



Feeding wheat distillers dried grains with solubles (wDDGS) to growing and finishing pigs. Environmental and nutritional benefits of bioethanol co-products (ENBBIO).

wDDGS, a home grown protein source, has been successfully used in growing and finishing pig diets as part of a Defra and industry funded research project. The ENBBIO LINK project was a collaboration involving 25 industry and academic partners*, sponsored by Defra through the Sustainable Livestock Production LINK programme.

Summary

- The results of the work indicate that wDDGS may be used at up to 300g/kg (30%) in balanced, pelleted diets for growing and finishing pigs from 40kg liveweight to slaughter without adversely affecting pig performance or carcase quality
- wDDGS is a potential home grown substitute for other protein sources such as soyabean meal, rapeseed meal and sunflower meal
- While the bulk of this work concentrated mainly on pelleted diets, the wDDGS needs to be finely ground to ensure homogenous mixing when using in meals
- It is vital that the quality of the material in terms of its digestible nutrient content is known and that this information is fully utilised in the diet formulation process to balance amino acid levels
- wDDGS production could substitute 389kt of soyabean meal and therefore spare 150kha of land area.

The project

The ENBBIO LINK project, a collaboration between all sectors of the bioethanol, livestock and arable industries investigated the value of DDGS produced by the UK bioethanol industry for all sectors of livestock production. The non-ruminant programme examined the nutritional value of wDDGS in poultry and pigs.

Four separate pig trials were carried out to determine the nutritional value and maximum inclusion rate of UK sourced wDDGS in growing and finishing pig diets. Two digestibility trials in growing pigs determined the quality and digestibility of the protein and individual amino acids of a UK sourced wDDGS. These were followed up by two growing and finishing pig performance trials.

The performance trials at the University of Nottingham and Harper Adams University used:

- Four pelleted diets: 0, 100, 200, 300g/kg wDDGS, which were of the same calorific value but were not isonitrogenous. They were also balanced for digestible amino acid levels

- Two diet phases : 35-65kg liveweight (grower) and 65-105kg liveweight (finisher)
- Performance parameters: Daily Liveweight Gain (DLWG), Daily Feed Intake (DFI) and Feed Conversion Ratio (FCR)
- Carcase characteristics: carcase weight, killing out percent (KO%), P2 (measurement for back fat thickness), pH at 45 minutes and 24 hours after slaughter and skatole.

Results

Performance

As all four treatment diets were balanced for energy and amino acids there were no detrimental effects of increasing wDDGS level on liveweight gain or feed intake for the overall grower/finisher studies, although the University of Nottingham trial did suggest an optimum level of 200g/kg wDDGS for 35-65kg pigs.

Figure 1 Effect of wDDGS on average DLWG: 40kg to 100kg

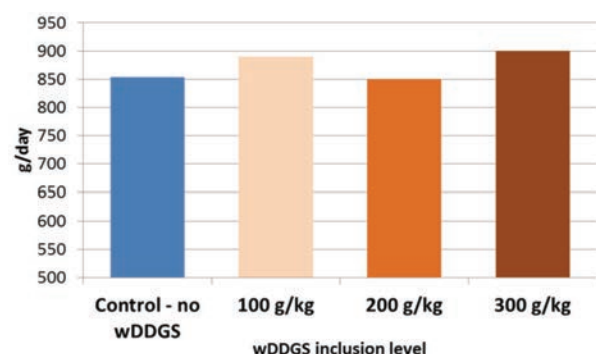
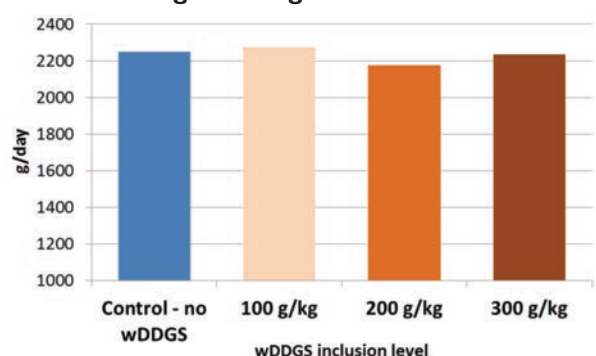
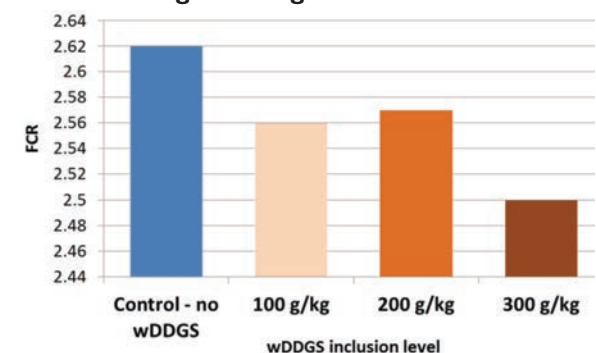


