compromise milk production and subsequent reproduction and lead to different mobilization of fat reserves. This work was aimed at evaluating the effects of an extract of *Galega officinalis* L. and *Foeniculum vulgare* P. Miller on fat reserves mobilisation, reproductive efficiency and piglets’ growth. The above extract, whose galactopoietic function is known, was added to lactating sows diet. 48 multiparous sows (L x LW) were divided into 2 homogeneous groups and reared in single cages from 3 days before delivery to weaning, 21 days after farrowing. The control group was given a commercial feed whilst the treated group was given the same feed with the addition of 12.5 g/100 kg BW of an extract of *Galega* and *Foeniculum*. Sow BW and backfat thickness in P2 measurements were collected 3 days before and 21 days after delivery. Recordings were also made of the number of piglets born alive and weaned, the litter weight and the daily feed intake of each sow. Blood samples were collected from each sow at 3 days before delivery, 14 and 21 days after farrowing to detect plasmatic NEFA content. During lactation, the reduction of backfat thickness in the treated group was significantly lower than control group (5.58 vs. 7.29 mm, P<0.01), whilst no significant differences were observed in sow BW at weaning. Nevertheless the lowest mobilization of fat reserves did not reduce NEFA in plasma, probably because of the considerable individual variability of this parameter. Piglet BW at birth and at weaning were not statistically different, nor were ADG (231.2 and 224.9 g for control and treated group respectively), number of piglets born alive or number of weaned piglets. The feed intake (7.19 vs. 7.53 kg/d for control and treated group respectively, P=0.19) did not differ. The weaning-heat interval was shorter in the treated group (5.71 vs. 6.37 d, P<0.05), showing an improvement of reproductive efficiency. These data suggest that the extract of *Galega* and *Foeniculum* can limit the loss of backfat thickness in sows during lactation and can improve reproductive efficiency without any unfavourable effects on piglet growth.
Effects of new natural feed additives on growth and intestinal microflora of weanling piglets

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ABSTRACT

Some feed additives are used because of their demonstrated ability to increase growth rate, improve feed utilization, and reduce mortality and morbidity from clinical and subclinical infections. As alternatives to additives like antibiotics, herbs and herbal mixtures are receiving increasing attention. Many herbs and spices are known to have antibacterial effects, to increase the palatability of diets and thereby increase feed intake, or to have antioxidants and immunostimulant effects, preventing infections. In this trial it was examined the different effects of four dietary herbal additives on the performance and on intestinal microflora of weanling pigs. Animals were divided into five groups of 28 piglets each and treated from 21 to 41 days of age as follows: CN (negative control, no additives); AB (positive control, 2 g/kg feed of apramycin and 1 g/kg feed of colystin); LY (1,6 g/kg of Lycium barbarum); PE (2 g/kg of Paeonia lactiflora); OL (2 g/kg of Olea europea); PO (2 g/kg of Portulaca oleracea). Individual weight was determined on d21, d29, and d41, and feed intake was estimated at the end of the treatment period (d41). Faecal samples were collected on 29d and 41d and total bacterial count, *Escherichia coli*, *Enterococcus* spp., total coliforms, anaerobic bacteria, and *Lactobacillus* spp. were cultured in selective media. The average weight gain in the treatment period was greater in LY, PE and PO groups with respect to OL and CN group (respectively 3.7, 3.82, 3.76, 3.16 and 3.22 kg, SE=0.23 kg). Average feed intake was higher in these groups with respect to CN, indicating that the tested substances did not negatively affect palatability of feed. Microbiological evaluations on faecal samples showed a lower value for total bacterial count (P<0.1), *E. coli* (P<0.1) and total anaerobic count (P<0.01) in PE group, with respect to CN group. In PO group *Enterococcus* spp. (P<0.05) and total anaerobic count (P<0.01) were lower with respect to CN group. These results suggest that these herbal additives could contribute to improve growth performance and control intestinal microbiota.

