

Natural Betaine benefits broiler chicks

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Poultry CRC project leader Dr David Cadogan, from CRC partner [Feedworks](#), has recently submitted the final report for his project *Influence of betaine on embryo survival, hatchability and progeny*

performance. This was a two-part project investigating both the value of ([Danisco's](#)) Betafin ®S1 as a feed additive in layers, and the effect of Betafin ®S1 on broiler breeders.



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Dr David Cadogan (centre) with Professor Bob Swick and Mark Dunlop

The presence of betaine enables microbes, plants and animals alike to be more resistant to temperature, osmotic, disease or environmental stresses. As temperature variation and fluctuation does occur in commercial incubators, this raises potential issues for embryo development and survival. Impaired embryo development produces a considerable loss in broiler and layer performance and health. The benefits of natural betaine supplementation have been investigated in other species, including humans. For example, Van Wettere et al. (2012) demonstrated that betaine significantly improves embryo survival in gestating sows by reducing blood homocysteine (a blood toxin) and reducing (temperature) stress on the sow. Betaine is also an extremely good source of methyl groups, which are used to spare the amino acid methionine, increase carnitine levels and methylate DNA to maximise its integrity and gene expression.

The layer experiment was designed to investigate whether significant amounts of dietary natural betaine can accumulate in the eggs laid by commercial hens. For broilers, the potential benefits of natural betaine supplementation was investigated in Ross 308 broilers, measuring the hatchability, percentage of chick culls and hatched weight under commercial conditions.

[Hy-line](#) laying hens were offered either a control diet (zero betaine) and a treated diet (1000ppm of betaine) in a 6 week trial. Overall results indicated the natural betaine supplementation significantly increased the betaine content of the eggs ($P < 0.001$) from 0.46 mg/100g (control) to 1.37 mg/100g (treated), representing a 3 fold increase (equating to 0.91mg/100g). However, this had no significant effect on other production parameters of the laying hens (there was a numerical 2.4% increase in egg weight by the treated diets).

For broiler breeders the commercial evaluation of natural betaine was tested in 7000 Ross 308 broiler breeders, run in two blocks, with a partial crossover (one shed had both a control and a treated diet at different times) of treatments (control and betaine treated diets at 2000ppm of betaine). The broiler breeders were 32 weeks of age, and were offered the control and treated diets for a period of 24 weeks. Results showed natural betaine significantly improved hatch rate from 84.75% to 86.89% ($P = 0.004$), but had no effect on hatch weight or number of chick culls.

“A 2.5% improvement in hatch rate is worth approximately 1.5 cents per egg” said David, “and if 750,000,000 eggs are produced per annum to produce 600,000,000 broilers, then this is worth approximately \$11.3 million dollars to the broiler industry”. It is also highly likely that natural betaine will also improve the hatch rate in layer, duck and turkey breeders. Additionally, increasing natural betaine to layer diets could also promote health benefit to egg consumers.

“The potential *in-ovo* effects of natural betaine in chick development and subsequent growth and carcass characteristics could be significant, and this strongly warrants further investigation” said David. Currently, at a 2kg/tonne dose rate, betaine would cost between \$9 and \$10 per tonne to incorporate in breeder diets. Therefore, further research is necessary to assess the effects of lower (more cost effective) doses.

For further information on this project, or to request a copy of the Final Report, please contact the Poultry CRC (admin@poultrycrc.com.au).