Heat treated cereals in post weaning diets?

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Heat treatment of cereals produces a gelatinisation of their starch which 'opens its structure'. Applied in piglets diets, enzymatic digestion is expected to be more efficient. However, as several trials demonstrate, the use of this kind of cereal does not mean an economic advantage.

Since the beginning of the 1980s, through the evolution of management systems towards the early weaning of pigs, several thermal treatments have been applied to cereals and soya, which are then incorporated into piglet feeds on the basis of a better adaptation to solid diets. More recently, the advantages of using heat treated cereals in piglet diets is being rethought and several experiments have established that its use could be less profitable than the use of 'crude' cereals.

From birth to weaning age and also in the following production stages, piglets undergo some important physiological and anatomical changes in their development process. At birth, the piglet has very high levels of lactase enzyme, necessary to digest milk from the mother.

On the other hand, amylase enzyme (produced by saliva and pancreas) is almost non-existent, but increases naturally between three and five weeks of age. This enzyme is the one in charge of dietetic starch hydrolysis.

It is known that the piglet's digestive tract has a high adaptation capacity of its morphological structure as well as its microbial and enzymatic activities relative to the different characteristics of the diet, especially carbohydrates, from birth up to several weeks after weaning.

	Group A Heated cereals	Group B Crude cereals
Batch	60	60
Weaning age (days)	20.8	20.8
Weaning weight (kg)	6.1	6.1
Weaning-28 days		
Weight 28 days	7.2	7.1
ADI (g/d)	188	172
ADG (g/d)	157	143
FCR	1.19	1.21
28-42 days		
Weight 42 days	11.6	11.8
ADI (g/d)	379	450
ADG (g/d)	314	336
FCR	1.20	1.34
42-63 days		
Weight 63 days	20.4	22.3
ADI (g/d)	700	786
ADG (g/d)	419	500
FCR	1.67	1.57
Weaning-63 days		
ADI (g/d)	507	572
ADG (g/d)	314	362
FCR	1.49	1.48
63-124 days		
Weight 124 days	60.8	64.5
ADI (g/d)	1684	1681
ADG (g/d)	662	692
FCR	2.54	2.43

Table 1. Results in each group and phase of the extruded versus crude cereals trial (March to June 2004).

Piglet digestive capacity is determined by the growth of the gut tissue and by the adaptation to the stimulus produced by the antigenic compounds in the diet.

Piglet diets have to be digestible to stimulate gut development to improve the absorption capacity and enzymatic hydrolysis. One of the feed characteristics which can affect starch digestibility is, for example, grinding size. Fine feed particles will have a bigger surface available for the enzymatic action inside the gut of the piglet.

On the basis of a piglet's feeding programme, we wanted to see if the inclusion of heat treated cereals during the first part of the programme (from weaning up to 42 days of age) could affect the efficiency of the piglets during the whole growing period (from weaning up to 63 days of age) and during the first stage of the fattening period (from 63 up to 124 days of age).

One experiment was conducted with 120 piglets weaned between 17 and 23 days of age (average 20.8 days) and an average weight of 6.1kg. Two groups of 60 piglets were divided into pens of 15 piglets each. The first group (group A) was fed with a commercial feed based

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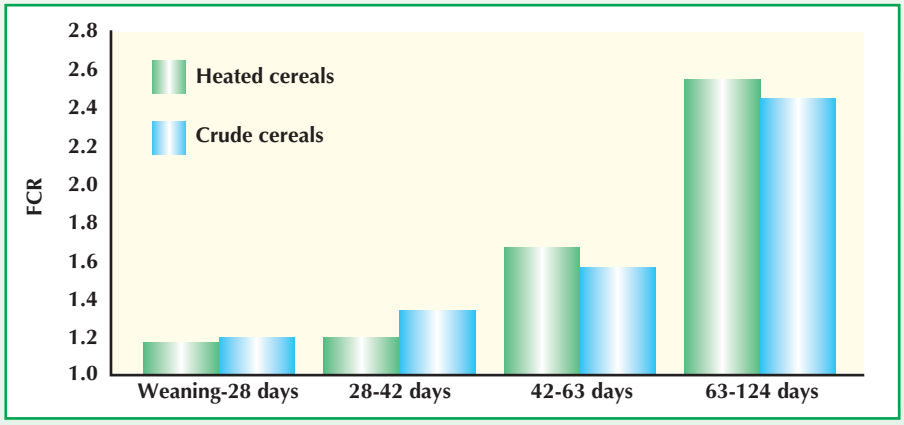
Fig. 1. Food conversion rate in each group and stage.



