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The compensatory response of pigs previously fed a diet with an increased fibre content. 2. Chemical body components and composition of daily gain*

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ABSTRACT

The composition of the daily gain of pigs previously fed a high-fibre diet (HF) was investigated in 60 pigs growing from 25 to 105 kg body weight (BW) using a comparative slaughter technique. From 25 kg body weight (BW), the pigs were fed the HF diet up to 50 (group HF50) or 80 (group HF80) kg BW, followed by feeding with the conventional low-fibre diet (LF). The pigs of groups LF105 and HF105 were continuously fed diet LF or HF, respectively. When the HF diet was fed, the daily empty body gain of the HF50 and HF80 pigs was lower ($P<0.05$) compared with the LF105 animals. Similarly, the daily protein ($P<0.01$) and fat deposition (difference not significant) of the HF50 pigs was lower than in the LF group. The pigs of the HF80 group tended ($P=0.09$) to deposit less protein daily, and their daily fat deposition was lower ($P<0.01$) than in the LF105 animals. During the first stage of realimentation (50 to 80 kg BW), pigs from group HF50 grew faster and deposited more ($P<0.01$) protein daily (169 g) compared with the LF105 (132 g) and HF105 animals (139 g). Nonetheless, the pigs of groups HF50 and LF105 deposited similar amounts of fat (291 and 296 g, respectively), whereas those of group HF105, considerably less (208 g; $P<0.05$). During subsequent realimentation (80-105 kg BW) the empty body gain of pigs did not differ significantly among groups (on average 916 g). Despite the absence of differences in growth rates, daily protein accretion in the pigs from groups HF80 and HF105 tended ($P<0.07$) to be higher (by 14 g) compared with those from group LF105. During this period, pigs from groups HF50 and HF80 deposited more fat daily (on average by 110 g; $P<0.01$) than those of groups LF105 and HF105. These results prove that the compensatory response is closely associated with higher protein deposition and with better protein utilization for growth.

KEY WORDS: pig, compensatory growth, composition of daily gain, body composition, dietary fibre

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INTRODUCTION

Roughage feeds commonly fed to animals kept outdoors worsen their performance compared with conventionally reared animals. Therefore, in this type of production, much attention is paid to finding a way that would improve the growth performance of pigs. It seems that an alternative could be *via* the compensatory growth phenomenon, which improves the performance of previously restricted animals (de Greef, 1992; Bikker, 1994; Skiba et al., 2001). In earlier studies on the compensatory response, pigs were restricted in terms of protein (de Greef, 1992) or feed/energy intake (Bikker, 1994). The type of restriction applied, as well as its duration, differently influenced the subsequent compensatory response, especially with regards to the chemical composition of daily gain (Skiba et al., 2001). Both kinds of previous restriction resulted in periodically enhanced daily protein deposition during the following growth period. Fat deposition was, however, significantly greater in pigs previously restricted with feed/energy intake.

A recent literature search did not return studies on the influence of feeding pigs with a high-fibre diet on their subsequent compensatory response. Therefore, this study was conducted to test the influence a high fibre diet on the composition the daily gain of pigs during consumption of that diet and after returning to conventional feeding. It was hypothesized that pigs previously consuming a diet with increased fibre will show a compensatory response after returning to a conventional diet, and that their body and gain composition will be changed.

MATERIAL AND METHODS

Sixty crossbreed gilts (♂ Duroc × ♀ Large White) were kept individually from 25 to 105 kg body weight (BW) in 2.6 m^2 pens equipped with an automatic feeder and nipple drinker. The pigs were continuously fed a conventional diet (LF, group LF105) *ad libitum,* or a diet with an increased fibre content (HF, group HF105). The remaining animals were fed the HF diet up to 50 (group HF50) or 80 (group HF80) kg BW, followed by the LF diet. Detailed information on feeding strategy and diet composition is given in the first part of this study (Skiba et al., 2006). It was assumed that the pigs of group LF105 were simulating conventional feeding and the pigs of group HF105, outdoor feeding (due to the consumption of a large amount of fibre). The pigs in groups HF50 and HF80 were simulating animals that were fed according to an outdoor feeding strategy for a certain period, after which a compensatory growth phenomenon was incorporated into their growth pathway.

