



Survey Situation Of Salbutamol Residues In Fresh Pork Sold In Fresh Market And Supermarket In Krung Thonburi District, Bangkok, Thailand

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Abstract

Background: At present, those who raise pigs for commercial purposes have applied the use of different types of antibiotics and hormones to accelerate the growth and increase the pig's body weight which causes the residue of the substance in the meat. Red meat accelerators are also very popular among manufacturers. But it is dangerous to both animal and human health which causes various serious diseases and now there are also problems of illegal pork smuggling within the country mostly within the area that has not passed, various contamination could be found in those pork.

Objective: To studies the situation of red meat accelerator residues in pork sold to consumers in the market. A survey research study to detect red meat accelerators contaminated in fresh pork sold in fresh markets and supermarkets. Salbutamol test kit, produced by the Department of Medical Science, Thailand, was used to examine red meat accelerators in pork samples.

Result: The results from the 40 pork samples shows that 29 which is 72.50% of pork samples used in this research does contain red meat accelerator residues. 12 of those affected pork samples are from the fresh markets with 60% red meat accelerator residues while 17 of those affected pork samples are from the supermarkets with higher red meat accelerator residues, standing at 85%.

Conclusion: From studying the data, it is known that contaminated red meat accelerators have also been detected in pork from domestic market sources. This shows that there is still illegal use of red meat accelerators or the importation of illegal pork which is a substance that negatively affects our health.

Keywords: Pork, Red meat accelerators, Illegal pigs, Health

Introduction

Proteins within the red meat such as pork has a variety of benefits that a person could use. It can enhance the process of muscle building [1] while preventing muscle loss, boost immunity within one's body, control weight gained and effectively produce energy for the body to use. It recommended for an adult to intake at least five to seven ounce of proteins a day from their daily diet. Proteins are especially important as a person continues to grow older in order to prevent Sarcopenia, a medical term for gradual loss of muscle since our muscle does decline in mass parallel to the age gained. [2]

These days pork are highly favored by the mass, however many might not be aware that these pork meat could potentially contain chemical residue. Manufacturers within their limited space, cost and time needs to maximize their productivity in order to profited from the high demand of the consumer and so they rely on various drugs to make it happen. One of them is antibiotics. When a person consume it, It could cause drug allergies and resistance plus any side effects or even cancer. [3] There are also the red meat accelerators or beta-agonists such as ractopamine causing the reduction of fat in pork meat

while increasing its red meat, this is because in today's society people tend to pick their meat of choice by looking at the redness of the meat which represent freshness. [4] Another chemical like Borax can also be in pork meat as part of the same illegal drugs prohibited. It allows product to have longer shelf life. It could cause kidney failure, brain inflammation and weakening of the bones. Due to the risk presented, Ministry of Public Health has already ordered the use of such drugs prohibited which cause many to illegally use said drugs. [5]

Although Thailand's Ministry of Public Health has banned the use of these harmful chemicals in pork. Many manufacturer have actively seek ways to smuggle illegal pork contaminated with of prohibited drugs from neighboring countries. Should people continues to ingest pork meat with all these chemical residue over a long period of time the side effect that could surface would be Irregular heartbeat, insomnia, nausea, vomiting and eventually even tumors or cancer as well. [6] There has already been an attempt to smuggle over 4.5 million kilograms of illegal pork hidden in containers at Laem Chabang Port, which is the main channel for import and discharge to cold storage which continues to the fresh market. At the beginning of 2023, the police has caught a smuggling attempt at the border provinces adjacent to neighboring countries such as Sa Kaeo, Mukdahan and Songkhla. So it is highly suspected that many of the illegal pork entering Thailand are mostly from these channels. And so the Thai Customs Department has ordered a strict inspection on all incoming products to prevent the increased in illegal pork meat. While accelerate the process of delivering illegal pigs

found to the Department of Livestock Development for termination. [7]

From the information given, the research on chemical residue in pork meat that is circulating around the market of Thailand has shown its importance more than ever. Because the general public does not have the awareness about whether the pork meat sold throughout the Thai's market is truly safe. The potential negative impact on these consumer's health could easily range from something minor and escalated to a long lasting damage or even death. Thus it is imperative for the study of chemical residue in pork meat to be conducted showing the severity of chemicals contaminated in pork and raise the awareness to the unknowing mass.

Objectives

1. To examine meat accelerator residues in pork sold in supermarket and fresh market in Bangkok
2. To compare meat accelerator residues rate in pork by sources of purchased

Study Method

This study was a survey research study to detect red meat accelerators contaminated in fresh pork sold in fresh markets and supermarkets. Salbutamol test kit, produced by the Department of Medical Science, Thailand, was used to examine red meat accelerators in pork samples.

