Analysis of Policy Making Factors on The Prohibition of Hormones and Antibiotics Use for Feed as a Public Health Protection

* Zaima Amalia, ** Wiku Adisasmito

* Faculty of Public Health Universitas Indonesia

** Department Health Administration and Policy, Faculty of Public Health Universitas Indonesia

Email: zaimaamalia111@gmail.com

Abstract. Food safety is one of the current international emerging issues. The danger of using antibiotics in animal husbandry is one of the contributors to human resistance. In Indonesia, antibiotics are commonly used as growth promoters in animal husbandry. Prohibition on the use of hormones and antibiotics mixed into animal feed written in Law No. 18 of 2009 on Animal Husbandry and Health which is then clarified by the Minister of Agriculture Regulation No. 14/Permentan/PK.350/5/2017 on the Classification of Animal Drugs. The purpose of this study is to determine the factors which influence the formation of policy on the prohibition of hormone and antibiotic use as feed additives, especially health, legal, political and economic factors. This research uses descriptive study by qualitative approach. Data were collected using in-depth interviews and literature studies. The result shows that legal factors have a stronger influence than health, economic and political factors. The study recommends that the government should develop monitoring programs, conduct surveillance in feed and breeder entrepreneurs, establish good coordination with local governments, conduct further residue studies on animal source food, and further review the economic impact of the policy. Breeders also need to improve the cleanliness of the cage and try natural feed. While feed entrepreneurs need to find a replacement of antibiotic/hormone mixed feed safely.

Keywords: policy making, hormones and antibiotics, feed additive

Abstrak. *Keamanan pangan merupakan salah satu isu internasional. Bahaya penggunaan antibiotik pada budidaya hewan menjadi salah satu penyumbang timbulnya resistensi pada manusia. Di Indonesia, antibiotic lazim digunakan sebagai growth promotor pada budidaya hewan. Larangan penggunaan hormon dan antibiotik imbuhan pakan tertulis dalam Undang-Undang No. 18 tahun 2009 tentang Peternakan dan Kesehatan Hewan yang kemudian diperjelas dengan Peraturan Menteri Pertanian Nomor 14/Permentan/PK.350/5/2017 tentang Klasifikasi Obat Hewan. Tujuan penelitian ini adalah mengetahui faktor yang mempengaruhi pembentukan kebijakan larangan penggunaan hormon dan antibiotik imbuhan pakan, khususnya faktor kesehatan, hukum, politik, dan ekonomi. Penelitian ini menggunakan studi deskriptif dengan pendekatan kualitatif. Data dikumpulkan menggunakan wawancara mendalam dan studi literatur. Hasil penelitian menunjukkan bahwa faktor hukum memiliki pengaruh lebih kuat dibandingkan faktor kesehatan,ekonomi dan politik. Penelitian ini merekomendasikan agar Pemerintah membangun program pengawasan, melakukan surveilans di pengusaha pakan maupun peternak, menjalin koordinasi yang baik dengan pemerintah daerah, melakukan penelitian residu lebih lanjut pada pangan asal hewan, dan mengkaji lebih lanjut dampak ekonomi dari adanya kebijakan tersebut. Peternak juga perlu meningkatkan kebersihan lingkungan kandang dan mencoba pakan yang alami. Sedangkan pengusaha pakan perlu mencari pengganti antibiotik/hormon imbuhan pakan yang aman.*

Kata kunci: *pembuatan kebijakan, hormon dan antibiotik, imbuhan pakan*

INTRODUCTION

Antimicrobials such as antibiotics, antivirals, and antimalarials are known since 1940 reduce the morbidity and mortality of various infectious diseases (Australia First National Antimicrobial Resistance Strategy 2015-2019). Antimicrobials could be ignorant for microorganisms (resistant). In the Minister of Health Regulation (PMK) No. 8 Year 2015 on Antimicrobial Resistance Control in Hospitals, mentioned that antimicrobial resistance (AMR) is a condition where antimicrobials are no longer effectively used clinically because the ability of microorganisms to survive increases.