The comparative slaughter technique as described by Kotarbińska (1971) was used to calculate the gain of the chemical body components. Before slaughter, the pigs were transported individually to the Institute's experimental slaughterhouse, located about 20 m from the pig house, stunned electrically, exsanguinated and scalded. The number of animals slaughtered at a particular BW was limited as much as possible due to the costs and labour-intensity of the experiment. Thus, at 25 kg BW (beginning of the experiment) six of the "zero" pigs were slaughtered. Next, at 50 kg BW, six pigs from group LF105 and two pigs each from groups HF50, HF80 and HF105 were randomly selected and slaughtered. At 80 kg BW, six pigs from group LF105 and three pigs each from groups HF80 and HF105 were slaughtered. Finally, at 105 kg BW, six pigs from each of the four groups (LF105, HF105, HF80, HF50) were slaughtered. The design of the experiment and number of animals are presented in Table 1, the design of the slaughter of pigs in Table 2.

Table 1. Design of the experiment

Group	Feed applied during particular growth period		
	25-50 kg BW	50-80 kg BW	80-105 kg BW
LF105	LF (n=18)	LF (n=12)	LF (n=6)
HF50	HF (n=14)	LF (n=12)	LF (n=6)
HF80	HF (n=11)	HF (n=9)	LF (n=6)
HF105	HF (n=11)	HF (n=9)	HF (n=6)

LF-low fibre diet, HF- high fibre diet, LF105- group of pigs fed the LF diet throughout the study, HF50- group of pigs fed the diet HF up to 50 kg BW following the diet LF, HF80- group of pigs fed the diet HF up to 80 kg BW following the diet LF, HF105- group of pigs fed the diet HF throughout the experiment

Table 2. Design of the slaughter of pigs

Group	No of pig slaughtered at particular body weight, kg			
	25	50	80	105
LF105		6	6	6
HF105		2	3	6
HF80	total 6	2	3	6
HF50		2	6	6

LF105- group of pigs fed the LF diet throughout the study, HF50- group of pigs fed the diet HF up to 50 kg BW following the diet LF, HF80- group of pigs fed the diet HF up to 80 kg BW following the diet LF, HF105- group of pigs fed the diet HF throughout the experiment

The contents of chemical components (water, protein, fat (ether extract) and ash) were determined according to AOAC methods (1994). Protein and energy utilization were subsequently calculated using the following formula:

protein utilization = (daily protein deposited in the body/daily intake of digestible protein)×100 energy utilization = (total daily energy deposited in the body as fat and protein/daily intake of energy) ×100

To calculate the amount of energy deposited in the body, 23.86 kJ for protein and 39.76 kJ for fat were used.

The adiposity relative to body weight was determined using the allometric equation $Y = a \times X^b$ developed by Huxley (1932). In this case Y was the fat:protein ratio related to X, representing the empty body weight (EBW), a was the intercept, and b was the slope of the regression line (the so-called growth coefficient).

Statistical analysis was performed by ANOVA analysis of variance and regression analysis using Statgraphics Centurion version 15 software.

RESULTS

Restriction period

The values given in the text and tables as HF50 are averages for pigs from groups HF50, HF80 and HF105, those given as HF80 are averages for HF80 and HF105 pigs, as the pigs of these groups were treated similarly during particular stages of the restriction period.

The content of chemical components in the empty body did not differ significantly between the LF105 and HF50 pigs (Table 3). The content of water, protein and ash in the HF80 pigs was, however, increased (P<0.05), and fat content, decreased (P<0.05) compared with the LF105 pigs by 5.5, 5.1, 12.8 and 15.6%, respectively.

Table 3. Content of chemical components, g/kg: water (W), protein (P), fat (F), ash in the body at the end of the restriction period

Restriction	Group	n	W	P	F	Ash
25-50 kg BW	LF105	6	600	169	146	24.8
	HF50[1]	6	660	166	139	23.9
	SEM		7.99	2.68	5.24	0.58
	P		NS	NS	NS	NS
25-80 kg BW	LF105	6	595	158	212	23.6
	HF80[2]	6	628	166	179	26.5
	SEM		8.90	5.97	23.8	2.07
	P		*	*	*	*

[1] average for treatment HF50 and HF80 and HF105; [2] average for treatment HF80 and HF105; * P<0.05; NS - non significant

Daily empty body gain (EBG) of pigs from group HF50 was lower (P<0.001) compared with the pigs of group LF105 (691 vs 802 g) (Table 4). Daily protein deposition of HF50 pigs was 24 g/day lower (P<0.01), but no significant differences in protein utilization were found. Daily deposition of fat in pigs of the HF50 group decreased by 28 g (difference not significant), and their daily ash deposition was 3.8 g lower (P<0.01). Utilization of energy did not differ significantly between LF105 and HF50 animals.

