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Enhancing Competitiveness of Wild Pigs Feeding and Wild Pork Processing During Evfta - A Case Study in Asian Countries: Vietnam, China and Thailand

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ABSTRACT

Pork, especially wild pork meat is one of the delicious major foods in Asian meals, researches have been made to improve quality of feeding wild pigs and pork has been meaningful in recent years. China, Thailand and Vietnam are 3 countries in Asia where people set up high quality wild pg farming, hence this study will make a comparison among three nations. Authors mainly use statistics, research and qualitative analysis including synthesis and inductive methods. Feeding wild pigs in Vietnam environment in Northern region of Vietnam such as Thai Nguyen province, we need to combine nutrition food with protein, energy and acid amine at proper proportion. Next, from wild pork meat, we can process into delicious food offered to markets. Last but not least, we also make suggestions for exporting wild pork meat to world markets including not only US but also European under EVFTA agreement.

KEY WORDS: EXPORT, FEEDING, WILD PORK AND PIGS, VIETNAM, THAI NGUYEN, CHINA, THAILAND.

INTRODUCTION

As Bui Thi Thom, Dinh Tran Ngoc Huy (2021) stated that Vietnam can try to adapt to pork meat criteria with high quality from European markets in order to export wild pork to Europe in future during EVFTA. The door to the EU has opened wide when tariff barriers are removed according to the schedule. However, to be able to stand firmly in this market, Vietnamese goods still have to overcome a series of challenges such as: Rules of origin, requirements on traceability, technical standards, dynamic hygiene and safety, etc. opened wide when tariff barriers were removed according to the schedule.The EU is one of Vietnam's largest export markets.

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Ballari and Garcia (2013) also mentioned that Wild boar diet is dominated by plant material (90%) in both ranges, but animal matter and fungi are consumed in greater proportions in the introduced range than in the native range. Food items frequently include agricultural crops (especially in the native range) and endangered animal species (especially in the introduced range). Energy requirements, food availability, and seasonal and geographical variations are major factors influencing food selection by wild boar. These factors may also interact with human activities (e.g. agricultural crops, supplementary feeding) to influence diet composition further. Dietary studies should be more rigorous and consistent across ranges to allow better comparisons.

And Bui Thi Thom, Dinh Tran Ngoc Huy, Tran Van Phung (2021) also stated that Pig farming is very important in Vietnam, esp. In Thai Nguyen city and Northern provinces, pork products are suitable for people's taste. At present, most pig breeds are selected and raised in accordance with local conditions, especially wild boar and hybrids are very popular with people, the demand for products is increasing day by day.

We structure study with introduction, literature review, method, main findings, discussion and conclusion. We also see in below figure feeding wild pigs.

Figure 1: Feeding wild pigs in Vietnam

(source: internet)

2. Literature Review: We summarize related studies in below table 1

METHODOLOGY

Authors also use statistic and data to make analysis an propose solutions. Experiences in Vietnam food processing (wild pork meat) also mentioned. Beside, Authors mainly use combination of quantitative methods and qualitative methods including synthesis, inductive and explanatory methods.

RESULTS AND DISCUSSION

4.1 Effect of nutritional composition in the diet: Dietary composition from a modern point of view is a general balance in terms of quantity and quality of nutrients such as proteins, amino acids, minerals, vitamins, starches, and fats with an appropriate ratio to ensure adequate nutrition. ensure high digestibility and feed utilization efficiency, in which the appropriate protein ratio will contribute to feed costs, reduce costs and improve productivity. In the balance relationship between nutritional components, people are most often interested in the protein/Exchange energy (energy) relationship; amino acids/energy, maximum fiber content.... The nutritional balance in the diet was developed for pig subjects and incorporated into the dietary standards.

Ideal protein concept: The ideal protein contains all the amino acids in the proportions required by pigs. Thus, all the essential amino acids and the sum of the non-essential amino acids in the ideal protein have the same role. In the ideal protein, the ratio of amino acids is based on the relationship to the amount of protein in the diet, where lysine is calculated as 100%. For growing pigs this ratio is as follows: (According to ARC, 1981, Wang, 1990; Fuller,1979 , Cole 1992 , Chung 1992, 1998) and Campbell, 1985) Of these, cystine can account for up to 50% of the requirements for sulfur-containing amino acids and tyrosine contains 50% of the requirements for cyclic amino acids. Methionine and Pheniallanine can be converted to cysteine and tyrosine with 100% activity. This conversion follows the ratio of 1.25 methionine = 1 cystine. Arginine is an essential amino acid only for young cattle when they are in strong growth, but when they are mature, the body can synthesize enough of their own needs. The ideal ratio of amino acids mentioned above is suitable for all types of growing pigs regardless of genetics, characteristics and weight. (source: Wild pigs project, Bui Thi Thom et al, 2013).

