

EFFECT OF FEEDING SYSTEM IN RELATIONSHIP TO FATTENING AND PRODUCTION PARAMETERS FROM MANGALITSA BREED

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Abstract

Nowadays it is a trend in the market of pork to create products based on traditional specialities and these products require a specific meat quality with emphasis on dry matter content, intramuscular fat content in meat and fatty acid composition. The aim of this study was to verify the intensive feeding system in fattening of Mangalitsa breed from the point of view of improving fattening and slaughter parameters. In the study, sixteen pcs of Mangalitsa breed were used. The pigs were divided into two groups. The first group was fed under the intensive conditions (G_1), where the pigs received complete feed mixture for fatteners by *ad libitum* system. The second group was fed under the semi-intensive conditions (G_2), where the Mangalitsa breed received feed mixture with restraint twice a day. The fattening period lasted from 30 kg to 100 kg. The G_1 had higher average daily gain, lower feed intake as well as feed consumption efficiency compared to G_2 ($P < 0.05$). In general, the G_2 had lower slaughter yield, but significantly longer carcass length ($P < 0.05$) compared to G_1 . The G_1 had higher weight of shoulder, but lower weight of neck ($P < 0.05$), loin, thigh as well as lower percentage of lean meat cuts and meat from the thigh compared do G_2 . The loin eye area was also significantly lower in G_1 than in G_2 ($P < 0.05$). Regarding differences between fat parts from pigs, the G_1 had higher backfat thickness and percentage of carcass fat than G_2 . It can be concluded that indigenous breed Mangalitsa can be reared in the intensive conditions, where the fattening parameters were improved and quality of carcass was not significantly changed.

Key words: average daily gain, carcass, Mangalitsa breed, slaughter traits

In recent years, there has been increasing interest in indigenous breeds such as Mangalitsa breed (Petrović et al., 2011), because meat and meat products from these pigs are highly accepted by consumers due to high quality of meat. The meat from Mangalitsa is tasty with excellent consistency (Parunović et al., 2013). The high amount of intramuscular fat and the high levels of unsaturated fatty acids have been pointed out as the most relevant quality aspects in meat from indigenous pig breeds (Stanišić et al., 2015), although the indigenous breeds exhibited low average daily gain, higher feed intake as well as high fatness and low leanness (Szulc et al., 2012). The Mangalitsa is a typical fat-type, curly haired pig with relatively low reproductive performance, but good adaptability to rearing conditions such as extensive conditions compared to pig meat breeds. The Mangalitsa sows achieve 165-180 kg of body weight and boars 165-220 kg of body weight at 2-3 years of ages under the extensive conditions. The lard is generally 65-70 % and lean meat 30-35 % in carcass side compared to pig meat breeds, which have over 50 % of lean meat in carcass (Egerzegi et al., 2003). The future of the Mangalitsa is dependent largely on whether products derived from them can be utilized effectively by long-term market or consumers (Parunović et al., 2012). The Mangalitsa breed represents a key role in a healthier nutrition plan due to

high content of unsaturated fatty acids, which are essential to human nutrition and disease prevention (Szábo, 2006).

The present study was conducted to verify the intensive feeding system in fattening of Mangalitsa breed from the point of view of improving fattening and slaughter parameters.

Material and Methods

The experiment was realized in the Experimental centre of animal near the Department of Animal Husbandry at the Slovak University of Agriculture in Nitra. In the study, twenty-four pigs of Mangalitsa breed were used. In the study, sixteen pigs of Mangalitsa breed were used. The pigs were divided into two group with different feeding system. First group of pigs ($n=9$) were reared in the intensive system (G_1). The pigs received complete feed mixture for fatteners (Table 1) by *ad libitum* system in the intensive system. The second group of Mangalitsa breed ($n=7$) were reared in the semi-intensive system (G_2). The pigs were fed by feed mixture (Table 2) with restraint twice a day. The nutrient composition of feed mixtures of both groups are shown in Table 3. The pen was consisted of concrete floor, which was bedding straw. The fattening period was lasted from 30 kg to 100 kg. After the fattening period the pigs were moved to

slaughterhouse in the Experimental centre of animal. Then they were electrically stunned and slaughtered according to government regulation NR SR 432/2012 (about the protection of animals during the slaughter). The dissection of carcasses was done according to standard practices of station of fattening and slaughter values in Slovakia (initially STN 466 164).

The data were subjected to statistical analysis by ANOVA using the Statistic Analysis System (SAS) package (SAS 9.2 using of application Enterprise Guide 5.1.) Differences between groups were analysed by Tukey's test.

Results and Discussion

Means and standard deviations of fattening parameters of pigs are shown in Table 4. The G₁ had higher average daily gain (ADG) by 56 % , lower feed intake by 42.9 % as well as feed consumption efficiency by 33.1 % compared to G₂ (P < 0.05). From the point of view of fattening parameters, the intensive feeding system is more effective due to higher ADG, lower feed intake just as feed consumption efficiency than the semi-intensive feeding system. According to study of Serra et al. (1998), the Iberian pig breed achieved higher ADG, which was more than 39.8 % and 18.9 % compared to our results. Further, the report of Pârvu et al. (2011) showed that Mangalitsa achieved higher AVG, but lower feed intake than in our results.

