100 % Organic feed for pigs – results of feed trials in the UK

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Abstract

Current regulations for organic pig and poultry production systems permit feed ingredients of non-organic origin, primarily due to concerns that a 100 % organic diet would be unable to meet the demand for the essential amino acids lysine and methionine. 100 % organic diets for monogastrics will become compulsory in the EU from 1st January 2015, and so there is an urgent need to develop economically profitable feeding strategies based on organic feed across Europe. Feeding trials carried out with Gloucester old spot pigs in the UK found that there was no significant difference in the weight gains across the diets until the last week of the trial when there a significant difference in weight increase for the male pigs on the bean diet. This suggests that a 100 % organic diet using peas or beans can provide an acceptable alternative to a soya-based diet.

Introduction

Current regulations for organic monogastric production systems permit feed ingredients of non-organic origin, primarily due to concerns that a 100 % organic diet would be unable to meet the demand for the essential amino acids lysine and methionine. Soybean meal, the most commonly used protein feed source is not widely grown in Europe due to climatic conditions, and there are environmental, GM and social concerns about using imported soya. 100 % organic diets for monogastrics will become compulsory in the EU from 1st January 2015, and so there is an urgent need to develop economically profitable feeding strategies based on organic feed across Europe. This paper reports on feeding trials carried out with Gloucester old spot pigs in the UK; a control diet (lucerne silage and barley with soya) was compared with two novel diets (lucerne silage with beans; lucerne silage with peas).

Material and methods

Three diets for pigs were compared, each containing 55 % lucerne silage. The control diet contained soya. The remaining two diets contained either peas or beans as alternative protein sources. The details of the diets are shown in Table 1 below.

Six pens were used, each containing seven or eight animals (Gloucester old spot) of the same gender. Each diet was floor fed ad-lib to two pens (one containing males and one containing females).

The pigs were weighed on a weekly basis on the same weighbridge. Ear tag numbers and electronic IDs were checked so that weights were recorded as individuals and the mean weight for each pen calculated. The first weighing was carried out on 21.8.2012 (week 0) and the final weighing 14 weeks later on 20.11.2012 (week 13). The trial diets began on 28th August (week 1) and the lucerne started 10 days prior to that.

The statistical analysis was carried out using R version 2.15.2 (R development core team, 2009). The weights across the diets and the weight gains across the diets were compared using analysis of variance. A two-factor ANOVA was used to analyse the data to test the impact of diet and gender (and the potential interaction between the two). Post-hoc testing, where necessary, was carried out using Tukey's HSD test.

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Table 1: Comparison of the diets.

Ingredient	DIET 1 %	DIET 1 Ration weight (kg/pig)	DIET 2 %	DIET 2 Ration weight (kg/pig)	DIET 3 %	DIET 3 Ration weight (kg/pig)
Lucerne silage	55	1.10	55	1.21	55	1.21
Rolled barley	30	0.60	30	0.66	30	0.66
Field beans	0	0	14	0.31	0	0
Field peas	0	0	0	0	14	0.31
Soya	14	0.28	0	0	0	0
Mineral	1	0.01	1	0.02	1	0.02
Actual feed fed (kg/day/pig)		1.99		2.20		2.20

Results

Figure 1 shows the weight gain over the period for each category (i.e. for each diet and each gender).

The results of the statistical analysis are shown in Table 2. The first column shows the p values for the two-factor ANOVA and the second column shows the results if diet only is considered as a factor. The weights at each weighing period are considered separately and then the weight gain is calculated at each period compared to week1.

The weight gain between week 1 and week 13 shows a significant difference (F-statistic: 2.856 on 5 and 40 DF, p-value: 0.02687 for the two-factor ANOVA and F-statistic: 3.478 on 2 and 43 DF, p-value: 0.03979 for the one-factor ANOVA). Tukey's HSD was used as the post-hoc test to investigate the apparent significant difference.