In its management, livestock animals are given antibiotics with a certain dose to treat the infection to be free of microorganisms so that no disease in the animals.The side effects of this antibiotic on animals is they would become fat. However, this side effect is used for enhancing cattle fattening in order to be marketed immediately through feed mixtures (Director General of Animal Husbandary and Health, 2016).

The use of antibiotics as a growth factor consumed by animals could consistently accumulate as a residue in the meat. When consumed as human food, the antibiotic residue contained in the meat would go to the human body. If it occurs continuously for a period of time, the residue would accumulate and make the microorganisms in the body resistant to the antibiotic (Kennedy, 2007).

Based on data in 2014, the Quality Testing and Animal Product Certification Center (BPMSPH) conducts antibiotic residue test and microbial contamination test.

The antibiotic residue test was performed by bioassay screening method on penicillin, macrolide, aminoglycoside and tetracycline group of animal source food (ASF) from 11 provinces, while microbial contamination test was conducted on ASF from 33 provinces (BPMSPH, 2014).

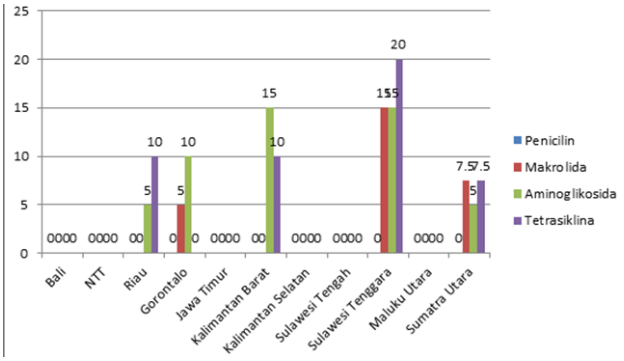

Figure 1. Percentage of Resicual Antibiotic Residue Test Result on Animal Source Food in 11 Provinces 2014

Based on Indonesian National Standard (SNI No. 01-6366-2000) the maximum limit of antibiotic residues in food which is still allowed to consume for antibiotic amoxicillin, ampicillin and chloramphenicol is 0.01 µg/g and the maximum limit of tetracycline antibiotic residue is 0.1 µg/g (Masrianto et al. 2013).

For antimicrobial resistance data on humans, Indonesia does not have national data which is the result of continuous surveillance and monitoring. Resistance research is still sporadic and does not use uniform methods. Whereas, antimicrobial resistance could lead to a failure of standard therapy which resulting in longer treatment and higher costs, prolonging illness so that potentially infectious and more antimicrobial resistance in the community. This phenomenon requiring treatment with second line antibiotic which is more toxic and even increasing the risk of death (Siswanto, 2014).

Various studies have shown that the presence of antibiotic residues in the animal source food is still prevalent and could lead to resistance in animals and humans who consume it. Therefore, supervision is required in the use of antibiotics for animals as a drug and also as a mixture of animal feed. In the Minister of Agriculture Regulation No. 14/Permentan/PK.350/5/2017 on Classification of Veterinary Drugs, one of them refers to Article 22 Paragraph (4) letter C of Law No. 18 of 2009 which was later changed into Law No. 41 of 2014 on Animal Husbandry and Animal Health, stated that hormones and antibiotics are not allowed as feed additive. This regulation was only promulgated on May 12, 2017 and was first socialized on May 26, 2017. This study will look at the factors which influence the policy making of prohibiting the use of hormone and antibiotic mixed with feed as feed additives, such as legal, health, political and economic factors.