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on extruded cereals. The second group (group B) was fed with feeds produced based on the Ingaso Nucleus and formulated with crude cereals. During following periods, both groups were fed with the same third feed up to 63 days of life, based on crude cereals.

During the first post weaning week piglets in group A (eating extruded cereals) showed a higher intake and growth (0.1kg difference) and the food conversion rate (FCR) was slightly better (see Figs. 1 and 2).

From 28 days of age up to 42 days of age, piglets in group B (eating crude cereals) achieved better intake and growth (0.3kg more than group A), but group A had a better FCR.

From 42 up to 63 days of age (both groups were eating the same feed), group B had a significant advantage in both growth and feed intake, as well as FCR. Data suggested that piglets in group B already had an optimum digestive evolution and preparation.

The last control was for both groups at 124 days of age. Group B, fed with a crude cereals based feed since weaning, kept on increasing the weight difference (64.5kg average in group B vs. 60.8kg average for group A). From the results of this experiment, it could be concluded

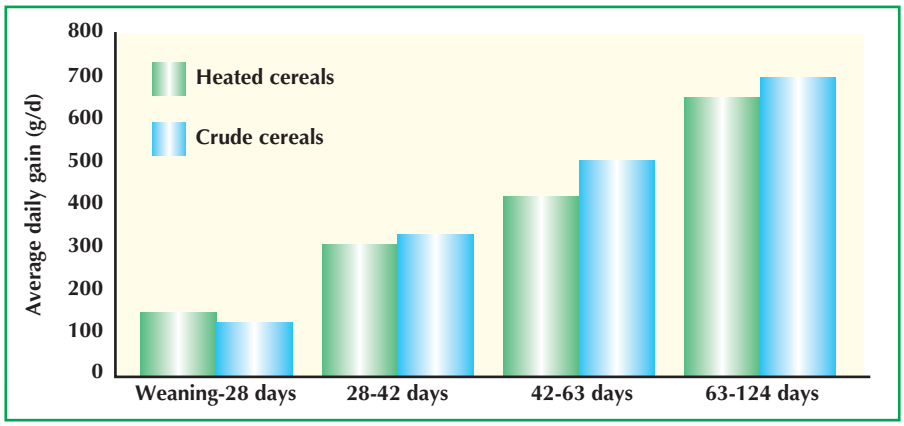

Fig. 2. Average daily gain (g/d) in each group and stage.

that the inclusion of heat treated cereals (extruded in this case) during the first post weaning stages did not improve production results for the period between weaning up to 63 days of age.

The difference in the results obtained from 42 days up to 63 days is remarkable (see Table 1).

In the period between weaning up to 28 days a minimum advantage in the piglets fed with extruded cereals was noted, but this was reduced in the following trial periods.

High temperatures used during the extrusion processes together with humidity and the reducing capacity of sugars contained in cereals, favour Maillard reactions between carbohydrates and proteins, which can affect the rest of the components of the cereals, especially lysine. A reduction between 1-2% in terms of gross protein and energy has been calculated.

Piglet feeds based on crude cereals and soybean meal and using Ingaso nucleus allow an optimum digestive system development, which then assists a more secure and efficient adaptation to the following feeds containing the same kind of crude cereals.

This concept also enhances pig performance. ■