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Performances of Italian pig breeds fed diets for commercial hybrids

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ABSTRACT

The effects of specific diets for commercial hybrids were investigated on 6 Casertana (CA), 11 Mora Romagnola (MR), 19 Large White x Mora Romagnola (LM) and 9 Borghigiana (BO), a hybrid of Large White and Nera Parmigiana. Diets were formulated assuming that requirements of breeds were similar and did not differ from those used for the hybrid pigs bred in the Experimental Station. Feeds were prepared weekly and made up of meal and pellets (when \( \leq 60 \text{ kg L.\omega.} \); CP 20.7; ED 3610 kcal/kg) or meal (when 60<\( \text{kg L.\omega.} \leq 90 \text{ kg}; \) CP 19.5; ED 3662 kcal/kg; and when \( >90 \text{ kg L.\omega.} \); CP 17.5; ED 3720 kcal/kg). All animals had an under-skin transponder and were fed with an automatic feeder for calculation of average daily gain (ADG) and feed conversion index (FCI). BO and LM reached the final weight (199 kg and 210 kg) more rapidly than CA and MR (200 kg and 193 kg); differences between sexes were observed for BO only. ADG were calculated for 5 groups based on L.w. of animals: \( \leq 60 \text{ kg}, 60<\text{kg} \leq 90, 90<\text{kg} \leq 120, 120<\text{kg} \leq 160, >160 \text{ kg}.\) Differences were analysed with a bifactorial model (breed x group) with interaction. When \( \leq 60 \text{ kg}, \) ADG of LM was statistically lower than CA and MR (P<0.001); in the other groups, BO and LM showed higher values than other breeds; when 120<\( \text{kg} \leq 160 \text{ kg}, \) CA showed higher ADG although not statistically different from others. On the whole trials, the two hybrid types showed better ADG. The CA and MR consumed more than BO and LM; FCI was 4.2 and 4.3 vs. 3.5 and 3.7 respectively. Performances of the hybrids were not different from those of commercial hybrids; CA and MO confirmed to be prone to adipogenesis and showed a poor growth rate if compared with other types. Nevertheless they represent a valuable genetic reserve to utilise for recovering some properties of meat or fat, actually lost due to the selective programs.
Meat quality in cross-bred F1 (wild boar x swine) reared indoor and outdoor pens

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ABSTRACT

The demand of healthiness and quality of animal production is great, especially for meat, which has to be poor in fat and rich in proteins and unsaturated fatty acids. These special characters are distinctive of meats from extensive and/or semi-extensive rearing of wild and autochthonous animal species. The rearing of hybrid (wild boar x swine) may supply niche production with high added value, in those areas more and more tending to be marginal. Eight hybrids, weaned at 50 days, have been reared in indoor pigsty and in outdoor pen. Both groups have been fed, for 180 days, on a feed containing 10% grape skin. The chemical composition of Longissimus dorsi (LD) and Quadriceps femori (QF) muscles and the fatty acid composition have been determined. The data have been analyzed for variance and the significance between the means evaluated using Student’s "t" test. The rearing system significantly affects (P<0.01) not only the ash content of raw LD, which is higher for the animals reared indoor (1.27 vs. 1.18%), but also the protein level (P<0.01) of the QF, higher for the indoor reared subjects (22.12 vs. 19.64%) and ω6/ω3 ratio, higher (P<0.05) for the indoor reared animals (19.42 vs. 14.61). On QF muscle from outdoor reared animals it has been observed a greater (P<0.05) content of C18:1 ω9 (42.18 vs. 39.05%) and a lower amount (P<0.05) of C18:1 ω7 (3.60 vs. 4.10%) and a significant difference (P<0.05) of the total content of monounsaturated fatty acids, more abundant in the fat of F1 outdoor reared animals (49.10 vs. 46.68%). On the contrary, the distribution of fatty acid of raw LD muscle showed significant differences (P<0.05) to be charged to the C18:3 ω3 content, higher in the fat of the outdoor reared animals (0.58 vs. 0.40%). No significant differences have been measured on the QF muscle fat composition. On comparing the results, it can be asserted that, in spite of the differences found, the rearing system only in part affects the chemical and acidic composition of the meat from both groups, even considering cooking treatment.
The SIQUALTECA project: steam decontamination of carcasses in a commercial pig facility