METHOD

This research uses descriptive study with qualitative approach. The method used is Rapid Assessment Procedure (RAP), which is to collect data quickly through in-depth interview and literature study. This research was conducted in DKI Jakarta and Bekasi Regency in April-July 2017. The selection of informants in this study is based on the principle of conformity and adequacy, so that the research information is obtained from the Ministry of Agriculture (Kementan), Quality Testing and Feeding Certification Center (BPMSPH), National Agency of Drug and Food Control (BPOM), Indonesian Consumers Foundation (YLKI), Livestock Association, and Livestock Feeders Association (GPMT). The process of gathering information is done until no longer variations found of answers which could be declared sufficient by the researchers.

Data analysis used in this qualitative research is content analysis by transcribing (spruce up and summarizing notes), reviewing field notes which have been made, sending transcripts to informants to be corrected in accordance with the previous interview process, and simplifying the records by eliminating unused sentences and provide additional notes.

RESULTS AND DISCUSSIONS

This research was done by analyzing the result of interview to informant and other supporting data. For informants who have been interviewed, will be written with code to maintain the confidentiality of self-information data. Here is a list of characteristics of informants who have been successfully interviewed:

Table 1. Informants' Characteristics

Code	Sex	Length of Serve	Length of Work	Last Education
I 1	M	2 year	10 years	Doctoral or equivalent
I 2	F	3 month	27 years	Doctoral or equivalent
I 3	F	1 year	17 years	Bachelor or equivalent
I 4	F	1 year	11 years	Master or equivalent
A 1	M	7 years	40 years	Master or equivalent
A 2	M	1 year	20 years	Doctoral or equivalent
A 3	M	5 years	20 years	Doctoral or equivalent
A 4	M	2 years	7 years	Master or equivalent
K	F	2 years	17 years	Professionals
M	M	18 years	30 years	Bachelor or equivalent

Analysis of Health Factors

After the interview, the results obtained that chicken farmers are using antibiotics as a growth promotor mixed in the feed, while the cattle ranchers are not. While for hormones, both chicken and cow do not use it. On the other hand, dairy farmers get calves imported from Australia where the use of hormones as fattening measure is allowed. So, the Indonesian government finally made an

agreement that calves which are imported by Indonesia might be given hormones up to 3 months before being imported, to prevent residue.

In addition, cattle ranchers also told that in the mixed feed, some were mixed with ractopamine, which contained β-agonist-1. Raktopamine was previously used to increase beef production which the required dose is 400mg/e/h for best results (Palupi, 2015). Nonetheless, raktopamin has been prohibited by the issuance of the Minister of Agriculture Regulation No. 14/PERMENTAN/PK.350/5/2017 on the Classification of Animal Drugs.

Table 2. Summary of Antibiotic and Hormone Use as Feed Additive

	Poultry (chicken, duck, etc.)	Ruminants (cow, goat, buffalo, dll)
Antibiotics	- Commonly used as a growth promotor by suppressing bacteria - AGP already exists in domestically produced commercial food - All antibiotics are classified of drugs prohibited in Permentan No. 14/Permentan/PK.350/5/2017 on the Classification of Animal Drugs, but valid from January 1, 2018, so that the Minister of Agriculture Decree No. 806/Kpts/TN.260/12/94 on the Classification of Veterinary Drugs is still applied	None
Hormones	None	- Not used in Indonesia - 80% of cattle imported from Australia previously used hormones up to 3 months before importation - The cattle feed uses a mixture of β-agonist-1 imported from America - β-agonist-1 includes drugs prohibited in Permentan No. 14/Permentan/PK.350/5/2017 on the Classification of Animal Drugs

I1, I2, and A1 believe that the presence of residues in food produced by humans, could cause disease for consumers. This is in line with A, et al (2015) that the use of antibiotics at the time of breeding still leaves residue on the food and affects the acumulated residues on the consumer so that it could affect human health (Boeckela et al., 2015). Unfortunately, there has been no national data of disease caused by antibiotic abuse up until now.

