**Effect of farrowing pen hygiene (standard vs. optimal) and creep feeding regime (dry pelleted starter diet vs. liquid mixture of milk replacer and starter diet) on pig feed intake and growth**

Application: Creep feed dry matter intake of piglets was increased when a liquid mixture of starter diet and milk replacer was offered but only when optimal hygiene conditions existed in the farrowing accommodation. This dietary strategy increased pre-weaning growth and weaning weight and improved pen hygiene increased creep feed dry matter intake.

Introduction: Piglet weaning weight (ww) can be increased by increasing pre-weaning creep feed intake. The objective was to evaluate the effect of providing dry pelleted starter diet (DPS) or a liquid mixture of milk replacer and starter diet (LMR+S) to suckling pigs housed in farrowing accommodation of standard or optimal hygiene on pre- and post-weaning feed intake and growth.

Material and methods: The experiment was a 2x2 factorial arrangement with factors being pen hygiene (standard or optimal) and creep feeding regime (DPS or LMR+S). The standard hygiene environment was obtained by thorough washing with water and <18 hours drying. The optimal hygiene environment was obtained by detergent application, followed by a thorough water wash, chlorocresol-based disinfectant application and 6 days drying. Both cleaning protocols were implemented prior to entry of the sows to the farrowing rooms. Prior to entry of sows, 16 pens from each hygiene environment were swabbed for determination of *Enterobacteriaceae* counts and total bacterial counts. On day (d) 107 of gestation, 87 sows were weighed and blocked on the basis of parity, previous number of piglets weaned and bodyweight before being randomly assigned to one of the four treatments. By 48 hours post-farrowing, litter size was standardised within block. From d11 to weaning at d28 DPS (3 mm diameter) was offered. Between d4-9 piglets on LMR+S (~15% dry matter) treatment were offered liquid milk replacer only; thereafter a liquid mixture of milk replacer and an increasing proportion of starter diet was offered up to weaning. Suckling pigs were weighed on d4 and d28 of age and total dry matter feed intake (DMI) was recorded for the entire suckling period. At weaning, single-sex pen groups (12 male or female pigs of even weight per pen; n=12 pens/treatment) were formed, blocked on sex and ww and followed until target slaughter weight (130±1.9 kg). Data were analysed using PROC MIXED (v9.4, SAS Institute Inc.) with creep feeding regime (DPS or LMR+S), pen hygiene (standard or optimal) and their associated interactions as fixed effects. Block was a random effect and piglet birth weight (for pre-weaning parameters) and ww (for post-weaning parameters) were included as co-variates, when significant in the model. The litter/sow was the experimental unit prior to weaning and pen group was the experimental unit post-weaning. Pre-weaning mortality per litter and days required to reach target slaughter weight from weaning to slaughter were analysed using PROC GLIMMIX with multinomial distribution. The Tukey-Kramer adjustment was applied for multiple comparison of means and differences were considered significant when P≤0.05.

Results: At entry of sows to farrowing accommodation, optimal hygiene pens had lower *Enterobacteriaceae* counts (0.4 vs 3.5 ± 0.10 log10 CFU/cm2) and total bacterial counts (2.1 vs 4.9 ± 0.14 log10 CFU/cm2) compared to standard hygiene pens (P<0.05). There was a creep feeding × hygiene interaction for ww. Weaning weight was higher for LMR+S compared to DPS in both standard and optimal hygiene environments (Table 1; P<0.05). At weaning LMR+S piglets were heavier than DPS piglets (8.9 vs 8.3 ± 0.12 Kg; P<0.05). There was a creep feeding × hygiene interaction for DMI from d4-28 of lactation; DMI was increased by LMR+S in the optimal but not the standard hygiene environment (Table 1; P<0.05). The DMI of piglets was higher in the optimal compared to the standard hygiene environment (475 vs 326 ± 34.8 g; P<0.05). The ADG was higher for LMR+S compared to DPS (289 vs 272 ± 6.4 g/day; P<0.05) but was not affected by pen hygiene (P>0.05). The proportion of piglet deaths per litter between d4-28 was reduced by 1.01 ± 0.50% with LMR+S (P<0.05). Post-weaning, pigs originating from optimal hygiene farrowing pens had numerically higher ADG and reached target slaughter weight 3.8 days earlier (P<0.05) than pigs from standard hygiene pens.

Table 1: Effect of creep feeding regime (DPS or LMR+S) and farrowing pen hygiene (standard or optimal) on pre-weaning piglet feed intake and growth [Least square means ± pooled standard errors of the mean (SEM)].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Creep feeding  | DPS1 | LMR+S1 |  | P-value |
| Hygiene | OPTIMAL | STANDARD | OPTIMAL | STANDARD | SEM | Hygiene | Creep feed | Hygiene \* Creep feed |
| No. sows/litters | 22 | 23 | 21 | 21 |  |  |  |  |
| Bodyweight (kg) |  |  |  |  |  |  |  |  |
|  Day 4 | 2.1 | 2.2 | 2.3 | 2.2 | 0.09 | 0.78 | 0.32 | 0.62 |
|  Day 28 (weaning) | 8.3ab | 8.2a | 8.9c | 8.7bc | 0.18 | 0.35 | <0.01 | 0.03 |
|  |  |  |  |  |  |  |  |  |
| Total dry matter intake (g/pig)  | 374a | 343a | 576b | 310a | 49.2 | 0.01 | 0.09 | 0.02 |
|  |  |  |  |  |  |  |  |  |
| Average daily gain (g/day) | 274 | 269 | 295 | 283 | 7.9 | 0.26 | 0.01 | 0.62 |

a-c Values within a row that do not share a common superscript differ significantly at P<0.05.

1 Dry pelleted starter diet from d11-28 (DPS) and a liquid mixture of milk replacer and starter diet from d4-28 (LMR+S).

Conclusion: Total creep feed dry matter intake of suckling piglets was increased by feeding a liquid mixture of milk replacer and starter diet but only under optimal hygiene conditions. The liquid mixture of milk replacer and starter diet increased pre-weaning growth and weaning weight and reduced pre-weaning mortality. Optimal pen hygiene increased total creep feed dry matter intake of suckling piglets and reduced the days to slaughter.

Acknowledgements: This project has received funding from the EU’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement N° 955374.