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Effect of the addition of 0.5% L-arginine to diets for fattening pigs on selected fattening and carcass traits

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The aim of the study was to determine the effect of arginine-supplemented diets fed to growing pigs on fattening and carcass traits. During the fattening period (30 kg to approx. 117 kg), 40 crossbred PL x PLW pigs (barrows : gilts – 1:1) were fed in a two-stage system with feed supplemented with a 0.5% addition of arginine (experimental group E – 20 pigs) or without added arginine (control group C – 20 pigs). Daily weight gains were monitored, and post mortem cold carcass weight, dressing percentage, lean meat percentage, weight of the ham (without feet and knuckles), and weight of the quadriceps femoris muscle were determined. The daily weight gains of E and C pigs were comparable. The carcasses of E pigs had higher meat content (P = 0.006) and higher ham weight than the control pigs (difference of 0.8 kg). Moreover, a larger share of ham was confirmed in the half-carcasses from group E vs C (P ≤ 0.05). The weight of the quadriceps femoris muscle was 31% higher in the experimental group than in the control (P = 0.001). Enrichment of the diets with arginine had a beneficial effect on the carcass characteristics. The increased weight of the quadriceps femoris muscle and its larger share of the ham and in the half-carcass of experimental pigs relative to the control are important characteristics in processing.

KEY WORDS: fattening pigs, arginine, daily weight gains, carcass traits, quadriceps femoris muscle

At each stage of an animal's growth and development, the amount of amino acids supplied with feed should be balanced, as this underlies the normal functioning of the body. Arginine, as a conditionally essential amino acid, must be supplied with the diet. About 40% of arginine from feed is degraded in pigs, due to the high activity of the enzyme arginase – a hydrolase (Wu and Morris, 1998). This amino acid can be synthesized in the small intestine, and the main substrate for its production is glutamine, an alpha-amino acid (Tapiero et al., 2002; Ścibior and Czeczot, 2004; Hanczakowska and Niwińska, 2013).

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Arginine is a substrate for the synthesis of cellular proteins, as well as ornithine, polyamine, nitrogen oxide, proline, glutamic acid, glutamine, creatine and dimethylarginine (Graboń, 2006). The primary sites of their metabolism are the small intestine, kidneys and liver, with the rate of the transformations dependent on the organ and tissue (Closs and Mann, 2000).

In the metabolic cycle of three amino acids, ornithine, citrulline and arginine, urea is formed from ammonia, carbon dioxide and aspartic acid, and thus arginine in a living organism is partially responsible for its production and removal (Graboń, 2006). Decarboxylation of ornithine involves the production of polyamines, which have a beneficial effect on the capacity for reproduction and on cell differentiation (Blantz et al., 2000). In a review paper, Wu et al. (2007) report that enrichment of the diet of rats and pigs with arginine decreases the plasma concentration of urea and increases that of ornithine and arginine. This is important because arginine is a precursor of synthesis of biologically important metabolites – nitrogen oxide and creatine (Galli, 2007).

In an experiment carried out by Nall et al. (2009), enrichment of the diet with CLA (1.5%) and arginine (1.25%) increased the body weight of experimental rats, which suggests that both compounds are involved in stimulating muscle protein synthesis. Additional supplementation with arginine was also shown to reduce adipose tissue gain. Research on rats receiving glutamine (2%) and arginine (1.2%) with their feed showed that the supplements improved intestinal function and increased the body weight of the experimental rats (Beutheu et al., 2014). The addition of glutamine and arginine prevented a reduction in the number of intestinal villi in the group of animals diagnosed with inflammation of the intestinal mucosa. Administration of lipopolysaccharide and 2% arginine with water reduced damage to the intestinal mucosa of experimental rats, increased proliferation of enterocytes in the jejunum, and increased the weight of the small intestine, which Sukhotnik et al. (2004) regard as a beneficial phenomenon. Hanczakowska and Niwińska (2013) cite the results of various studies on the effect of arginine and glutamine on the structure and function of the intestinal epithelium of weaned piglets. Greater villus height and crypt depth were observed in the histometric analysis, which was conducive to improved weight gain. Rao and Samak (2012), Kim and Kim (2017) and Perna et al. (2019) also stress the beneficial effect of glutamine and arginine on the intestinal epithelium and its functioning in young pigs.