The results for the slaughter traits of pigs are presented in Table 5. In general, the G₂ had lower slaughter yield, but significantly longer carcass length

(P < 0.05) compared to G₁. As regards the differences of mainly cuts and carcass fat, only small differences were found. However the G₁ had higher weight of shoulder, but lower weight of neck (P < 0.05), loin, thigh as well as lower percentage of lean meat cuts and meat from the thigh compared do G₂ (P < 0.05). The loin eye area was also significantly lower in G₁ than in G₂. The quality of carcass was not changed in the intensive conditions, but the weight of main cuts was lower just as loin eye area.

These results are in agreement with findings of Bocian et al. (2012); Daza et al. (2006); Kuzelov et al. (2011); Parunović et al. (2012); Petrović et al. (2011). On the other hand, Swallow-bellied Mangalitsa and White Mangalitsa achieved lower values of warm carcass weight and cold carcass weight than in our results (Parunović et al., 2013).

Regarding differences between fat parts from pigs, the G₁ had lower weight of backfat, but higher backfat thickness compared to G₂. Similarly, weight of carcass fat was lower and percentage of carcass fat higher in G₁ than in G₂, although there were not significant differences. Results show that indigenous breeds reared in the intensive conditions had more fat in carcass than pigs reared in the semi-intensive conditions. According to study of Szabó et al. (2010), Mangalitsa breed had higher backfat thickness compared to Hungary Large White, but the results of Mangalitsa were less compared to our results. Indigenous polish pig breed Zlotnicka spotted had lower backfat thickness and higher level of lean meat than in our results (Szulc et al., 2012).

Table 1. Composition of complete feed mixture

Ingredients	%
Corn	50
Barley	10
Wheat	10
Soybean meal	10
Linseed	10
Granuled alfalfa	7
Mineral and vitamin supplement	3

Table 2. Composition of feed mixture

Ingredients	
Maize %	60
Oat %	30
Straw pellets %	10

Table 3. The nutrition content of feed mixtures

Traits	CFM	FM	Pellets
ME, MJ.kg ⁻¹	12.69	11,54	2,58
Dry matter, %	89.79	91,3	96,37
Crude protein, %	13.75	10,39	6,3
Crude fat, %	5.23	3,21	2,02
Crude fibre, %	7.36	9,04	32,95
Ash, %	5.39	4,03	6,48

CFM: Complete feed mixture; FM: Feed mixture

Table 4. Fattening parameters of Mangalitsa breed from different breeding systems

Traits	G ₁ (n=9)		G ₂ (n=7)	
	\bar{y}	SD	\bar{y}	SD
Days of fattening	114 ^a	7.7	258 ^b	3.4
Average daily gain (g)	614.1 ^a	43.2	270.7 ^b	3.4
Feed intake kg per 1 kg gain	5.2 ^a	0.25	9.1 ^b	0.18
Feed consumption efficiency (MJ) for 1 kg gain	69.6 ^a	3.4	104 ^b	2

a,b: Different letters in the same row indicate significant statistical differences (Tukey's test, P < 0.05)

Table 5. Slaughter traits of Mangalitsa breed from different rearing systems

Traits	G ₁ (n=9)		G ₂ (n=7)	
	\bar{y}	SD	\bar{y}	SD
Hot carcass weight (kg)	81.5	4.79	83.36	3.64
Cold carcass weight (kg)	79.56	4.13	81.64	3.39
Loss by chilling (%)	1.19	0.79	1.04	0.49
Slaughter yield (%)	79.02	1.73	78.32	1.36
Carcass length (cm)	71.61 ^a	2.12	88.93 ^b	2.54
Neck (kg)	2.15 ^a	0.3	2.78 ^b	0.27
Shoulder (kg)	3.33	0.22	3.16	0.37
Loin (kg)	3.13	0.34	3.15	0.43
Thigh (kg)	4.8	0.67	5.1	0.54
Meat from the thigh (%)	12.31	1.86	12.55	1.09
Weight of lean meat cuts (kg)	13.41	1.11	14.79	1.48
Lean meat cuts (%)	34.36	3.27	34.89	3.03
Loin eye area (mm ²)	2611 ^a	382.2	3586 ^b	719.7
Jowl (kg)	1.29	0.23	1.25	0.15
Pork belly (kg)	7.96	0.83	7.98	0.58
Weight underskinfat from thigh (kg)	3.34	0.62	3.35	0.38
Kidney fat (kg)	0.12	0.01	0.12	0.01
Backfat (kg)	7.21	1.43	7.29	0.43
Backfat thickness (cm)	5.7	0.8	5.5	0.6
Weight of carcass fat (kg)	21.39	2.27	21.7	1.49
Carcass fat (%)	26.87	2.16	26.58	1.52

a,b: Different letters in the same row indicate significant statistical differences (Tukey's test, P < 0.05)

Conclusion

According to the results obtained, the Mangalitsa breed had higher average daily gain with lower feed intake in the intensive conditions than Mangalitsa in the semi-intensive conditions. As regards the slaughter traits, the Mangalitsa in the intensive conditions had lower percentage of meat with higher level of carcass fat in carcass that Mangalitsa breed in the semi-intensive conditions. It can be concluded that indigenous breed Mangalitsa can be reared in the intensive conditions, where the fattening parameters were improved and quality of carcass was not significantly changed.

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