Archivos de Zootecnia
Journal website: https://www.uco.es/ucopress/az/index.php/az/
ORAL COMMUNICATION

Effect of production system (organic vs. conventional) and roughage supplementation in diet on performance of growing-finishing Krškopolje pigs

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Additional keywords

Autochthonous breed.
Growth rate.
Feed intake.
Backfat.

SUMMARY

Performance of Krškopolje pigs in conventional and organic production system was investigated in project TREASURE. Thirty-six castrates were assigned (at app. 70 kg) to 3 treatment groups (TG): organic (ECO), conventional (CON) and conventional with lucerne supplementation (CON+L). CON (n=12) and CON+L (n=12) were housed indoors, while ECO (n=12) pigs were housed in a pen with an outdoor access. Two barley based diets were composed; organic for ECO (12.4 MJ ME, 12.9% CP, 0.7% Lys) and conventional (12.7 MJ ME, 13.6% CP, 1.2 % Lys) for CON and CON+L and distributed in equal quantities (app. 3.4 kg per pig) to CON and ECO whereas CON+L were offered 10% less feed. ECO and CON+L were supplemented with lucerne hay or pellets, respectively. After 73 days on trial, CON+L pigs had 11% lower (P=0.148) average daily gain (ADG) and ECO had 13% higher (P= 0.097) ADG than CON pigs. ECO pigs had less variation in body weight at the end of the trial. Backfat thickness gain was 0.28 vs. 0.32 and 0.36 mm/day for CON+L, CON and ECO, respectively (P=0.083). Feed conversion ratio was comparable in CON and CON+L (4.90 vs. 4.91 kg feed/kg gain).

Efeito do Sistema de produção (orgânico vs convencional) e da suplementação com forragem na dieta sobre a performance de crescimento e acabamento de suínos Krškopolje

RESUMO

A performance de suínos Krškopolje produzidos no sistema convencional e orgânico foi estudada no âmbito do projeto TREASURE. Foram utilizados trinta e seis porcos castrados (com peso inicial aproximado de 70kg) distribuídos por 3 grupos de tratamento (TG): orgânico (ECO), convencional (CON) e convencional com suplementação com luzerna (CON+L). Os porcos CON (n=12) e CON+L (n=12) foram alojados em pavilhão fechado enquanto que os porcos ECO (n=12) foram alojados num parque com acesso a uma zona exterior. Foram preparadas duas dietas à base de cevada: orgânica para ECO (12.4 MJ EM, 12.9% PB, 0.7% Lisina) e convencional (13.2 MJ EM, 13.6% PB, 1.2 % Lisina) para os grupos CON e COM+L e distribuídas em quantidades iguais (cerca de 3,4kg por porco) para os grupos CON e ECO enquanto os animais do grupo COM+L receberam 10% menos de alimento. Os grupos ECO e CON+L foram suplementados com feno de luzerna e luzerna em pellets, respetivamente. Após 73 dias em ensaio os porcos do grupo CON+L apresentaram um ganho médio diário inferior (11%, P=0,148) aos porcos COM enquanto que os porcos do grupo ECO apresentaram um ganho médio diário 13% (P=0,097) superior aos porcos do grupo CON. Os porcos do grupo ECO apresentaram uma menor variação de peso corporal no final do ensaio. O ganho de espessura da gordura subcutânea dorsal foi de 0,28 vs 0,32 e 0,36mm/dia para os grupos CON+L, CON e ECO, respetivamente (P=0,083). O índice de conversão foi equivalente nos grupos CON e CON+L (4,90 vs 4,91 kg alimento/kg ganho).

Palavras chave adicionais

Raça autóctone.
Ritmo de crescimento.
Consumo de alimento.
Gordura subcutânea dorsal.