Arginine is an amino acid essential for the normal growth of the body, which can be observed in young monogastric animals (Graboń, 2006), chicks in the initial stage of growth (Ball et al., 2007) and piglets (Wu et al., 2000). Al-Daraji and Salih (2012), using an arginine feed supplement in Ross 308 broiler chickens, observed better feed intake in the experimental birds and greater body weight gains than in the control group without this supplement. According to Graczyk-Wojciechowska (2000), arginine exerts a positive effect in conditions of stress or infection, contributing to restoration of epithelial cells and lymphocyte renewal, improving immunity, reducing the risk of infection, accelerating wound healing, and taking part in collagen formation. Abdukalykova and Ruiz Feria (2006) showed that a 1.5% addition of arginine positively influenced specific cellular immunity – an increase in the level of antibodies was observed in the body. Lv et al. (2018) made similar observations using glutamine, while contrasting results were obtained by Kidd et al. (2001).

Arginine is an important amino acid not only for young animals, including piglets, but also for their mothers, pregnant and lactating sows (Bass et al., 2017). In sows, due to the poor blood supply to the placenta, an insufficient amount of amino acids in feed may limit transport of nutrients from the blood of the mothers to the foetuses (Wu and Morris, 1998; Che et al., 2013). The use of arginine

in the optimal amount and stage of gestation improves nutrition in foetuses and their survival rate (Bérard and Bee 2010; Let al., 2014; Bieliński et al., 2017). The use of arginine also has a positive effect on the formation of skeletal muscle fibres in young animals (Bérard and Bee, 2010). Flynn et al. (2002) report that the addition of arginine to the diet of lactating sows increased the share of blood vessels in the body of the sow, and production of polyamine and nitrogen oxide led to cell proliferation in the mammary tissue of sows nursing piglets.

According to Wu et al. (2000) and Kim et al. (2004), in the post-natal period the milk of the sow does not meet the piglets' need for arginine, but glutamine ingested with the milk is converted in the intestinal epithelial enterocytes to citrulline, which in turn is converted to arginine (Hanczakowska and Niwińska, 2013). Owing to this mechanism, supplementation of sow feed with glutamine compensates for the low content of arginine in the food of neonates.

The literature indicates that in various animal species, including pigs, arginine supplementation influences cell proliferation, muscle fibre formation, and muscle mass gain. Therefore we conducted an experiment to investigate the effect of feed supplemented with arginine on selected fattening and carcass traits in pigs, including the weight of the quadriceps femoris muscle.

MATERIAL AND METHODS

The experiment was carried out at a piggery in the Greater Poland Voivodeship, and the fatteners were slaughtered at a local slaughterhouse in accordance with the applicable procedures. The weaners selected for the study (n=40), PL x PLW crossbreds, were divided into two groups, control C and experimental E, with 20 individuals in each group. They were kept in group pens in a system without litter (Regulation of the Ministry of Agriculture and Rural Development, 2010), where they had continual access to feed and water. The pigs were fed balanced dry grower and finisher diets (Table 1) in a two stage system: stage 1 – from 30 kg to 80 kg body weight; stage 2 – from 80 kg body weight to slaughter at about 117 kg. For the experimental group (E), the diets were enriched with a 0.5% L-arginine supplement. The animals were weighed three times: at the start of fattening, when the feed was changed, and at the end of fattening. Fattening lasted 98 days. Daily weight gains were calculated, and after slaughter the dressing percentage, lean meat content (with an IM-03 apparatus), and cold carcass weight were determined. Cooled right half-carcasses (+4°C, 24 h) were dissected, separating the ham (without the feet and knuckles), which was weighed. The quadriceps femoris muscle was separated from the ham and weighed, after which its percentage share of the weight of the ham in the weight of the half-carcass was calculated.