> *"There is no data, but there is a high chance that there is a connection of contaminated food and AMR, because of improper use." (I 1)*

In addition, all informants believe that withdrawal time has an important role in generating residues on food. This is in accordance with research Bachri, et al (2005) that pre-production management, including feed management, plays a significant role in producing high quality and safe-to-eat livestock products. Additionally, it requires knowledge, awareness of breeders, and supervision from the government.

Physiological and pathological conditions between poultry and cattle are different, so the two groups need different treatments. The Government has endeavored to publish various guidelines, such as Permentan No.79 of 2014 on Guidelines for Native Chicken Breeding and Local Chickens and Permentan No. 31 of 2014 on Guidelines for Good Broiler and Laying Chicken Farming.

Legal Factor Analysis

Law No. 18 of 2009 on Animal Husbandry and Animal Health in Article 22 paragraph (5), Article 49 paragraph (2) and Article 51 paragraph (4) as amended by Law No. 41 of 2014 on Amendment to Law no. 18 of 2009 on Animal Husbandry and Health is the basis for the making of the Minister of Agriculture Regulation No. 14/PERMENTAN/PK.350/5/2017 on the Classification of Animal Drugs. This Permentan is a revision of the Minister of Agriculture Decree No. 806/Kpts/TN.260/12/94. This Permentan was enacted on May 12, 2017 and was first socialized on May 26, 2017 when the research was conducted. In addition, the existence of a special article of the law which explains the criminal sanction in Article 87 for violation of Article 22 paragraph (4) letter C shows that this act is strictly prohibited and has bad impacts for the community. The emergence of this article is also a form of special attention from the government which shows that this is a serious crime.

The mandate to create derivative rules in order to regulate the use of hormones and antibiotics is understood by many stakeholders. Therefore, the government seeks to carry out the mandate as well as possible.

> *"In medicine, there is also a warning that feed should not be mixed with antibiotics. There is also in the Law, look at this (showing the book that contains the law, opened Law No. 41 of 2014 Article 22). That means, this is a mandate which must have its derivatives. So, we finally make this regulation (Regulation of the Minister of Agriculture No. 14/PERMENTAN/PK.350/5/2017 on Classification of Veterinary Drugs) "(I 2)*

The drafting of this ministerial regulation concerning the prohibition of hormones and antibiotics as feed additives was initially recognized as one of the mandates of the Food Directorate. However, after the preparation is processed, the Food Directorate feels that the contents of the rules which have been made are more pertaining to animal drugs, therefore the drafting of the regulation is submitted to the Directorate of Animal Health eventually.

The incorporation of the regulation is also recognized by A2. According to him, the merger does not cause any effect in the implementation process later.

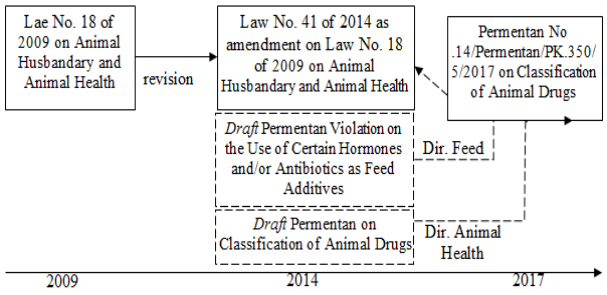

Figure 2. Length of time in policy-making concerning prohibition on the use of hormones and/or antibiotics mixed with feed

In addition, in making the regulation, I1 and I2 stated that nothing is superior to both economic and health factors. While in regard to the legal factor, this is one of the obstacles faced according to I3. It is also similar to what was stated by A2.

