

NUTRITION

- Functional amino acid supplementation (methionine, threonine, tryptophan) at 120% of NRC (2012) requirements, regardless of dietary protein content, improves growth performance, acute-phase response, and bacterial shedding in Salmonella-challenged pigs.
- Feeding diets containing 3 or 5 ppm DON reduced growth performance and feed intake in grower-finisher pigs (35 – 120 kg). The variability in growth and feed intake response was more variable and the overall impact of feeding DON was less than previously observed in finisher pigs, suggesting that younger pigs may be better able to cope with consuming DON-contaminated diets. Additionally there was no effect of DON consumption on immune function, as assessed through antibody response to vaccination.
- There was no effect of consumption of diets containing 1 ppm DON on performance of grower finisher pigs. Therefore, while the limited of 1 ppm established by CFIA is appropriate, there is indication that pigs are able to handle higher DON levels. Overall, producers may be able to feed DON-contaminated feed to pigs but adjustments will be necessary.
- Low birth weight and reduced feed intake in the suckling period negatively affect weaning weight. However, pigs can largely recover from reduced feed intake by the end of nursery.
- Extreme hydrothermal processing (steam explosion) reduces total ergot alkaloid content and alters the ergot alkaloid profile.
- Feeding newly weaned piglets' diets contaminated with 0.5, 1, 2 or 4 mg/kg ergot alkaloids resulted in a linear reduction in growth, but only during the first week of the experiment.
- Steam explosion of ergot-contaminated wheat screenings mitigated the negative effect of ergot on growth in newly weaned piglets.
- Feeding growing pigs diets with 40% wheat millrun (high dietary fibre) or field peas does not increase greenhouse gas production (CO₂, CH₄ or NO₂) from either the pigs (enteric) or manure.
- Partial life-cycle analysis (considering feed production and animal production) indicates that the inclusion of milling by-products into the diet will decrease the carbon footprint of pork production.



ENGINEERING

- A multi-year investigation comparing the effects of the raised without antibiotics (RWA) programs with non-RWA pig production, demonstrated a reduction in the tetracycline-related antimicrobial resistance genes (ARGs) in RWA barns compared to non-RWA barns.
- RWA barns also have a significant reduced group of multi-drug resistant-ARGs, possibly linked to lower amounts of drug classes recorded from RWA barns compared to non-RWA barns.
- Evaluating the effectiveness of different types of activated carbons in removing lincomycin from different water matrices has shown that lincomycin adsorption was greater for a solution with initial pH of 10, compared to an initial neutral pH of 6.5. Presence of NaCl did not affect the absorption capacity of the activated carbon.
- Evaluating the effectiveness of different type zeolites found increasing the pH, or the presence of NaCl reduced the absorption capacity of the natural zeolite.
- Evaluating the best performing adsorbents (Activated carbon 1240, NR, F400) for lincomycin and tetracycline removal found adsorption capacities of synthetic manure were similar to the ones found at pH 10 in deionized water, but were reduced in real manure due to competition and the presence of solids.
- Magnetizing a commercial activated carbon, utilizing an ultrasonic-assisted co-precipitation method where iron oxide nanoparticles was deposited on the activated carbon powder particles, results in an adsorbent that possesses high saturation magnetization (13 emu g⁻¹) with superparamagnetic properties and sufficient magnetic power to be separated from water using a simple magnet.



- Magnetically activated carbon can effectively remove tetracycline and lincomycin in aqueous solution individually or when both antibiotics are present in a mixture.
- The adsorption capacity of activated carbon slightly decreased for both antibiotics after magnetization. This decrease was much higher for lincomycin than tetracycline.
- Adsorption capacity of the magnetic activated carbon toward tetracycline is highly temperature dependent. Higher temperatures are more favourable for adsorption of tetracycline, by the developed adsorbent, indicating the endothermic nature of this process.
- Adsorption capacity of magnetic activated carbon toward tetracycline was up to four times higher, in addition to preferentially adsorbed, when compared to lincomycin at room temperature.

ETHOLOGY

- Production of older sows was improved by early mixing compared to late mixing, in group gestation or when exercise was provided - compared to stall housing, with reduced numbers of stillborn piglets and increased numbers of liveborn.
- A retrospective analysis of 6,128 Canadian swine transport records revealed journey distance, trailer type and temperature on the day of travel as risk factors for piglet mortality during transport.
- Temperature and distance interacted to influence mortality. Transport in very cold (<-10 °C), cold (-10 to 5°C) and mild (5 to 20°C) conditions has a lower risk of mortality for short (<500km, <6hrs) and medium (500 to 1250km, 6-14hrs) journeys, than long (1250 to 2500km, >14-28hrs) journeys.

- The risk of mortality in long distance transport is lower when conducted in mild temperatures, compared to transport in very cold, cold and warm (>25°C) conditions.
- The risk of mortality for journeys, taking place in very cold and cold conditions, is lower for a straight deck trailer compared to a potbelly trailer.
- A low-cost consumer grade infrared camera was as effective at detecting body temperature change due to a mild handling stressor. This technology may be able to predict transport stress on-farm, or meat quality problems at the packing plant.
- The increase in sow mortality in the industry highlights the need for a greater focus on gilt selection and development, improvements to mortality recording methods to increase accuracy and consistency of the data, and allowing a better understanding of the health problems associated with sow death loss.
- Wearable cameras can present a reliable option to perform on-farm pig welfare assessments at the pen level. Factors such as lighting and camera angle may affect the assessment of some indicators such as hernias.
- Cameras offer an effective, low cost tool to perform assessments without exposing farms to biosecurity risks, facilitating the ability for third party assessment if desired.
- Stall-housed sows show a level of motivation to exit the stall, and this is influenced by animal experience (stall-naïve: gilts, vs stall-experienced: sows), with gilts valuing the ability to exit the stall equally to that of receiving extra food. Sows valued extra feed more than time out of the stall, and provision of high fibre feed additional to the gestation ratio reduced sow motivation to exit the stall.
- Providing periodic exercise (10 minutes of walking once per week) to stall-housed gestating sows benefitted the reproductive performance of old parity sows only, increasing the number of liveborns and reducing stillborns.
- Housing sows in groups resulted in a 33% reduction in stereotypic behaviours in early and mid-gestation indicating a reduction in sow stress, whereas sows in stalls (control and exercised sows) showed an equally greater level of stereotypic behaviour.
- Although stall-housed gestating sows are motivated to access time out of their stall, the data to date suggests that providing periodic exercise for 10 minutes once per week shows negligible measurable improvements in sow welfare.



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