Information

Cronología del artículo.
Recibido/Received: 14.02.2017
Aceptado/Accepted: 21.06.2017
On-line: 15.01.2018
Correspondencia a los autores/Contact e-mail:
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INTRODUCTION

The only Slovenian autochtonous pig breed - Krškopolje pig is reared in very diverse conditions. Most of the farmers rear these pigs in extensive conditions, often using a combination of indoor and outdoor systems. Krškopolje pigs are often reared on organic farms (respecting Commission regulation (EC) 889/2008 on organic production and labelling of organic products), which recommends the use of robust genotypes. As reported by Brandt et al. (2010, p. 539-542) autochthonous pig breeds are better adapted to organic production systems than the modern ones. As shown in the study on two German local pig breeds (Angler Sattelschwein and Schwäbisch-Hällisches), these did not suffer as much from reduced dietary protein and energy intake applied in organic system than the modern breeds. Krškopolje pigs have been reported to reach daily gain 637 g from birth to slaughter (at 132 kg), in the finishing phase it even exceeded 1000 g/day

(Kastelic 2001, p. 34). Because information on growth potential of Krškopolje pigs is very scarce, and studies made so far were performed in very diverse conditions, an experiment was set in which the effect of rearing system (conventional vs. organic) was compared.

MATERIAL AND METHODS

Thirty-six barrows of Krškopolje breed originating from 12 litters/farms (3 pigs per litter) born in a two-week period were assigned within litter to three treatment groups (TG). Pigs in groups CON (n=12) and CON+L (n=12) were housed indoors (2 pens per TG; 6 pigs per pen) with partially slatted floors (7.5 m^2), whereas pigs in group ECO (n=12) were housed in a single pen (16 m^2) with free access to outdoor area (100 m^2) in order to simulate organic conditions. Prior to the experiment (from weaning onwards), the pigs were fed commercial diets adapted to the stage of growth suitable for either organic (group ECO) or conventional production systems (groups CON and CON+L). For the experiment, two barley based diets were composed; group ECO received organic feed mixture, while groups CON and CON+L were fed a conventional diet **(Tables I and II)**. Feeding was planned to allow pigs to fully exhibit their growth potential, but to limit excessive fat deposition in the last phase of fattening. Thus, all pigs were initially (before the experiment) fed on *ad libitum* basis while during the experiment daily feed distribution for ECO and CON was limited to 3.5 kg (45 MJ ME per pig). Additional 10% restriction was applied to CON+L. Pigs in ECO and CON+L group were supplemented with dried lucerne hay (ECO) or pellets (CON+L) on *ad libitum* basis. The pigs were weighed every two weeks and their back fat thickness at the level of last rib was measured ultrasonically. Data was analysed using the MIXED procedure (SAS Institute Inc, Cary, USA). A fixed effect of treatment group and a random effect of an animal were included in a statistical model.

Table I. Composition of experimental feed mixtures (%) (Composição dos alimentos compostos, %)

	Organic feed mixture	Conventional feed mixture
Barley	76.4	74.5
Soybean cake	8.3	6.0
Sunflower cake	10.0	8.0
Wheat feed flour	/	5.4
Molasses (sugarcane)	3.0	3.0
Calcium carbonate	1.1	0.96
Salt	0.34	0.34
Monocalcium phosphate	0.69	0.24
Vitamin and trace mineral mixture	/	0.50
Amino acid supplement	/	0.87
Lignosulphonate	/	0.25
Mineral supplement (Fe, Cu, Zn, Mn, Se)	0.07	/
Vitamin A	0.001	/
Vitamin E	0.10	/

RESULTS

In the experimental period, the actual daily feed disappearance was in average 3.4, 3.1 and 3.4 kg/day for CON, CON+L and ECO, respectively. At the start of the trial there were no differences between groups in body weight of pigs (P=0.325, **Figure 1**), but pigs in group ECO had thinner back fat than pigs in group CON (P=0.019, **Figure 1**). After 73 days of fattening, there were no differences among groups either in body weight (P=0.547, **Figure 1**) or in back fat thickness (0.902, **Figure 1**). Feed restriction in CON+L resulted in