Table 4. Daily gain (g) of the empty body (EBG), water (W), protein (P), fat (F), ash and utilization of protein and energy during the restriction period

Restriction	Group	n	EBG	W	P	F	Ash	Utilization	
								protein	energy
25-50 kg BW	LF105	6	802	490	140	151	20.6	49.8	37.5
	HF50[1]	6	691	436	116	122	16.8	46.5	33.8
	SEM		13.4	16.55	5.55	10.40	0.7	2.65	1.77
	P		***	NS	**	NS	**	NS	NS
25-80 kg BW	LF105	6	876	489	136	230	20.7	40.0	42.6
	HF80[2]	6	767	453	127	166	21.2	43.7	36.2
	SEM		14.7	12.9	3.42	11.42	0.8	1.66	1.51
	P		**	NS	NS	**	NS	NS	*

[1] average for treatment HF50 and HF80 and HF105; [2] average for treatment HF80 and HF105; *** P<0.001; ** P<0.01; * P<0.05; NS - non significant

The empty body gain (EBG) of pigs of the HF80 group was 109 g lower than the LF105 pigs. Moreover, the pigs of the HF80 group tended (P<0.09) to have deposited less protein daily, and their daily fat deposition decreased by 64 g (P<0.01) compared with the pigs of group LF105. The efficiency of protein utilization did not differ, but utilization of energy was 6.4% better (P<0.05) in the HF80 pigs compared with the LF105 animals.

Realimentation period

The body protein content in the middle of the realimentation period (80 kg BW) of the HF50 and HF105 pigs was higher (P<0.05) compared with the pigs of group LF105 (166 and 166 vs 158 g/kg; Table 5). The fat content in the body, however, took the following order (P<0.07): 180 g/kg (group HF105), 196 g/kg (group HF50) and 212 g/kg (group LF105). The ash content in the body of HF105 and HF50 pigs was higher than in the LF105 animals (26.5 and 25.7 vs 23.6 g/kg; P<0.05).

The empty body gain (EBG) of pigs in group HF50 during growth from 50 to 80 kg BW, was highest (P<0.05) compared with the LF105 and HF105 pigs (980 vs 918 and 872 g/day), (Table 6). Group HF50 pigs deposited more protein daily than the LF105 and HF105 animals (169 vs 132 and 139 g, respectively; P<0.01). The pigs from groups HF50 and LF105, however, deposited a similar amount of fat (291 vs 296 g), whereas those from group HF105 deposited considerably less of this body component (208 g; P<0.05). Daily water accretion did not differ among groups. The animals in group HF50 did show, however, the highest (P<0.01) daily accretion of ash (28.8 g) compared with pigs from groups HF105 and LF105 (25.7 and 20.3 g, respectively). Moreover, the efficiency of protein utilization differed (P<0.05) between groups (41.6, 40.3 and 34.1%, respectively for the HF105, HF50 and LF105 pigs). Energy utilization by pigs from groups LF105 and HF50 did not differ significantly (43.9 and 43.6%, respectively), however it was insignificantly higher than in HF105 (37.8%).

The final protein and ash content in the body (at 105 kg BW) did not differ significantly among treatments (Table 5). The water content, however, differed (P<0.01) between the HF105 and LF105, HF50 and HF80 pigs (603 vs 573, 554 and 584 g/kg, respectively). HF105 pigs had the lowest fat content in the body (207 g/kg), whereas those of groups HF50, HF80 and LF105 were fatter (267, 234 and 249 g/kg, respectively; P<0.01).

Table 5. Content of chemical components, g/kg: water (W), protein (P), fat (F), ash in the empty body at the middle (80 kg) and at the end of the realimentation period (105 kg)

Realimentation	Group	n	W	P	F	Ash
50-80 kg	LF105	6	606	158	212	23.6
	HF50	6	612	166	196	25.7
	HF105[1]	6	628	166	180	26.5
	SEM		10.21	2.20	7.93	0.63
	P		NS	*	NS	*
80-105 kg	LF105	6	573	152	249	26.3
	HF50	6	554	153	267	26.2
	HF80	6	584	156	234	25.9
	HF105	6	603	162	207	27.7
	SEM		7.96	3.20	9.14	0.49
	P		**	NS	**	NS

[1] average for group HF80 and HF105; ** P<0.01; * P<0.05; NS - non significant

The average daily gain of EBG of pigs growing from 80 to 105 kg BW did not differ significantly among groups (Table 6). In spite of this, daily protein accretion in the group HF80 and HF105 pigs tended to be higher (P<0.07) compared with those of groups LF105 and HF50 (148, 147 vs 133, 133 g, respectively). The pigs in groups HF50 and HF80 deposited more fat daily (441 and 364 g, respectively; P<0.01) than those in groups LF105 and HF105 (332 and 254 g, respectively).