> *"All. There is no priority or whatsoever. This is from upstream to downstream. Everything moves synergistically, but the handling was different. This section handles the upper part, while the other handles the downstream. "(I 2)*

> *"... to continue, finally we make it as a prohibition, Prohibition of Antibiotics as Feed Additives. It turns out that it is not allowed in legal language, so the title eventually became the Classification of Animal Drugs. The title only even changed up to 5 times. We are titled after this prohibition, composed it again, and oh... title could not be like that. Finally, a 'yes' we got from practitioners, academics, IPB, colleges, after technically the contents are agreed, then we discussed the substance, later to the legal language. "(I 2)*

The existence of Permentan No. 14/Permentan/PK.350/5/2017 on the Classification of Animal Drugs is apparently not known to many stakeholders. The socialization from the ministry was just implemented once at the time this research was conducted. Hence, the government is still trying to socialize while providing grace period until the end of 2017. According to A3, A4, and A2, the role of government has not run well when compared with other industrial businesses. This is especially in terms of supervision which caused the lack of existing human resources.

> *"I asked to (the directorate) Animal Health, he said that it has been published. But in what kind of form, I do not know. "(I4)*

> *"... Therefore, given the grace period until the end of December 2017. So, we would have a guidance if it prohibited in 2018. "(I3)*

> *"Yes indeed. Government supervision is less, even more on the feed. But because the feed is made by ourselves, we never checked it. Usually the one that we checked the most is the commercial ones, such as making permission, listing permitting circulation, etc." (A3)*

Politic Factors Analysis

The government's lack of supervision is due to the lack of human resources available. In addition to supervision, no informant told the existence of guidance or direction from the relevant institutions to provide information about farming. In the current period of regional autonomy, the role of local governments should be more dominant. Although informants from policymakers stated that there was a cooperation with local government, the statement did not arise from breeders itself (A2), indicating that local governments played only a few roles.

However, with the Decree of the Minister of Labor and Transmigration No. 47 of 2013 on the Draft Stipulation of the Indonesian National Competency Standards in Agriculture Category, Main Group of Livestock, Group of Animal Feed, Sub Group of Feed Quality Control which later on become Indonesian National Competence Standards, shows that livestock feed has become one of the attention not only by the ministry of agriculture, but also by other ministries.

Economic Factors Analysis

A2 explained that the possibile increase in cost is required as an impact if antibiotics use are not allowed at all. Meanwhile, doubts about the positive economic impact are also seen from I1. The reason behind the doubt is that there is no replacement solution of antibiotics as a growth promotor. In fact, feed costs have a contribution of 60-80% of the cost of production in cattle farming (Ministry of Agriculture, 2015).

> *"If you use AGP, it's cheaper than AGP's replacement. Let's say probiotics, enzymes, amino acids, organic minerals, acidifiers; but if we use AGP, the cost is much cheaper. For example, using the AGP Rp 10,000/kg, now Rp50,000/kg. Because it could not stand alone. There must be a combination. There is a research that using probiotic itself could not work, should combine with acidifier for example, which makes the cost multiplied. "(A 1)*

> *"There could be, there must be a solution... A contradictive between the economic interests of business actors with the health of consumers. However, there must be a fact of health problems related to antibiotics use in the animal source food as a form of consumer advocacy to prosecute. "(I 1)*

With the Minister of Agriculture Regulation No. 14/Permentan/PK.350/5/2017 on the Classification of Animal Drugs, informants expect farmers to no longer use hormone and antibiotic mixed with the feed because it is prohibited.

A4 welcomed the regulation with no objection. Farmers

themselves recognize its role in meeting market needs and make efforts to improve the quality of its products, one of them is using the AGP. Unfortunately, AGP which has been used by farmers through feed, is prohibited by the government because it is considered that has no positive effect for humans. Therefore, the A3 hopes to get an AGP replacement to keep the safety of animal source food.

The presence of AGP prohibition, commonly used to suppress pathogen bacteria in the body of poultry (including chickens), is feared will affect the health of these animals. This of course also could affect the health of consumers. In addition, feed efficiency/Feed Convention Ratio would increase and also impact on the selling price.