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ABSTRACT

The microbiological examination of carcasses was conducted in a commercial pig slaughter facility with a maximum slaughter capacity of 200 animals per hour. In particular, 108 half carcasses were examined at the end of the slaughter line. The log mean numbers of total mesophilic aerobes was 5.89 log_{10} CFU/cm^2. Estimated log mean numbers of coliforms and E. coli were 2.86 and 2.31 log_{10} CFU/cm^2 respectively. Values obtained for mesophilic count and E. coli on carcasses were higher than those indicated in the Decision 2001/471/CE. These results should lead to undertake concrete actions to review the controls of the procedures, to discover the causes and to avoid the repetition of such results. Salmonella spp. was isolated from 26.9% of slaughtered pigs, whereas 8.6% of samples analysed for L. monocytogenes were found positive. Results obtained from microbial counts, together with the high Salmonella spp. and L. monocytogenes prevalence, suggest that general hygiene standards alone are not sufficient to ensure food safety and reduce the risk of foodborne illness. To evaluate the effectiveness of steam pasteurization in such an environment, a pilot-plant process which exposes the carcasses to steam before the evisceration step was developed. In 4 trials 86 carcasses were sampled. After treatment, mesophilic counts were significantly reduced (P<0.05) by up to 2.26 log_{10} CFU/cm^2. The current study verified that the scaled-up commercial pasteurization system is very effective in reducing the levels of natural mixed flora on surfaces of commercially slaughtered pig carcasses. Furthermore, if the evisceration is carried out properly, steam treatment can be placed before the evisceration step to reduce the negative effect of heat on meat appearance. Nevertheless, the decontamination must be considered as supplement to a slaughter procedure already optimized in terms of hygiene. Decontamination treatments, in fact, do not eliminate the consequences of a slaughter practised under scarce hygienic conditions, but can improve the effectiveness of an already implemented HACCP system.
ABSTRACT

Some species of Lactic Acid Bacteria (LAB) and coagulase negative staphylococci (CNS) are generally used as starter cultures for dry fermented sausages because of their capability to positively affect the organoleptic and hygienic characteristics of these products. Among LAB, lactobacilli are of increasing interest for their probiotic properties, which can exert a positive effect on human health. Actually, the most common way of consumption of probiotics is represented by fermented dairy products, but recently the new idea to use probiotic strains in other foods, such as fermented meat products, is developing. Therefore the aim of this study was the selection of suitable Lactobacillus (Lb.) and Staphylococcus (S.) strains, isolated from dry fermented sausages, to formulate an innovative meat starter culture showing probiotic characteristics. 11 Lactobacillus strains were characterized for probiotic behaviour (survival to low pH, growth in the intestinal environment, adhesion to intestinal epithelium, utilization of prebiotic carbohydrates) and technological properties (growth in presence of NaCl, antimicrobial, acidifying, superoxide dismutase (SOD), proteolytic and nitrate reductase activities). Most of them belonged to the Lb. plantarum species. 96 Staphylococcus strains were characterized for technological properties such as nitrate reductase, proteolytic, lipolytic and antioxidant activities as well as growth ability at different temperatures, pH and NaCl concentrations. All Lactobacillus strains showed interesting probiotic properties and good antimicrobial, antioxidant and acidifying activities. Several Staphylococcus strains possess remarkable antioxidant, nitrate reductase and proteolytic activities and growth characteristics (temperature, pH and NaCl). In conclusion, the strains characterized in the present research are eligible as a good starter cultures for different technological conditions and types of manufacture of fermented sausages. Moreover, provided the probiotic behaviour of lactobacilli, the starter culture formulated could be defined as probiotic and may favour the development of new fermented meat as functional food.