



Australasian Pork Research Institute Ltd APRIL

PROJECT SUMMARY

Project Number and Title: *Nutritional supplementation to increase the number of pigs weaned and fertility of sows which farrow and are mated during summer/early autumn (A3B-102).*

Project Leader: Assoc. Prof. William van Wettere and Dr Jessica Craig

Project Participants: The University of Adelaide, Rivalea (Australia) Pty Ltd., and Feedworks

Aims and Objectives: To determine the effects of arginine supplementation with or without betaine from 7 days prior to farrowing until the first post-weaning oestrus and during different seasons, on piglet mortality and growth prior to weaning, as well as sow reproductive performance following weaning.

Experimental design: This study was conducted to determine the effects of arginine supplementation with or without betaine from 7 days prior to farrowing until the first post-weaning oestrus, on piglet mortality and growth prior to weaning, as well as sow reproductive performance post-weaning. The study comprised two replicates, summer and winter/spring (spring), with four dietary treatments applied from farrowing shed entry until first post-weaning oestrus: Control, standard diet; Betaine, standard diet plus betaine (0.2%); Arginine, standard diet plus arginine (L-arginine; 1.0%); Arginine plus Betaine, standard diet plus arginine (1.0%) and betaine (0.2%) (n = 130 sows per treatment per seasonal replicate). Numerous reproductive and lactation indices were measured including in the following lactation.

Key Findings:

1. During summer, the inclusion of arginine in sows reduced piglet mortality, adding arginine and betaine to sow diets improved subsequent reproductive performance, while the addition of betaine (regardless of the presence of arginine) also improved subsequent reproductive performance.
2. Regardless of the inclusion of betaine in the diet, arginine reduced piglet mortality between fostering and day 3 of lactation from 19.8% to 14.7% ($P < 0.01$), reduced the number of piglets which died from fostering to weaning (2.20 ± 0.13 versus 2.55 ± 0.13 ; $P = 0.06$), and reduced the number of live born piglets which died prior to weaning (2.86 ± 0.15 versus 3.33 ± 0.15 ; $P < 0.05$).

Subsequent reproductive performance:

1. Arginine and betaine together reduced the weaning to remating interval ($P < 0.05$) from 5.6 to 5.1 days, increased the number of piglets born alive from 12.3 to 12.9 piglets/litter, and decreased the number of piglets born dead from 1.7 to 1.0 at the subsequent litter ($P < 0.05$).
2. When the main effect of betaine was analysed, its inclusion increased the number of piglets born alive at the subsequent litter from 12.3 to 12.8, and decreased the number and percentage of still born piglets from 1.64 to 1.18 and 10.9 to 8.1%, respectively ($P < 0.05$).
3. For treatments applied in spring, there were no benefits of including either betaine and arginine, either together or separately, in the diets of sows from pre-farrowing to remating, on measures recorded during the first and second lactation. Stillbirth rates were higher at the first farrowing, and litter size on day 25 of the first lactation was lower following supplementation of betaine and arginine separately ($P < 0.001$). This result appears to be contradictory to the bulk of the available literature, and may, therefore, require further validation.

Applications to Industry: It is clear from the current study that adding betaine and arginine to the diets of sows which farrow and lactate during summer improves piglet survival and subsequent reproduction of sows. However, there appear to be no benefits of adding these supplements to the diets of sows during winter. Further work is required to validate these outcomes within commercial systems, to determine the cost-benefit of their addition and to facilitate adoption across the industry.