Statistical analysis of the results was performed using the SPSS IBM Statistics 25 package. The tables present the means and standard deviations for the features. Normal distribution of variables in groups was tested by the Shapiro-Wilk test. If the trait had normal distribution, Student's t-test was used to compare groups (body weight at slaughter, daily gains, carcass weight, dressing percentage, lean meat content, share of ham in the half-carcass, share of the quadriceps femoris muscle in the half-carcass). The Mann-Whitney U test was used where there was no normal distribution (ham weight, weight of quadriceps femoris muscle, and share of quadriceps femoris muscle in the ham).

RESULTS AND DISCUSSION

The final weight of the fatteners and daily weight gains were comparable in the two groups, C and E (Table 2). The dressing percentage was similar in both groups, but meat content was significantly

Table 1

Nutritional value of 1 kg of grower and finisher diet

Value of feed	Diet	
	Grower	Finisher
Metabolic energy (MJ)	13.1	12.2
Crude protein (g)	175	152
Crude fibre (%)	4.0	4.5
Calcium (g)	5.0	5.0
Lysine (g)	9.8	9.0
Methionine + Cysteine (g)	5.5	5.0
Threonine (g)	5.8	5.5
Arginine (g)	0.79	0.70

higher ($P = 0.006$) in group E than in group C; the difference between groups for this trait was 1.6 percentage points. Kim et al. (2004) showed that the addition of 0.8% arginine to feed increased feed intake and daily gains. Tan et al. (2009) added 1% arginine to feed for fattening pigs and noted an increase in body weight gain, which in their opinion was due to the 6.5% greater feed consumption. Wu et al. (2010) also confirmed an increase in feed intake and weight gain. The present study found no significant effect of arginine in feed on daily gains in fatteners. This was probably due to the relatively low level of supplementation with arginine (0.5%) and the fairly high initial body weight of the weaners used for the experiment (30 kg). This is confirmed in the literature, as researchers emphasize the positive role of arginine in the growth and development of weaned piglets (Wu et al., 2000; Wu et al., 2010), rats, dogs, cats, rabbits, horses and small ruminants (Ball et al., 2007), as well as poultry (Ball et al., 2007; Al-Daraji and Salih, 2012). Madeira et al. (2014) conducted an experiment in which the use of a 1% arginine supplement in feed for fatteners increased fatback thickness and improved the sensory attributes of meat, i.e. tenderness and juiciness, while Ma et al. (2010) reported a slight decrease in carcass fat following the addition of arginine to feed. Tan et al. (2009) used a 1% addition of arginine to feed for fatteners and noted no differences in dressing percentage between groups. On the other hand, they emphasize that there was a 5.5% ($P \leq 0.05$) increase in the share of skeletal muscles in the carcasses of experimental pigs in comparison with the control and an 11% decrease in fat content ($P \leq 0.01$). Arginine is a strong stimulatory substance; it increases the release of insulin, growth hormone (GH) and insulin-like growth factor (IGF-I) into the bloodstream, which according to Newsholme et al. (2005) is conducive to an increase in muscle mass gain in animals. The benefits of arginine, pointed out by Sukhotnik et al. (2004), Abdukalykova and Ruiz Feria (2006), Wu et al. (2007), Nall et al. (2009), and Bérard and Bee (2010), speak in favour of its use in experiments on growing pigs. In studies by Kim et al. (2004), Tan et al. (2009), Wu et al. (2010), and Madeira et al. (2014), the addition of arginine to feed has ranged from 0.5% to 1.2%. The diets were supplemented with the knowledge that the feedstuffs present in the diets (mainly cereal grains) also contain arginine, as it has been shown to be present in animal and plant products. Arginine is found in the meat of slaughter animals and seafood, as well as seeds and cereal grains, which are the main components of feed (Zdrojewicz et al., 2019).