The role of protein and amino acids in meat-raising pigs: We already know that amino acids are the structural components of proteins. The various proteins of the muscles, bones, blood, organs and cells of the body have about 20 amino acids. Of which, 10 amino acids are essential amino acids, which are amino acids that must be provided from the feed for the pig to synthesize into the cell's protein. The remaining amino acids are non-essential amino acids, which the pig's body can synthesize from glucose, metabolites and other sources. On the other hand, since pigs are monogastric animals, they must rely on dietary amino acids to meet their essential amino acid requirements. Therefore, the protein in the diet must be easily digestible and the amount of amino acids released must meet the 10 essential amino acids. (source: Wild pigs project, Bui Thi Thom et al, 2013).

Hope (1958) mentioned that nutrition needs of pigs: A complete diet includes proteins, carbohydrates, fats, minerals and vitamins plus crude fibre and ample supplies of good water. The bulk of the pig's diet is made up of crushed grain which is rich in carbohydrates and has adequate fibre and phosphorous. An animal protein supplement and the calcium supplement detailed later, provide the supplementary protein fats, minerals and vitamins which are needed to build up the basic grain ration into an efficient production food. Proteins may be of animal or vegetable origin but supplies of animal protein are essential if pigs are to be reared successfully. Good sources of animal protein for pig-feeding are meatmeal, whalemeal, dried whale solubles and separated milk. Young green crops and pastures and leguminous plants such as peas and beans are the main sources of vegetable protein available in Australia. In general terms, the proteins are utilised in building up muscle, nerves, bone and blood.

Cole et al (1992) suggested that with different pig breeds, with different characteristics, body weight, or growth, there are different protein requirements, but in terms of quality (amino acid composition) of that protein is not different. This conclusion is based on the fact that it is difficult to distinguish the structural patterns of amino acids of meat cell proteins of different weight types of pigs. This shows that, if we know the ratio of amino acids of this type of pig, it can be applied to other types of pigs, other breeds.

Table 1. Previous studies

Authors	Year	Content, results
V.A. Teletnep	1966	Feeding conditions, not only affect the amount of digestive juices secreted, but also change the activity of digestive enzymes markedly.
Phung Thang Long et al	2004	showed that when reducing protein ratio from 18-16 %, feed consumption/kg weight increase increased to 8.76%, when decreased to 14% feed consumption/kg weight increase increased to 13.89%. In other words,
		when increasing the protein level of the diet, there was an effect of reducing feed consumption/kg weight gain of pigs, which is relatively consistent with our experimental results when studying pigs. hybrid forest.
Dao Le Hang	2008	Wild boars are more active at night, at dusk and at dawn. When the pigs matures it will leave the herd and live independently around 50-350 kg, with some domesticated pigs up to 450 kg. Males are usually larger than females.
Ton That Son et al	2006	when studying the digestive enzyme secreting activity of pancreatic juice, it was found that the protease activity depends on the intensity of secretion of the pancreas and its composition. Ration. With diets that are well balanced in nutritional composition relative to the body weight and age of the pig, there is little variation in trypsine intake.
Hoang Toan Thang, Cao Van	2006	when studying the effect of the same level of protein on the nitrogen digestion in the small intestine of pigs, it was found that, in the diet, there are different types of feeds. different diets, the content of nitrogen forms in the intestinal chyme is different.
Thanapongtharm	2016	In Thailand: detailed geographical analysis of the different production systems will be used to spatially-inform planning decisions for pig farming accounting for the specific health, environment and economical implications of the different pig production systems.
Lander et al	2020	While pigs initially foraged around settlements, population growth led people to pen their pigs, which made them household trash processors and fertilizer producers.
Bui Thi Thom, Dinh Tran Ngoc Huy, Tran Van Phung	2021	stated that Wild boar hybrids meat has a rich and higher nutrient content than domestic pork, helping us to compensate for vitamins that vegetables and
		fruits do not have or have very little, such as vitamins B1, B2, B6, B12, A and D.