> *"Without antibiotics, the mortality rate of poultry could increase to 6-10%. If we still use antibiotics now, the death rate is in the range 1-5%. That's the first. The second, FCR. So, the business actor is actually less benefited. With the prohibition of this antibiotic, there will be an increase of 10 points. The FCR currently at 1.65 and would become 1.75. Feed convention ratio. So that is the amount of feed efficiency needed to add 1kg weight in animals. Well, with all the other requirements needed, after considering the FCR earlier, obtained the current market price for example Rp 7,000,-. Once the antibiotic as AGP is prohibitied altogether, the FCR has risen to 1.75, which of course also would affect the selling price in the market. "(A2)*

Livestock is one of the strategic sectors that have high economic value. Some informants believe that the policy of prohibiting the use of hormones and antibiotics in animal feed will bring a positive impact on society.

> *"Oya, surely (there are economic impacts for society)." (I 2)*

I 4 explained that the government has conducted a research on meniran as a replacement of AGP. In addition, other studies have also found that finding an AGP substitute by utilizing natural ingredients is the best solution (Gribbs and Jacob, 2005; Doyle, 2001; Seal et al., 2013). The use of probiotics accompanied by good environmental healthcare efforts would protect livestock from infectious diseases. Enzymes such as bile salt hydrolase (BSH) are widely exist in microflora and could increase lipid metabolism. The studies are conducted in America and Europe which of course have geographical differences and animal genes. Thus, it is necessary to conduct research in Indonesia to find the best alternative.

Analysis of Health and Economic Factors

The existence of the prohibition on the use of AGP would affect the price of poultry, which certainly would also affect people's purchasing power. However, since there is no more residual potential resulting from feeding on livestock, the quality of animal source food improves. Therefore, poultry which is a source of protein in the society would be healthier if consumed, then productivity would increase, and the economic development of the community would also increase.

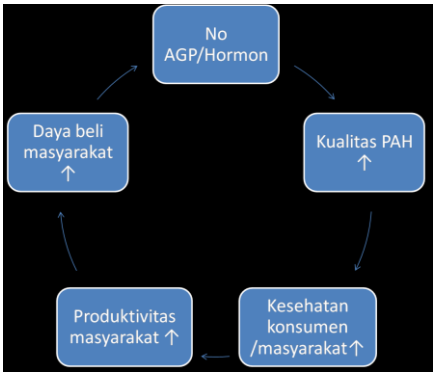

Figure 3 Analysis of health and economic factors

Analysis of political factors and legal factors

Prohibition of the use of hormones and antibiotics as feed additives still have not found a proper replacement up until now. Although it still permitted until the end of 2017, it is likely that an appropriate replacement discovery was not available by early 2018. The government has not been able to perform monitoring tests for all types of antibiotic and hormone as feed additive. This might allow some non-compliance actors with regulatory requirements. Hence, a good supervision system is required which supported by the capability of a valid laboratory examination with a firm legal basis.

Analysis of health, economic and political factors

Prohibiting the use of hormones and antibiotics in animal feed is one way to prevent the occurrence of antibiotic resistance. Like the story of one infomant, the ban on synthetic hormones was at first a concern of the World Trade Organization (WTO). Similarly, the prohibition of antibiotics, which is also a concern not only by the World Health Organization (WHO), but also the Food and Agriculture Organization (FAO), and supported also by the Corporate Affairs Commission (CAC). Additinally, if the animal source food produced could zero residue, surely Indonesia would benefit greatly because it could export its food abroad, especially to the European Union.

However, many changes are needed, ranging from strict supervision to the process of beef importation, as well as the prohibition of antibiotics and hormone use as feed additives and drugs (including ractopamine). This supervision starts from eliminating importers, manufacturers of commercial feed, feed distribution, feed storage, feeding, untul ready to harvest. Moreover, it is necessary to set up and make special supervisors to show the role of government in terms of guidance and supervision.