Sampling

Pork samples were randomly selected from fresh market and supermarket in Thonburi district, Bangkok, Thailand, as displayed in Table No. 1

Table 1: Pork samples categorized by part and sources of purchased

No.	Sample	Total No. of Sample	Fresh Market	Supermarket
1	Pork Hip	6	4	2
2	Pork Loin	8	4	4
3	Pork Neck	8	2	6

4	Pork Belly	8	6	2
5	Pork Tenderloin	6	4	2
6	Pork Shoulder	2	-	2
7	Pork Rib	2	-	2
	Total	40	20	20

Procedure [8]

1. Bring different parts of pork to grind thoroughly.
2. Put 3 spoons of minced red pork samples into the extraction bottle.
3. Add 3 ml of distilled water into the extraction flask.
4. Boil the sample in boiling water for 20 minutes and wait for it to cool down.
5. Strain out the pieces of pork. Using filter paper
6. Aspirate the filtered water sample into a 1 mL test flask.
7. Use a syringe to suck 1 ml of SBT-1 reagent into the test bottle.
8. Use a syringe to suck 1.5 ml of SBT-2 reagent into the test bottle.
9. Use a syringe to suck 0.5 ml of SBT-3 solution into the test bottle.
10. Take a test bottle that has already been filled with various reagents. Boil it in warm water of 60-70 degrees for 1 hour.
11. Interpret the test results by looking at the color of the water in the test flask.

Equipment

1. 3 test bottles
2. Extraction bottles, amount 3 bottles
3. 3 ml syringes (sampling) 3 pieces
4. Syringe 3 ml. (suction solution), amount 4
5. 20 sample scoops
6. Sample extraction cups, amount 3 pieces
7. Filter paper, amount 20 sheets
8. 1 bottle of SBT 1 liquid
9. 1 bottle of SBT 2 liquid
10. 1 bottle of SBT 3 liquid
11. 1 bottle of distilled water
12. 3 plastic pieces of meat

13. Manual, amount 1 sheet

14. Parts of pork

Data Analysis

Descriptive statistics were used to analyze the data such as frequency and percentage. The test result is interpretation by

Figures 1: The picture shows no salbutamol found and salbutamol found, respectively



If the pork does not use red meat accelerators, after the test the water in the test flask should be clear or colorless as shown in the picture on the left of the example. But if it is pork that has been detected using red meat accelerators after the test the color of the water in the flask will be reddish brown as shown in the picture on the right of the example.

Results

From a total of 40 pork samples, it consisted of different parts of pork as shown in Table no. 1, the test results showed that 29 (72.50%) pork samples were found to contain red meat accelerator residues. Red meat accelerator residues were detected in pork neck, pork shoulder and pork rib samples 100.00% , followed by pork belly 75.00% and tenderloin 66.67% respectively. (Table No.2)

Table 2: Results of red meat accelerator examination in pork samples (n=40)

No.	Sample	Total No. of Sample n	No. of Positive Result n (%)
1	Pork Hip	6	3 (50.00)
2	Pork Loin	8	4 (50.00)
3	Pork Neck	8	8 (100.00)
4	Pork Belly	8	6 (75.00)
5	Pork Tenderloin	6	4 (66.67)
6	Pork Shoulder	2	2 (100.00)

7	Pork Rib	2	2 (100.00)
	Total	40	29 (72.50)

Of the total 40 samples, 20 were from fresh markets and 20 were from supermarkets. 12 pork samples were detected with red meat accelerator residues, accounting for 60.00%, and pork samples from supermarkets were found to have red meat accelerator residues 17 samples, representing 85.00%. (Table No.3)

Table 3: Results of Beta Agonist examination in pork samples categorized by source of purchased (n=40)

No.	Sample	Total No. of Sample	Fresh Market		Supermarket	
			No. of Sample n	No. of Positive n (%)	No. of Sample n	No. of Positive n (%)
1	Pork Hip	6	4	2 (50.00)	2	1 (50.00)
2	Pork Loin	8	4	2 (50.00)	4	2 (50.00)
3	Pork Neck	8	2	2 (100.00)	6	6 (100.00)
4	Pork Belly	8	6	4 (66.67)	2	2 (100.00)
5	Pork Tenderloin	6	4	2 (50.00)	2	2 (100.00)
6	Pork Shoulder	2	-	-	2	2 (100.00)
7	Pork Rib	2	-	-	2	2 (100.00)
	Total	40	20	12 (60.00)	20	17 (85.00)