Daily water deposition differed (P<0.05) between treatments and took the following order: 458 g (group HF105), 453 g (group LF105), 374 (group HF80), and 302 g (group HF50).

The pigs of group HF105 and HF80 utilized digestible protein more efficiently (P<0.05) as compared with the HF50 and LF105 animals (34.3 and 31.4 vs 26.6 and 28.2%, respectively). Metabolizable energy utilization by pigs from groups HF50 and HF80, however, was the best (48.4 and 44.0%, respectively) and higher (P<0.01) than in the pigs in groups LF105 and HF105 (40.2 and 34.9%, respectively).

Table 6. Daily gain (g) of the empty body (EBG), water (W), protein (P), fat (F), ash and utilisation of digestible protein and metabolizable energy during the realimentation period

Realimentation	Group	n	EBG	W	P	F	Ash	Utilization	
								protein	energy
50-80 kg BW	LF105	6	918	470	132	296	20.3	34.1	43.9
	HF50	6	980	491	169	291	28.8	40.3	43.6
	HF105[1]	6	872	499	139	208	25.7	41.6	37.8
	SEM		18.1	23.5	6.45	27.2	1.6	2.70	2.84
	P		*	NS	**	*	**	*	NS
80-105 kg BW	LF105	6	952	453	133	332	34.3	28.2	40.2
	HF50	6	907	302	133	441	30.8	26.6	48.4
	HF80	6	915	374	148	364	28.6	31.4	44.0
	HF105	6	890	458	147	254	31.2	34.3	34.9
	SEM		61.5	42.1	5.84	34.55	2.43	2.11	2.67
	P		NS	*	NS	**	NS	*	*

[1] average for group HF80 and HF105; ** P<0.01; * P<0.05; NS - non significant

Overall growth period

The EBG of the HF50 and LF105 animals was higher (P<0.01) compared with the pigs in groups HF80 and HF105 (895 and 892 vs 815 and 831 g, respectively; Table 7). Daily deposition of protein, water and ash did not differ significantly among treatments. Even so, the pigs in groups HF50 and LF105 deposited more fat daily (287 and 264 g, respectively; P<0.01) as compared with groups HF80 and HF105 (226 and 194 g, respectively).

The pigs in group HF105 utilized digesible protein more efficiently (P<0.01) as compared with the HF50, HF80 and LF105 animals (40.1 vs 34.0, 36.6 and 34.8%, respectively). Group LF105, HF50 and HF80 pigs utilized metabolizable energy similarly and better (P<0.01) than the pigs in group HF105 (41.8, 42.6 and 39.1 vs 36.0%, respectively).

Table 7. Daily gain (g) of the empty body (EBG), water (W), protein (P), fat (F), ash and utilization of digestible protein and metabolizable energy during the overall growth period (25-105 kg BW)

Group	N	EBG	W	P	F	Ash	Utilization protein	Utilization energy
LF105	6	892	471	133	264	24.4	34.8	41.8
HF50	6	895	449	134	287	24.9	34.0	42.6
HF80	6	815	440	126	226	22.6	36.6	39.1
HF105	6	831	478	135	194	24.2	40.1	36.0
SEM		18.0	19.76	4.79	12.36	0.87	1.61	0.94
P value		*	NS	NS	**	NS	**	**

** P<0.01; * P<0.05; NS - non significant

Body adiposity expressed as the body fat:protein ratio (F:P) (Table 8) differed significantly among groups, as coefficient b of the allometric equation ranged from 0.48 (group HF105) to 0.80 (group HF50). When the fat:protein ratio was calculated for a constant EBW (100 kg), it was found that the highest value was in pigs from group HF50 (1.59), followed by LF105 and HF80 pigs (1.51 and 1.46), with the lowest in the group of HF105 animals (1.28).