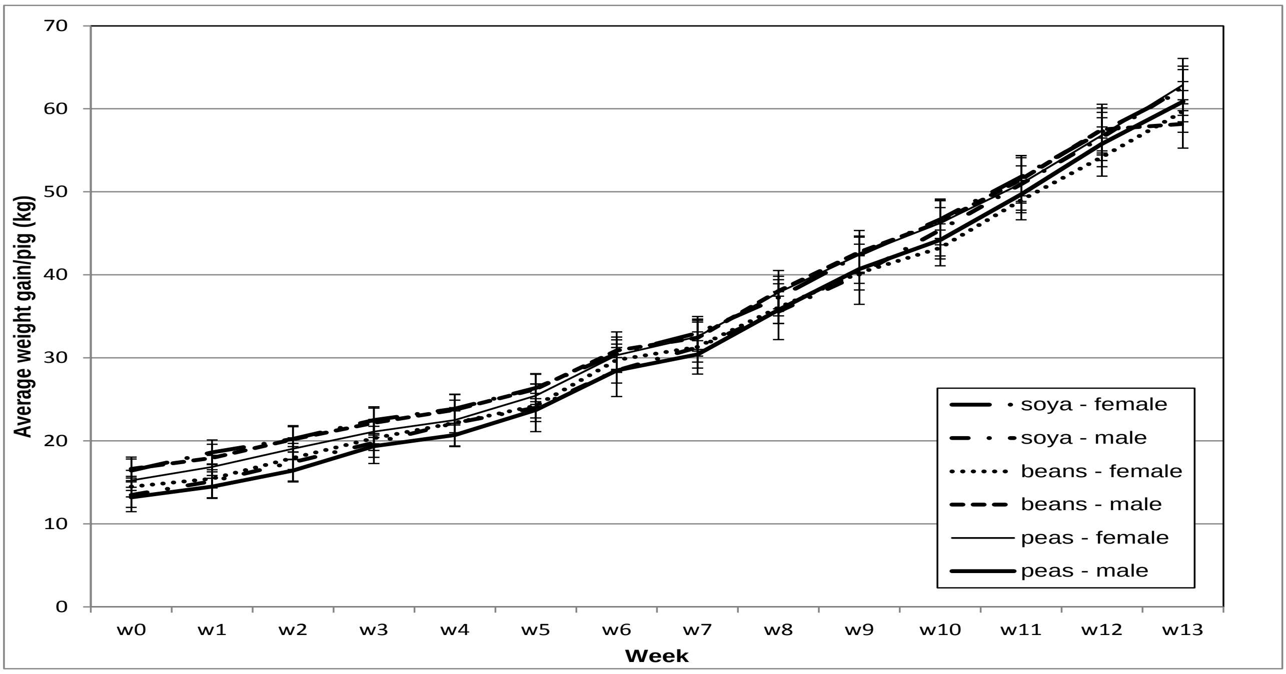

Figure 1: The average weight per pen at each weighing period showing the weight gain for each diet and gender. The error bars shown are the standard errors.

This identified that the significant difference for the weight gain between week 13 and week 1 is due to the male pigs on the bean diet. This can also be seen in Figure 1 which shows that this group had a slower increase in weight during the final week of the trial compared to the other diets. It is not clear from the data what caused this.

Discussion

There was no significant difference in the weight gains across the diets until the last week of the trial. This was caused by a significant difference in the last week (week13) for the male pigs on the bean diet which had a slower increase of weight compared to the other diets. This suggests that 100 % organic feed for pigs that meets the the required level of nutrients in different phases of production and support high animal health and welfare is possible to achieve by combining home grown protein from legumes with lucerne silage. Feeding pigs silage as part of a total mixed ration that includes barley and beans or peas for protein provides additional benefits as there is less aggressive behaviour such as tail-biting and can reduce costs by replacing bought-in feed.

Table 2: The p values for the ANOVAs of the weights and weight gains at each weighing period.

Week	Diet*gender	Diet
w1	0.3412	0.7192
w2	0.4717	0.7051
w3	0.7352	0.8176
w4	0.84	0.6844
w5	0.8365	0.9229
w6	0.9469	0.9015
w7	0.9588	0.9562
w8	0.9487	0.963
w9	0.9355	0.9923
w10	0.8996	0.8642
w11	0.9662	0.8808
w12	0.9486	0.911
w13	0.777	0.3486

Week	Diet*gender	Diet
w2-w1	0.284	0.2649
w3-w1	0.285	0.6078
w4-w1	0.08986	0.7482
w5-w1	0.4195	0.5089
w6-w1	0.2581	0.2592
w7-w1	0.4469	0.6859
w8-w1	0.4345	0.2243
w9-w1	0.7563	0.3632
w10-w1	0.6321	0.4623
w11-w1	0.6861	0.6768
w12-w1	0.5966	0.5901
w13-w1	0.02687	0.03979

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