Discussion

Red meat accelerators were detected in 29 pork samples (72.50%), this may be because in pig farms for commercial use, red meat accelerators are used to increase red meat content and reduce fat to increase productivity and increase pig weight. Causing the farmers who raise pigs to sell them for higher prices while able to reduce production costs. [9] Moreover, during 2022 and 2023, there were reports of seizures of illegal pork smuggling in large quantities. [10] Illegal pork is likely to be contaminated with various chemicals such as red meat accelerators and

Antibiotic Residue in quantities that are too high Including various pathogens. Because these pork has not passed the quality inspection before being sold in Thailand. [11] Illegal pork is sold to consumers through various channels such as retail stores, supermarkets, fresh markets, etc. [12]

The results of this study are in line with the study of Wichien Pewkham and Phinya Thirawiwatanakit [13] studied on the detection of red meat accelerators in pigs in Buriram Province during the fiscal year of 2012-2016. Red meat accelerator residues were found in 103 of the 3,338 meat samples examined

accounted for 3.09 percent. And the results of the study are consistent with the study of Suthin Khemongkol and Monwajee Chuduang [14] that studied the surveillance of red meat accelerators in pigs in Uttaradit Province in the fiscal year of 2012-2014 where red meat accelerators are found residues in 108 of the 1,528 pork samples examined accounted for 7.07 percent.

The results of this study are in line with Pramote Yenbuntham and Tawatchai Sattayasomboon's study [15] who studied about Situation of red meat accelerator contamination in pork and factors related to knowledge Attitudes of Pork Sellers in Phitsanulok Province Red meat accelerator residues were found in three of the 102 pork samples examined accounted for 2.9 percent.

The previous study was the detection of red meat accelerators in samples of pigs raised in Thailand. The percentage of red meat accelerator residuals was found to be less than 8.00 percent, indicating that commercial pig farm in the country had control over the use of red meat accelerators. However, the results of the last study detected 72.50 percent of red meat accelerators, which is considered very high. This may be due to collecting samples for study, collecting samples from fresh markets and supermarkets, which may contain illegal pork mixed in for sale to consumers. [16] Which these illegal pigs come from countries that allow the use of red meat accelerators such as Brazil, Argentina that enters Thailand illegally failed to pass the quality inspection for these pork and so containing red meat accelerators. Red meat accelerators found in the supermarket samples than the fresh market samples. 17 (85%)pork samples out of 20 pork samples from supermarkets were found to contain red meat accelerator residues. This could be attributed to the fact that the supermarket may accept illegal pork to sell because the cost is cheaper than domestic pork [17] to make more profit. Moreover illegal pork could be sold to supermarkets at a larger quantity than fresh market, with fewer transactions. Red meat accelerators were found to be contained in every part of pork because it can act as both neurotransmitters and hormones. by binding to particular receptors on the cell surface Two types of receptors on the cell surface can be divided into beta1, found in the heart and nervous system, and beta2, found in blood vessels. gastrointestinal tube fat cells and muscle cells can be absorbed well by eating

And when it enters the body, it reaches the highest concentration in the blood in just 2.5 hours. [18]

Red meat accelerators are prohibited to be used in livestock in Thailand because red meat accelerators have side effects on animals. It causes the heart to beat faster in some animals, myocardial infarction may occur. There is an increase in heat generation in the animal. Resulting in the animal's tolerance to heat less and may cause heat stress. Red meat accelerators also have a negative effect on humans who consume those meat. Affecting the function of the nervous system which includes hand tremors, muscle twitching, headache and irregular heartbeat. Some people may have insomnia, nausea, vomiting, and mental symptoms. And it is very dangerous for pregnant women and people with heart disease, high blood pressure, diabetes and hyperthyroidism. The Ministry of Public Health therefore has issued measures to prohibit the use of beta-agonists or red meat accelerators. In some countries, meat accelerators are allowed to be used under drug registration and legal use, for example United States, Canada and some countries in South America. [9] This results in lower production costs that can generate more profits for sellers which is why at present there are still smugglers who use red meat accelerators. [19] Once these pork were illegally imported to Thailand, there are high chance of having red meat accelerator residues. However, red meat accelerators were found in domestic pork samples from time to time according to the previous studies. [13,14,15]

Conclusion

The results from the 40 pork samples shows that 29 which is 72.50% of pork samples used in this research does contain red meat accelerator residues. 12 of those affected pork samples are from the fresh markets with 60% red meat accelerator residues while 17 of those affected pork samples are from the supermarkets with higher red meat accelerator residues, standing at 85%.

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