

# EFFECTS OF FEED ENERGY & NUTRIENT LEVELS ON LYD PIG CARCASS & PRIMAL CUTS WEIGHTS MEASURED BY VCS2000

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## I. INTRODUCTION

The per capita consumption of pork in South Korea has been steadily increasing from 19.0 kg in 2011 to 27.6kg in 2021, and as a result, the number of pigs being raised has also been gradually increasing [1]. Accordingly, the Korean government has implemented the VCS2000, an automatic grading and classification machine, as a pilot project since 2016 to increase processing speed, grading accuracy, and reduce costs in pig carcass grading [2]. Growth of pig and carcass are affected by the energy and nutrient levels of the feed [3,4,5,6]. However, there has been no research paper that has studied the direct comparison of carcass weight and production weight of primal cuts according to the energy and nutrient levels of the feed. So, this study aims to analyze carcass weight and 5 primal cuts (shoulder blade, loin, belly, shoulder picnic and ham) weight based on feed energy and nutrients level, using VCS2000 equipment, to support the development of the Korean swine industry.

## II. MATERIALS AND METHODS

The test material consisted of 12,566 LYD pigs (three-way crossbred of Landrace, Yorkshire and Duroc) from 24 farms. In June and July 2022, their carcass weight and 5 primal cuts were measured using the VCS2000 equipment. They were divided into three groups (A, B, C) based on energy and nutrient level of feed used in each farm. Group A used Prime feed, Group B used Middle feed, and Group C used Low feed. The energy and nutritional levels of each feed is shown in Table 1. Statistical analysis was performed using SPSS 26.0 version.

Table 1 The feed's energy and nutrient levels used in the experiment

Feed names and groups	Stage	Minimum <sup>1</sup>			Maximum <sup>2</sup>			DE <sup>3</sup> (kcal/kg)
		Crude Fat (%)	Calcium (%)	Lysin (%)	Crude Fiber (%)	Crude Ash (%)	P (%)	
Prime (A)	Weaning piglet	6.0	0.55	1.05	5.3	7.1	0.70	3,480
	Growing pig	5.0	0.55	1.00	5.3	7.1	0.60	3,480
	Finishing pig	5.0	0.50	0.73	6.0	7.1	0.60	3,400
Middle (B)	Weaning piglet	5.0	0.55	1.00	5.5	7.1	0.70	3,470
	Growing pig	5.0	0.55	0.91	5.5	7.1	0.60	3,440
	Finishing pig	7.0	0.55	0.51	6.0	7.1	0.60	3,400
Low (C)	Weaning piglet	4.0	0.55	0.85	5.3	7.1	0.60	3,300
	Growing pig	4.0	0.50	0.79	5.5	7.1	0.60	3,300
	Finishing pig	3.8	0.43	0.62	6.0	7.1	0.60	3,280

<sup>1</sup> Minimum amount in feed, <sup>2</sup> Maximum amount in feed, <sup>3</sup> DE: Dietary Energy

## III. RESULTS AND DISCUSSION

Table 2 shows the carcass weight and primal cuts weight of each group measured by VCS2000 equipment. Carcass weight was higher in the order of group A > B > C (p<0.0001). Energy from carbon-based components in feed is crucial for metabolic activities, including lean meat production,

and it can be estimated as dietary energy, which represents the gross energy content of feed ingredients [3, 4]. Lysine plays an important role in carcass weight and essential amino acid that is necessary for protein synthesis and muscle growth in pig [3]. In experiments involving growing and finishing pigs, supplementing their diet with lysine resulted in higher protein accumulation and improved growth performance of the pigs [5, 6]. Group A used Prime feed with higher lysine content at all stages, while Group B used Middle feed with higher lysine content in the weaning piglet and growing pig stages compared to Low feed used in Group C. In addition, the Prime feed has a higher energy level than the Middle feed in the weaning piglet and growing pig stages, and the Low feed has a lower energy level than the rest of the feeds in all stages. Group A had higher weights for all five primal cuts compared to the group B and C ( $p < 0.0001$ ). And group B had higher weights for loin, and ham compared to the Group C ( $p < 0.0001$ ). Pulkrábek et al. [7] reported a high positive correlation between carcass weight and the percentage of primal cuts.

Table 2 Carcass weight and 5 primal cuts weight of each group measured by VCS2000 equipment

Item (kg)	Treatments <sup>1</sup>			SEM	p-value
	A	B	C		
Carcass weight	86.8 <sup>a</sup>	85.8 <sup>b</sup>	85.5 <sup>c</sup>	0.048	<.0001
Shoulder blade	8.45 <sup>a</sup>	8.37 <sup>b</sup>	8.28 <sup>c</sup>	0.002	<.0001
Loin	7.86 <sup>a</sup>	7.71 <sup>b</sup>	7.69 <sup>c</sup>	0.005	<.0001
Belly	11.5 <sup>a</sup>	11.3 <sup>b</sup>	11.3 <sup>b</sup>	0.008	<.0001
Shoulder picnic	4.32 <sup>a</sup>	4.25 <sup>b</sup>	4.24 <sup>b</sup>	0.005	<.0001
Ham	16.2 <sup>a</sup>	16.1 <sup>b</sup>	15.9 <sup>c</sup>	0.010	<.0001

<sup>a-b-c</sup> Means in the same row with different letters are significantly different ( $p < 0.0001$ )

<sup>1</sup> A: Pigs on a farm using Prime feed, B: Pigs on a farm using Middle feed, C: Pigs on a farm using Low feed

#### IV. CONCLUSION

After analyzing the carcass weight and 5 primal cuts weight of LYD pigs using data obtained from the VCS2000 equipment, it was found that feeds higher energy and lysine levels increased the production rate in terms of carcass weight and the weight of 5 primal cuts.

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