Table 2

Selected fattening and carcass parameters

Parameter	Group				P-value
	Control		Experimental		
	$\bar{x}$	Sd	$\bar{x}$	Sd	
Body weight at slaughter (kg)	117.5	3.53	116.6	2.61	0.365
Daily weight gains (g)	891.0	34.62	888.0	27.43	0.744
Cold carcass weight (kg)	91.7	2.80	91.2	1.99	0.511
Dressing percentage (%)	78.1	0.32	78.3	0.73	0.344
Lean meat content (%)	56.2	1.75	57.8	1.83	0.006

In the present study, the higher meat content (P = 0.006) of the carcasses of fatteners from group E vs C was probably due to the additional intake of arginine with the diet, which is confirmed in studies by other authors (Kim et al., 2004; Tan et al., 2009). The ham weight in the experimental group was 0.8 kg higher (7.9%) than in the control (Table 3). The weight of the quadriceps femoris muscle was significantly higher in group E fatteners as compared to group C, with a difference of 31% (P = 0.001) in favour of the group receiving feed supplemented with arginine. The share of the quadriceps femoris muscle in the weight of the ham was also significantly greater in group E vs C (difference of 1.8 pp; P = 0.001). Analogously, the share of the ham in the half-carcass weight and the share of the quadriceps femoris muscle in the half-carcass were greater in group E vs C, by 1.9 pp ($P \leq 0.05$) and 0.60 pp (P = 0.001), respectively (Table 3). The significantly higher weight of the quadriceps femoris muscle obtained from group E vs C pigs was due to the specific effect of arginine as a substrate for synthesis of cellular proteins (Graboń, 2006).

Table 3

Weight of ham and quadriceps femoris muscle and their share in the half-carcass

Trait	Group				P-value
	Control		Experimental		
	$\bar{x}$	Sd	$\bar{x}$	Sd	
Weight of ham (kg)	10.10	1.26	10.90	1.04	0.072
Share of ham in half-carcass (%)	21.90	2.49	23.80	2.11	0.015
Weight of quadriceps femoris muscle (kg)	0.87	0.11	1.14	0.11	0.001
Share of quadriceps femoris muscle in ham (%)	8.70	0.09	10.50	0.09	0.001
Share of quadriceps femoris muscle in half-carcass (%)	1.90	0.22	2.5	0.23	0.001

The results of our study for carcass traits correspond to those presented by Kim et al. (2004), Newsholme et al. (2005), Nall et al. (2009), Tan et al. (2009), and Bérard and Bee (2010). In studies

on fattening pigs, the use of an arginine supplement in feed beneficially increased accumulation of protein in the muscles, and thus muscle mass gain and meat content (Kim et al., 2004; Newsholme et al., 2005; Tan et al., 2009).

Better development of the ham (without the feet and knuckles), including the quadriceps femoris muscle, was obtained from the experimental pigs than from the controls. As the animals used in the study represented the same genotype, the result may be interesting, primarily for processing, and also for producers of finished products.

CONCLUSIONS

Supplementation with arginine was not found to affect daily weight gains, cold carcass weight, or dressing percentage. The results of the study indicate that the addition of arginine affects meat content and the weight of the quadriceps femoris muscle. Pigs from the experimental group had significantly higher lean meat content, higher weight of the quadriceps femoris muscle, a larger percentage of the quadriceps femoris muscle in the weight of the ham, and a larger percentage of the quadriceps femoris muscle in the half-carcass as compared to the controls.

REFERENCES

Abdukalykova S., Ruiz Feria C.A. (2006). Arginine and vitamin E improve the cellular and humor al immune response of broiler chickens. International Journal Poultry Science, 5 (2): 121-127 (DOI: 10.3923/ijps.2006.121.127).