Another problem, if dietary protein is lacking, one or more of the essential amino acids, protein accumulation is only improved by the addition of these amino acids. If dietary protein is lacking in non-essential amino acids, protein accumulation will be improved by the addition of any amino acids. Therefore, we can interpret the ideal protein as one that will not be improved by the addition of any additional amino acids. And only when all amino acids are added at the same time, the process of protein accumulation is improved.

Pig protein requirements: In a nutshell, the maintenance requirement is the amount of protein that replaces the proteins that are required to be lost from the body consisting mainly of skin proteins and various nitrogen metabolism end products in the urine. Forced losses are generally assessed by determining nitrogen excretion when fed a protein-free diet and have a normal relationship to body mass. Whether or not this estimate is applicable, to animals fed diets with normal levels of protein in the feed. (source: Wild pigs project, Bui Thi Thom et al, 2013).

ysine	100	Isoleucine	50
Threonine	65	Leucine	100
Methionine + Cystein	55	Histidine	33
Tryptophan	19	Phenylalanine + Tyrosine	100
Arginine	42	Valine	70

Interaction relationship between protein and metabolic energy: Changes in the content of some amino acids in the internal organs can be attributed to the energy and protein intake that affect blood and organ mass (Bikker et al. 1994) and related fractions increased with increasing energy intake.The mass of blood, kidney, pancreas and spleen also increased with increased protein intake Schulz and Oslage (1976) (Excerpt from Vu Duy Giang 1999) , protein content in blood, digestive system and liver accounts for 5, 4 and 3% respectively compared with whole body protein.When different levels of energy intake will greatly affect the content and composition of acids The content of lysine, threonine, histidine, tyrosine, aspartic acid and serine in the internal organs was 10 - 30% higher, while cystine, leucine, phenylalanine valine was 40 - 50% higher than that in the carcass and the organs. The content of methionine, arginine, isoleucine, glutamic acid and glycine in the carcass was 10 - 30% lower than that of the organ.

The role of food exchange energy in the survival of pigs: All living, developing and reproductive activities of pigs are associated with the process of using and exchanging energy. Energy in food is stored in the physical forms of food such as fat, sugar, protein, and carbohydrates. Pigs receive food energy from the outside, through digestion, absorption in the digestive tract into the body and synthesized into fat, glucose, and pure protein of the pig's body. (source: Wild pigs project, Bui Thi Thom et al, 2013). Energy participates in the construction of nerve cells, nerve sheaths, forming important compounds such as lipoproteit, glucoproteit found in nerve cell membrane tissue, in exocrine glands. Fat both stores energy and acts as a cushion under the skin, surrounding the digestive tract, circulation, and respiration to resist mechanical impact, heat and cold for the body. Pigs need more energy than other cattle because the genetic makeup of pigs accumulates fat about 45-50% (Le Hong Man et al., 2003).

The difference is not statistically significant ($P > 0.05$). The results of Table 1 show that in the experimental groups, with the same results of the experimental pigs, but the lean percentage in the experimental groups TN 1 has a higher percentage of lean meat, but the difference is not significant. significant, not statistically significant ($P > 0.05$). The results of chemical composition analysis of experimental pork Table 1 also show that there is almost no difference in the proportion of chemical components of meat, especially the protein ratio of pork. (source: Wild pigs project, Bui Thi Thom et al, 2013)

Table 2. Results of slaughtering and yielding experimental pork

No	Description	Unit	Lot TN1 (n=3)	Lot TN2 (n=3)
1	Live weight	Kg	24,11 ± 2,45	24,14 ± 2,16
2	Jaw hook ratio	Kg	78,12 ± 0,19	78,89 ± 0,43
3	Sliced meat	Kg	13,45 ± 2,10	13,88 ± 2,15
4	Ratio of carcass	%	68,59 ± 1,26	68,69 ± 2,09
5	Lean meat ratio	%	55,67a ± 0,81	55,23a ± 1,11
6	Fat meat ratio	%	14,07 ± 0,76	14,23 ± 0,45

Note: In the same row, numbers with the same letters are incorrect

4.3 Thailand, China wild pigs compared to Vietnam wild pigs: We compare in below table:

The Vietnamese wild boar lives a lot in different ecological regions of which the types of wild boar in the Southeast, North and Laos may be one. In the old days in Da Lat, wild boar had two types, one with little hair, usually found at an altitude of 1,000m, and one on both cheeks with white lines, weighing 150 kg or more. Currently, this pig breed is being domesticated and

bred for livestock production and they usually have two groups of breeds: Long-faced breed group and short-faced breed group, so far, according to origin, there are four types of wild boar raised. Northern Vietnamese wild boar raised in Ba Vi, HanoiPhu Yen wild boar raised at Hoa Khanh rare animal farm, Khanh Hoa Cat Tien wild boar raised on farms in Can Giuoc, Long An and Dong Nai Binh Phuoc wild boar in the Southeast region (source: wikipedia.com, access date 12/7/2021).