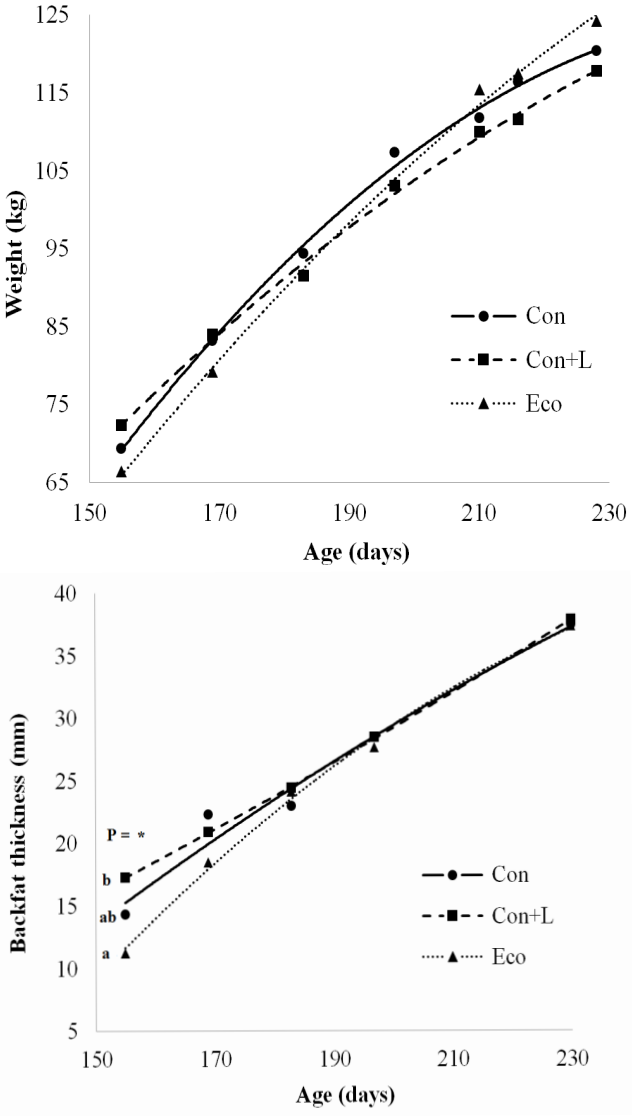

Figure 1. Gain of body weight and back fat in Krškopolje pigs during the experiment (Ganho de peso corporal e de espessura de gordura dorsal dos porcos Krškoplje durante o ensaio).

11% lower average daily gain compared to CON (623 vs. 700 g/day, P=0.148). In contrast, ECO pigs had 13% higher daily gain than pigs in group CON (792 vs. 700 g/day, P= 0.097). Back fat (last rib) gain was 0.28 vs. 0.32 and 0.36 mm/day for pigs in groups CON+L, CON and ECO, respectively (P=0.083). Feed conversion ratio was comparable in groups CON and CON+L (4.90 vs. 4.91 kg feed/kg gain).

DISCUSSION

Pigs in group ECO (fed organic diet) had 13% higher daily gains than pigs in conventional system, and a rough estimation based on growth data is that ECO pigs retained additional 6.0 MJ ME daily. This could be ascribed to dried lucerne hay consumption and potentially also lesser feed dissipation. Similar results were reported by Millet et al. (2004, p. 113) where higher average daily gain of organically fed or raised pigs compared to those housed in a conventional farm and consuming a conventional diet were observed in the last phase of fattening (70-105 kg). They concluded that even though feed intake of pigs fed organic diet was higher, their feed efficiency was better. Feed (mixture) conversion ratio of pigs raised in organic system was lower also in our study, however, it should be noted that pigs in the present study were also supplemented with lucerne hay and this additional energy intake is difficult to estimate. Pigs in group CON+L supplemented with pelleted lucerne did not compensate their diet restriction by consuming it, consequently leading to lower daily gains (11%).

CONCLUSIONS

The experiment with Krškopolje pigs represents one of the first studies on this breed, where its zootechnical performances were tested in conventional and organic system with additional scope to let the pigs exhibit their potential for growth. The study confirmed that when pigs get equivalent (nutrient composition) diets, their growth rate is comparable. However, study also showed, that improved housing conditions can contribute to less feed dissipation and higher weight uniformity in the pen at the end of fattening.

ACKNOWLEDGMENTS

The research was conducted within the project TREASURE, which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634476. The content of this paper reflects only the author's view and the European Union Agency is not responsible for any use that may be made of the information it contains.

Authors acknowledge also the core financing of Slovenian Agency of Research (grant P4-0133), the Ministry of Agriculture, Food and Forestry (V4-1417), and the breeders of Krškopolje pigs for their cooperation and support.

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