Al-Daraji H.J., Salih A.M. (2012). Effect of Dietary L-Arginine on Productive Performance of Broiler Chickens. Pakistan Journal of Nutrition, 11 (3): 252-257 (DOI: 10.3923/ pjn.2012.252.257).

Ball R.O., Urschel K.L, Pencharz P.B. (2007). Nutritional consequences of interspecies differences in arginine and lysine metabolism. The Journal of Nutrition, 137 (6): 1626-1641 (DOI: 10.1093/jn/137.6.1626S).

Bass B.E., Bradley C.L., Johnson Z.B., Zier-Rush C.E., Boyd R.D., Usry J.L., Maxwell C.V., Frank J.W. (2017). Influence of dietary L-arginine supplementation of sows during late pregnancy on piglet birth weight and sow and litter performance during lactation. Journal of Animal Science, 95: 248-256 (DOI: 10.2527/jas2016.0986).

Bérard J., Bee G. (2010). Effects of dietary l-arginine supplementation to gilts during early gestation on foetal survival, growth and myofiber formation. Animal 4 (10): 1680-1687 (DOI: 10.1017/S1751731110000881).

Beutheu S., Ouelaa W., Guérin Ch., Belmonte L., Aziz M., Tennoune N., Bôle-Feysot Ch., Galas L., Déchelotte P., Coëffier M. (2014). Glutamine supplementation, but not combined glutamine and arginine supplementation, improves gut barier function during chemotherapy-induced intestinal mucositis in rats. Clinical Nutrition, 33 (4): 694-701 (DOI: 10.1016/j.clnu.2013.09.003).

Bieliński P., Rekiel A., Więcek J., Sońta M. (2017). Effect of dietary arginina supplementation on body weight changes and productivity of sows. Annals of Warsaw University of Life Sciences – SGGW. Animal Science, 56 (2): 163-172 (DOI: 10.22630/AAS.2017.56.2.18).

Blantz R.C., Satriano J., Gabbai F., Kelly C. (2000). Biological effects of arginine metabolites. Acta Physiologica Scandinavica, 168 (1): 21-25 (DOI: 10.1046/j.1365-201x.2000.00646.x).

Che L., Yang P., Fang Z., Lin Y., Wu D. (2013). Effects of dietary arginine supplementation on reproductive performance and immunity of sows. Czech Journal of Animal Science, 58 (4): 167-175 (DOI: 10.17221/6711-CJAS).

Closs E.L., Mann G.E. (2000). Membrane transport of arginine and cationic amino acids analogs. W: Nitric oxide in physiology and pathology, red.: L.J. Ignarro. Academic Press; New York; 225-241.

Flynn N.E., Meininger C.J., Haynes T.E., Wu G. (2002). The metabolic basis of arginine nutrition and pharmacotherapy. Biomedicine and Pharmacotherapy, 56 (9): 427-438 (DOI: 10.1016 /s0753-3322(02)00273-1).

Galli F. (2007). Amino acid and protein modification by oxygen and nitrogen species. Amino Acids, 32 (4): 497-499 (DOI: 10.1007/s00726-006-0467-y).

Graboń W. (2006). Arginina - podstawowy aminokwas w procesie nowotworzenia. Postępy Higieny Medycyny Doświadczalnej, 60: 483-489.

Graczyk-Wojciechowska J. (2000). Aminokwasy jako uzupełnienie diety. HOLBEX Warszawa.

Hanczakowska E., Niwińska B. (2013). Glutamina jako dodatek do paszy dla prosiąt, Wiadomości Zootechniczne, R. LI, 1: 107-112.

Kidd M.T., Peebles E.D., Whitmarsh S.K., Yeatman J.B., Wideman R.F. (2001). Growth and immunity of broiler chicks as effected by dietary arginine. Poultry Science, 80 (11): 1535-1542 (DOI: 10.1093/ps/80.11.1535).