Table 8. Accretion rate of body fatness expressed by the ratio of fat:protein in the body during the experiment

Group	Y	a	X	b	r	Y, when X=100 kg
LF105	Ratio of F:P	0.05 ± 0.03	EBW	0.74 ± 0.14, P<0.0001	0.93	1.51
HF50		0.04 ± 0.03		0.80 ± 0.16, P<0.0001	0.85	1.59
HF80		0.08 ± 0.05		0.63 ± 0.14, P<0.0001	0.83	1.46
HF105		0.14 ± 0.63		0.48 ± 0.11, P<0.0001	0.80	1.28

a - an intercept; b - a slope of the regression line (growth coefficient); F:P - ratio of fat:protein in the body; EBW - empty body weight

DISCUSSION

Feeding animals the high-fibre diet for a short time (up to 50 kg) did not change their chemical body composition compared with pigs fed a standard diet. When, however, such feeding was prolonged until a heavier body weight was reached (80 kg BW), the protein content in the body increased and the fat content decreased. Comparing this response with the results of a previous study on compensatory growth, it was found that our pigs responded to restriction similarly to pigs with restricted feed/energy intake (Bikker, 1994), as animals restricted only in terns of protein intake always increased their body fat content at the end of the restriction (de Greef, 1992).

It is known that a change in the composition of daily body weight gain accompanies compensatory growth, and that the greatest changes concern protein and fat deposition. It is also well known that these changes depend on the type of previous restriction (de Greef, 1992; Bikker, 1994; Skiba et al., 2002). In our experiment, both groups of compensating animals (from 50 and from 80 kg BW) deposited more protein than the pigs in the LF105 group. This response was the most evident for a short period after removal of the growth suppressor (diet HF). During the later period of realimentation, enhanced protein deposition gradually diminished. This was a typical response, also observed in previous work on compensatory growth, however, in that study the observation was based mainly on changes in daily gain during the realimentation period (Skiba et al., 2001).

When trying to explain the compensatory protein deposition, we conclude that the reasons put forward to date do not give a clear answer as to which process plays a crucial role. It is thought a complex of several mechanisms/events occurring during this time is responsible (Lawrence and Fowler, 2002; Skiba, 2005). The results of the experiment presented here, however, indicate that one of the reasons for the higher compensatory protein deposition could be improved utilization of protein, considered as the percentage of feed digestible protein converted into protein deposited in the body, since in both groups of compensating pigs, protein utilization was superior to that in pigs from the groups continuously fed a standard diet (however, it was slightly worse in comparison with the pigs fed the high-fibre diet throughout the experiment).

The unexpectedly best protein utilization by the HF105 pigs growing from 80 to 105 kg BW was undoubtedly a result of these pigs (especially their gastrointestinal tract) adapting to the high-fibre diet. This adaptation allowed them to deposit even the same amount of protein during this time as to the pigs compensating from 80 kg BW (group HF80). Moreover, the highest appetite of the pigs in the HF105 group resulted in a higher daily intake of lysine/protein (despite the lower content of these nutrients in the HF diet) by these animals. The computed lysine/protein intake of the pigs from this group was close to CVB guidelines (1995), whereas the intake of this nutrient by pigs of the control group exceeded this recommendation, probably resulting in worse utilization and deposition, except for the pigs in group HF80, which showed compensatory growth during this period.

During the time when compensatory protein deposition was observed, pigs deposited similar amounts of fat compared with those continuously fed a low fibre diet, and even more than pigs fed the high-fibre diet throughout the experiment. During the later period of the realimentation, fat deposition predominated, similarly as in animals previously restricted with feed intake (Skiba et al., 2002). This confirms that pigs showing compensatory growth have a great pressure for protein deposition, even at the expense of fat deposition, similarly to what has been observed in very young pigs (Close et al., 1978). Moreover, this also confirms that the compensatory response is directed at those body components whose growth was the most reduced during the restriction, as was also suggested by other authors (de Greef, 1992). In the case of our pigs, the compensatory response included protein and fat, in contrast to pigs with previously restricted protein intake, which deposit more protein but a similar amount of fat compared with animals consistently fed adequately (Kyriazakis et al., 1991; de Greef, 1992). Earlier works (Kyriazakis and Emmans, 1992; Bikker, 1994; Skiba et al., 2002) had shown that pigs forced into compensatory growth by previous feed/energy restriction also deposited more fat in the body, as accretion of this body component was the most reduced during restriction. Greater fat deposition ensuing after compensatory protein deposition resolved, resulted, however, in better energy utilization. In contrast, when the animals showed compensatory growth, energy utilization for growth did not differ from conventionally growing pigs, whereas protein utilization was significantly enhanced, indicating that improvement of protein utilization for growth could contribute to the compensatory response.