Figure 2 Effect of wDDGS on average DFI: 40kg to 100kg



The Harper Adams University grower/finisher trial suggested an improvement in FCR with increasing wDDGS level; pigs fed the 300g/kg wDDGS diet had the most efficient FCR.

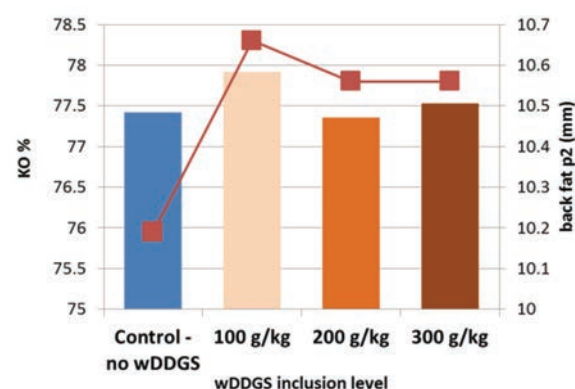
Figure 3 Effect of wDDGS on average FCR: 40kg to 100kg



Carcase characteristics

- There was no detrimental effect of increasing wDDGS levels on carcass weight, KO%, back fat P2 and tissue pH at 45minutes or 24 hours (Harper Adams University data)
- Increasing wDDGS level did not increase the risk of meat taint from skatole (University of Nottingham data).

Figure 4 Effect of wDDGS on average killing out % and back fat level



Conclusion

The results of the work indicate that wDDGS may be used successfully in pelleted diets at levels up to 300g/kg (30%) of the diet in growing and finishing pigs. However, there may be certain disadvantages:

- Amino acid digestibility can be reduced due to high processing temperatures
- Higher crude protein and higher fibre diets compared with diets using hipro soya
- Diets containing wDDGS will be higher in crude protein and will increase nitrogen content of the slurry.

* The ENBBIO consortium included BPEX, DairyCo, EBLEX, and HGCA divisions of the AHDB, AB Agri Ltd, AB Vista Feed Ingredients, ADAS UK Ltd, Aunir, Ensus Ltd, Evonik Industries AG, Glencore, Hook2Sisters, Marks and Spencer, Noble Foods, Premier Nutrition, Sciantec, the Scotch Whisky Research Institute, Scotland's Rural College, Syngenta, Tulip Ltd, and the University of Nottingham.

Further information

BPEX website:

<http://www.bpex.org.uk/research-innovation/research/environment/environmental-and-nutritional-benefits-of-bioethanol-co-products-enbbio/>

Influence of the in vivo method and basal dietary ingredients employed in the determination of the amino acid digestibility of wheat distillers dried grains with solubles in broilers Poultry Science (May 2014) 93 (5): 1178-1185

Chemical composition and prediction of amino acid content of maize- and wheat-Distillers' Dried Grains with Soluble Animal Feed Science and Technology (October 2013) 185 (3-4): 182-189

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