Kim M.H., Kim H. (2017). The Roles of Glutamine in the Intestine and Its Implication in Intestinal Diseases. International Journal of Molecular Sciences, 18 (5): 1051 (DOI: 10.3390/ijms 18051051).

Kim S.W, Pherson L.Mc., Wu G. (2004). Dietary arginine supplementation enhances the growth of milk-fed young pigs. Journal of Nutrition, 134 (3): 625-630 (DOI: 10.1093/jn/134.3.625).

Li X., Bazer F.W., Johnson G.A., Burghardt R.C., Frank J.W., Dai Z., Wang J., Wu Z., Shinzato I., Wu G. (2014). Dietary supplementation with L-arginine between days 14 and 25 of gestation enhances embryonic development and survival in gilts. Amino Acids, 46 (2): 375-384 (DOI: 10.1007/s00726-013-1626-6).

Lv D., Xiong Xia, Yang H., Wang M., He Y., Liu Y., Yin Y. (2018). Effect of dietary soy oil, glucose, and glutamine on growth performance, amino acid profile, blood profile, immunity, and antioxidant capacity in weaned piglets. Science China Life Sciences, 61, 10: 1233-1242 (DOI: 10.1007/s11427-018-9301-y).

Ma X., Lin Y., Jiang Z., Zheng C., Zhou G., Yu D., Cao T., Wang J., Chen F. (2010). Dietary arginine supplementation enhances antioxidative capacity and improves meat quality of finishing pigs. Amino Acids, 38 (1): 95-102 (DOI: 10.1007/s00726-008-0213-8).

Madeira M.S., Alfaia C.M., Costa P., Lopes P.A., Lemos J.P.C., Bessa R.J., Prates J.A. (2014). The combination of arginine and leucine supplementation of reduced crude protein diets for boars increases eating quality of pork. Journal of Animal Science, 92 (5): 2030-2040 (DOI: 10.2527/jas.2013-6876 PMID: 24663178).

Nall J.L., Wu G., Kim K.H., Choi C.W., Smith S.B. (2009). Dietary supplementation of L-arginine and conjugated linoleic acid reduces retroperitoneal fat mass and increases lean body mass in rats. The Journal of Nutrition, 139 (7): 1279-1285 (DOI: 10.3945/jn.108.102301).

Newsholme P., Brennan L., Rubi B., Maechler P. (2005). New insights into amino acid metabolism, beta-cell function and diabetes. Clinical Science, 108 (4): 185-194 (DOI: 10.1042/CS20040290).

Perna S., Alalwan T.A., Alaali Z., Alnashaba T., Gasparri C., Infantino V., Hammad L., Riva A., Petrangolini G., Allegrini P., Rondanelli M. (2019). The Role of Glutamine in the Complex Interaction between Gut Microbiota and Health: A Narrative Review. International Journal of Molecular Sciences, 20: 5232 (DOI: 10.3390/ijms20205232).

Rao R., Samak G. (2012). Role of Glutamine in Protection of Intestinal Epithelial Tight Junctions. Journal of Epithelial Biology and Pharmacology, 5 (suppl. 1): 47-54 (DOI: 10.2174/1875044301205010047).

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Sukhotnik I., Mogilner J., Krausz M.M., Lurie M., Shiloni E. (2004). Oral arginine reduces gut mucosal injury caused by lipopolysaccharide endotoxemia in a rat. The Journal of Surgical Research, 122 (2): 256-262 (DOI: 10.1016/j.jss.2004.07.004).

Ścibior D., Czeczot H. (2004). Arginina – metabolizm i funkcje w organizmie człowieka. Postępy Higieny i Medycyny Doświadczalnej, 58: 321-332.

Tan B., Yin Y., Liu Z., Li X., Xu H., Kong X., Huang R., Tang W., Shintazo I., Smith S.B., Wu G. (2009). Dietary L-arginine supplementation increases muscle gain and reduces body fat mass in growing-finishing pigs. Amino Acids, 37 (1): 169-175 (DOI: 10.1007/s00726-008-0148-0).