Finally, the protein content in the body of the two previously restricted groups of pigs did not differ significantly from pigs fed adequately throughout the experiment or from the pigs continuously fed a high-fibre diet. The same trend was observed for adiposity, water and ash content, except for the pigs continuously fed a high-fibre diet, which had considerably less fat than the animals in the control group. Thus, both groups of previously restricted pigs compensated their chemical body composition. Nevertheless, when overall performance was considered, only pigs restricted up to a lower body weight grew at a similar rate, deposited the same amount of protein, and took the same number of days to reach the final weight as the non-restricted pigs. Thus, only these animals showed complete compensation, whereas those subjected to longer restriction (feeding on the high-fibre diet up to 80 kg BW) showed what is called partial compensation (Hogg, 1991).

In studies on the growth of animals, their adiposity can be expressed as the fat:protein ratio in their empty body. Thus, it seems purposeful to compare how this parameter varied during growth of the particular groups of pigs by using an allometric equation ($Y = a \times X^b$). In this equation, b is the slope of the regression curve, it is also termed the growth coefficient. The intercept a has no biological meaning, however, it is the value of Y when X equals one. Positive allometry occurs when $b>1$, Y is then faster growing than X. In negative allometry ($b<1$), the relative increase of Y is smaller than X. If $b=1$ the components Y and X grow at the same rate (isometrically). The values of coefficient b found in our experiment indicate that the rate at which adiposity increased was below 1 in all groups of pigs. This means that negative allometry was observed, and that adiposity increased more slowly than the body weight of the pigs. Similar results were reported by Quiniou and Noblet (1995), who showed that the coefficient of the growth rate of adipose tissue of pigs growing from 15 to 110 kg BW was below 1, regardless of the pigs' obesity. The differences in the values of coefficient *b* between our groups of animals undoubtedly resulted from changes in the amount of protein and fat deposited by the animals of particular groups during restriction and realimentation. Because fat accretion showed the greatest diversity, it seems that this had the greatest impact on the value of coefficient *b*. The growth rate of protein and fat is genetically conditioned, but the results of our experiment indicate a potential for manipulation of the proportion between these body components within the same genotype *via* a "nutritional" way of exploiting the compensatory growth phenomenon. It seems to offer the potential of improving culinary quality (especially tenderness) of pork as well as its taste. Enhanced protein deposition is usually associated with an increased rate of protein turnover exhibited by compensating animals (Rossi et al., 2001), which positively influences meat tenderness (Therkildsen et al., 2002). Some authors reported, however, that meat tenderness could be influenced by the duration of realimentation (Kristensen and Emmans, 2002). Moreover, literature data indicate that an enhanced amount of fat deposited daily can also increase to some extent the intramuscular fat content in meat. This was evidenced in a study carried out with steers (Schoonmaker et al., 2004), as after removal of a growth suppressor (restricted feed/energy intake) the animals grew faster and, at target weight, were fatter, had a higher intramuscular fat content in the musculus *longissimus dorsi* compared with animals fed adequately throughout. Consequently, meat marbling of these animals also increased. Based on our results it seems that incorporating compensatory growth into the growth pathway of pigs in a manner resembling outdoor production (consuming an increased amount of fibre for a specified period) could offer the possibility of improving pork tenderness, but the precise explanation of this issue needs more detailed study.

CONCLUSIONS

Our results confirm that the compensatory response is temporary and occurs with the greatest intensity in the first few weeks after changing a restriction to realimentation and is more intensive in younger (restricted up to 50 kg BW) than in older (restricted up to 80 kg BW) pigs. The faster growth rate exhibited during the compensatory response is closely connected with greater protein deposition. Moreover, better protein utilization for growth could contribute to the compensatory response, and energy utilization seems to be of less importance. These results showed that incorporating compensatory growth into the outdoor production system could have a positive effect (however, only temporary) on protein deposition. Although, taking into account overall protein deposition, compensating pigs were similar to those fed under conditions similar to outdoor and to those fed conventionally as well. Our results also indicate that it is possible to regulate the growth rate and accretion of protein and fat in the body (*via* the phenomenon of compensatory growth). Furthermore, the culinary quality of the meat of such growing animals can be favourably influenced.

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