Table 3. Comparison of wild pigs

Thailand wild pigs	Vietnam wild pigs	China wild pigs
Thai Wild Boar is a breed of wild boar imported from Thailand to Vietnam, through many breeding and breeding processes, this wild boar has become quite popular in the market today, especially in the North, many models The breeding model and the whole market are very fond of this wild boar.	The Vietnamese wild boar is an indigenous breed of wild boar in Vietnam, living in many forests in Vietnam, some centers are allowed by the state to catch from the wild to breed but very few, most are hunters catch and sell them to breeders to breed themselves and sell to the market. Vietnam Wild Boar has many beautiful and popular lines today such as Binh Phuoc Wild Boar, Tanh Linh Binh Thuan Wild Boar, and Nam Wild Boar. Cat Tien, Central Highlands Wild Boar, Song Pha Ninh Thuan Wild Boar (the wild boar caught in the forest, give it that name) ... each line has its own set of points and beauty. Vietnam's wild boar is now favored by many customers. preferred, especially in the Central and Southern regions	The Chinese wild boar or North China wild boar (Scientific name: Sus scrofa moupinensis) is a subspecies of wild boar found in Vietnam, Sichuan, and China coast. Currently there are many records of only the diversity of pigs in this subspecies, this diversity is not recognized at present but it is possible that these diverse groups may be a separate subspecies.

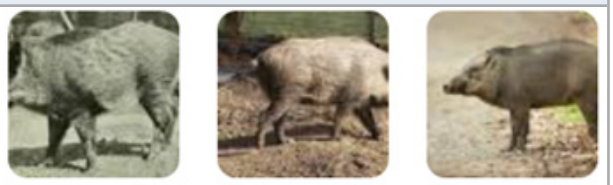
4.4 Wild pork meat processing: Bui Thi Thom, Dinh Tran Ngoc Huy (2021) mentioned that the EVFTA Agreement can increase the price competitiveness of Vietnamese goods when imported to this important market. Breeding wild boar is becoming a rich trend among young people who are passionate about clean animal husbandry. This is not just a simple hybrid wild boar breeding technique, but it is a problem that needs answers from young people about the technique of raising wild boars in a wild hybrid.

Today, the need to eat clean and drink clean of Vietnamese people is being concerned by many people. Initially just eating clean vegetables, clean fruits and now we have gradually switched from normal white pork to natural wild boar. Although the price is somewhat higher, but because of the quality and nutritional composition that it brings, they are still preferred by housewives. Hope (1980) said correct feeding helps pigs to grow quickly and to develop carcasses containing fat and lean meat in the proportions which the bacon-curers and the consumers of pig meats find most acceptable. Huy et al (2015) have mentioned important roles of banks in financing economic activities including agriculture.

Figure 2: Wild pigs in North of China

(source: internet)

Figure 3: Several wild pigs in the world



Bui Thi Thom, Dinh Tran Ngoc Huy (2021) mentioned that Feeding wild pigs and managing wild pork meat quality is meaningful in Vietnam, esp. In Thai Nguyen province as pork products can offer variety of tastes due to food processing and suitable for Vietnamese tastes and can export to the world widely. At present, most pig breeds are selected and raised in accordance with local conditions, especially wild boar and hybrids are very popular with people, the demand for products is increasing day by day. But raising pigs is also facing many obstacles, because wild boars are wild, domesticated more difficult than foreign pigs, and require a large area of land and a rich source of green food. Wild boars have good characteristics of adaptability, tolerance to harsh conditions in mountainous areas, taking advantage of natural food sources and low technical requirements.

CONCLUSION

Under the conditions of Thai Nguyen, the raising of wild boar and hybrids is also being concerned by people, but the system is gradually giving initial results on domestication, behavior monitoring... as for work. For research on diet and nutrition, we are conducting experiments. Therefore, the synchronous research from the domestication of breeding stock, cross-breeding, rations, care and rearing of wild boars and hybrids is an issue that needs to be completed in the coming time.

Limitation of research: We need to propose solutions for wild pork to enter European and world markets

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