Tapiero H., Mathé G., Couvreur P., Tew K.D. (2002). II. Glutamine and glutamate. Biomedicine and Pharmacotherapy. 56 (9): 446-457 (DOI: 10.1016/s0753-3322(02)00285-8).

Wu G., Meininger C.J., Knabe D.A., Bazer F.W., Rhoads J.M. (2000). Arginine nutrition in development, health and disease. Current Opinion in Clinical Nutrition and Metabolic Care, 3(1): 59-66 (DOI: 10.1097/00075197-200001000-00010).

Wu G., Morris S.M. Jr. (1998). Arginine metabolism: nitric oxide and beyond. The Biochemical Journal, 336 (15): 1-17 (DOI: 10.1042/bj3360001).

Wu G.Y., Bazer F.W., Davis T.A., Jaeger L.A., Johnson G.A., Kim S.W., Knabe D.A., Meininger C.J., Spencer T.E., Yin Y.L. (2007). Important roles for the arginine family of amino acids in swine nutrition and production. Livestock Science, 112 (1-2): 8-22 (DOI:10.1016 /j.livsci. 2007.07.003).

Wu X., Ruan Z., Gao Y., Yin Y., Zhou X., Wang L., Geng M., Hou Y., Wu G. (2010). Dietary supplementation with L-arginine or N-carbamylglutamate enhances intestinal growth and heat shock protein-70 expression in weanling pigs fed a corn- and soybean meal-based diet. Amino Acids, 39 (3): 831-839 (DOI: 10.1007/s00726-010-0538-y).

Zdrojewicz Z., Winiarski J., Popowicz E., Szyca M., Śmieszniak B., Michalik T., Buczko K. (2019). Rola argininy w organizmie człowieka. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej im. Witelona w Legnicy, 30 (1): 2449-2456.

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Wpływ dodatku 0,5% L-argininy do mieszanek dla tuczników na wybrane cechy tuczne i rzeźne

S t r e s z c z e n i e

Celem badań było określenie wpływu żywienia mieszankami suplementowanymi argininą na wyniki tuczne i rzeźne u świń rosnących. W tuczu (od 30 kg – do ok. 117 kg) 40 świń mieszańców pbz x wbp (udział płci wieprzki : loszki – 1:1) żywiono systemem dwufazowym, mieszankami suplementowanymi 0,5% dodatkiem argininy (grupa doświadczalna D – 20 szt.) lub mieszankami bez jej dodatku (grupa kontrolna K – 20 szt.). Kontrolowano przyrosty dobowe, a *post mortem* masę tuszy zimnej, wydajność rzeźną, mięsność oraz masę szynki właściwej (bez stópki i golonki) i masę mięśnia czworogłowego uda (*Musculus quadriceps femoris*). Przyrosty dobowe tuczników doświadczalnych i kontrolnych były porównywalne. Tusze pozyskane od świń z grupy D w porównaniu z grupą K charakteryzowały się większą mięsnością (P=0,006) oraz większą masą szynki właściwej (różnica o 0,8 kg). Potwierdzono też większy udział szynki w półtuszy w grupie D vs K (P≤0,05). Masa mięśnia czworogłowego uda tuczników doświadczalnych w porównaniu z kontrolnymi była większa o 31% (P=0,001). Wzbogacenie mieszanek w argininę korzystnie wpłynęło na cechy rzeźne. Większa masa mięśnia czworogłowego uda oraz jego większy udział w szynce właściwej i w półtuszy tuczników doświadczalnych w porównaniu z kontrolnymi są ważnymi cechami dla przetwórstwa.

SŁOWA KLUCZOWE: tuczniki, arginina, przyrosty dobowe, cechy rzeźne, mięsień czworogłowy uda