Analysis of health, legal, political and economic factors

Health, legal, political and economic factors are interrelated one to another. To produce animal source food which ASUH (Safe, Healthy, Intact and Halal), requires a legal umbrella so that the authorities could carry out their

obligations properly. Thus, it is expected to affect animal health, food safety and quality of animal source food, consumer/community health, community productivity, economic development, and ultimately improve people's welfare.

CONCLUSIONS

Based on the results and discussions of the research, it could be concluded that the legal factor is the most influential factor in the formation of policies on prohibiting the use of hormones and antibiotics as feed additives than health, economic, and political factors. This is because the legal factor is the main reason for the establishment of Permentan No. 14 of 2017 which is the mandate of Law No. 41 of 2014, also supported by other regulations at both local and foreign level. This become the needs of the community as food security guarantees.

Referring to the results of research, discussions and conclusions, then could put forward some suggestions as follows:

For the Government

a. The government needs to establish a surveillance program by developing the capability to conduct antibiotic and hormonal tests on feed.

b. Government needs to conduct surveillance in feed entrepreneurs and farmers related to the use of hormone and antibiotic as feed additives.

c. The central government needs to embrace local governments to educate farmers regarding good livestock management, not only through the regulation.

d. The government needs to conduct further research on the presence of residues in the animal source food.

e. The government needs to conduct further studies on the economic impacts of these policies, for the communities, business and ranchers.

For the Farmers

a. Breeders need to improve the cleanliness of the cage environment to reduce infectious diseases.

b. Poultry farmers need to try a natural feed as ruminant’s breeders currently doing.

For the Feed Entrepreneurs

a. Feed entrepreneurs need to find replacements for antibiotics/hormones as safe feed additives.

REFERENCES

Balai Pengujian Mutu dan Sertifikasi Produk Hewan, 2014. Laporan Tahunan 2014,

Boeckela, Thomas P. Van, et.al, Global trends in antimicrobial use in food animals. PNAS, vol. 112, 2015, no. 18: 5649–5654. www.pnas.org/cgi/doi/10.1073/pnas.1503141112

Kementerian Pertanian, 2015. Bahan untuk Laporan Tahunan Ditjen PKH 2014 (Aspek Pakan Ternak). Diunduh dari http://pakan.ditjenpkh.pertanian.go.id/upload/data/Lap_Tahunan_PKH_2014_Aspek_Pakan.pdf

Kennedy, David M. 2007. An Economic Analysis of the Human Health Impacts oAntibiotic Use in Food Animal Production and the Demand for Antibiotic Free-Meat. Dissertation. University of California.

Masrianto, Fakhrurrazi & Azhari, 2013. Uji Resdiu Antibiotik Pada Daging Sapi Yang dipasarkan Di Pasar Tradisional Kota Banda Aceh. Medikal Veterinaria, Vol. 7, No, pp.13–14.

Palupi, Maria Fatima. 2015. Kajian Pustaka Raktopamin sebagai Stimulan Lipolisis dan Hipertrofi Otot pada Babi. Buletin Pengujian Mutu Obat Hewan 2015.Edisi 2.

Sd, H., 2016. Residu Antibiotika pada Pangan Asal Hewan dan Pengujiannya. IPB, pp.1–65. Available at: http://bpmsph.org/wp-content/uploads/2016/06/Residu-antibiotika-pada-pangan-asal-hewan-dan-pengujiannya_pak-Huda.pdf.

Siswanto, 2014. Kajian Resistensi Antimikrobial dan Situasinya pada Manusia di Indonesia. Seminar Nasional dan Diskusi Interaktif Resistensi Antimikroba, pp.1–35. Available at: civas.net/cms/assets/uploads/2014/03/Kajian-Resistensi-Antimikrobial-dan-Situasinya-pada-Manusia-di-Indonesia.pdf.

UU No. 41 tahun 2015 tentang perubahan atas UU No.18 tahun 2009

UU No.18 tahun 2009 tentang Peternakan dan Kesehatan Hewan