

## DETECTED LEVEL OF RESIDUES TETRACYCLINE IN BREAST MEAT, DRUMSTICK AND HEART OF CHICKEN WITH HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

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### Abstract

A method for determination of tetracycline (TC) residues in chicken meat has been established, validated and applied to study the residue level in broiler chicken meats which collected from chicken that given antibiotic synthetic (0,05 mg/kg fed). In total, 40 day old broiler chickens were used in this experiment. They were allocated to 2 treatments in 5 replicates with 4 broilers each. The Control of treatment was using basal diet and compared with TC in fed. Each diet was fed from day old to 35 days. TCs were extracted from chicken meat with McIlvaine-EDTA buffer solution and were cleaned-up with SPE C18 column cartridge and identified by an HPLC with photo diode array (PDA) detector. The analysis results showed that highest level of residues TC was in heart. Level residues of breast and drumstick were lower than residues in heart. But all of result were still higher than the regulated maximum residue level (MRL) of 0,1 mg/kg (SNI Number 01-6366-2000) therefore the breast meat, drumstick and heart of chicken in this research were not safe for human consumption.

Keywords: *Tetracycline, meat chicken, and HPLC.*

### Introduction

Chicken meat is of high nutritional value of food and an important role in improving the quality of human resources. Chicken circulating in Indonesia is largely derived from the broiler. Broilers were able to grow quickly so can produce meat in a relatively brief, lasting 5-7 weeks. Broilers have an important role as a source of animal protein from cattle (Resnawati 2005).

Antibiotics are substances produced by a microorganism that can kill or inhibit the growth of other microorganisms in very low concentrations (Wiryosuhanto 1990). Sinaga (2004) revealed that the addition of antibacterial drugs (antibiotics) in animal feed rations aimed at increasing the growth rate to improve the rate of weight gain or feed efficiency. The use of drugs has increased sharply, particularly in beef cattle and broiler chickens to accelerate the pace of growth in body weight. One of the widely used antibiotics are tetracycline class to inhibit bacterial protein synthesis. The use of antibiotics should be in conformity with the rules because if violates the rules, will lead to residues in livestock products.

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Antibiotic residues can to irritated, toxicity, treatment failure due to resistance, and disruption of the micro flora in the digestive tract (Murdiati 1997). Reported that more than 50% of the 200 samples analyzed cow's milk containing antibiotic residues is quite high. Tetracycline antibiotic residues in chicken meat has not been reported. Therefore, the possibility of antibiotic residues in chicken meat by inspecting samples of chicken meat from the field by the method of high performance liquid chromatography (HPLC).

Chromatography is a general term for a variety of separation techniques based on a sample partition between a mobile phase, which can be either gas or liquid, and the stationary phase can be liquid or solid (Son 2004). Samples taken by the carrier or the called mobile phase (mobile phase) through the column. Column contains the stationary phase (stationary phase) which serves to separate the sample components. Almost every chemical compounds, both of which have low and high molecular weight, its components can be separated by chromatographic methods.

HPLC is one of the methods of chemical and physic-chemical technology that uses high-pressure column pump system and a sensitive detector so as to separate the chemical compounds with high speed and efficiency. The detector used is a diode array, which is a modification of the ultraviolet detector, which is more sensitive and specific to the two predetermined wavelengths. This detector is used to download a sample on the detection of ultraviolet to the visible spectrum (visible). Readings and measurements were done by a monochromatic that uses tungsten or deuterium lamp. The experiment aims to determine the presence of the tetracycline residues in chicken meat using HPLC.

## **Material and Method**

Experiments conducted in minifarm jatikuwung, Surakarta and for residue testing conducted at the Laboratory Kesmavet, Boyolali district. Carried out in September and October 2011. The materials used are of chicken breast, thigh, and heart of each of 20 samples derived from chickens reared intensively with basal feeding as control and the treatment given tetracycline as an additional provision of 0.05 mg / kg basal feed (Swastike, 2012). The materials used for the analysis of residues of antibiotics is the standard oxytetracycline (OTC), tetracycline (TC), chlor-tetracycline (CTC), oxalic acid, 0.0025 M, acetonitrile (grade), 20% trichloroacetic acid, citric acid monohydrate, disodium dihydrate hidrogenfosfat , EDTA disodium salt, nitrogen gas, methanol pa, 0.45 µm filter paper, aluminum foil, parafilm, distilled water, and akuabides. The instrument used was a

Shimadzu LC-20AD HPLC, HPLC syringe, column variants Polaris 5  $\mu$  C-A 150 x 4.6 mm, column solid phase extraction (SPE) variant C, Beckman Centrifuge TJ-6 models, centrifuge tube, vortex, vacuum filters, analytical balance, a plastic syringe, micropipette, tip micropipette, erlenmeyer, glass cup, measuring cup, pint flask, pipette drops, stir bar, a small vial, and spatula.

### Result and Discussion

The number of tests performed for three poultry product (breast, drumstick and heart) are shown in Figure 1 and table 1. A total of 20 samples of each meat were tested, and all the samples were positive and the level of residues TC more than SNI (Number 01-6366-2000). The details of the positive results, number, percentage of positives for antibiotic type and sample type were given in Table 1.

Table 1. Residues TC in Breast, Drumstick and Heart

Sampel	Level of Residues (mg/kg)	
Breast	0,215	More than SNI
Drumstick	0,232	More than SNI
Heart	2,19	More than SNI

Sources : The Result from Research

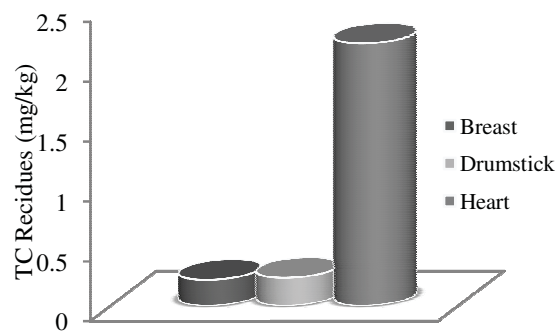


Figure 1. Residues TC (mg/kg)

Antibiotics (TC) in chicken feed to speed up body weight gain, they are consistent with research that has been done Swastike (2012), increase the weight of control chickens (Non TC) is lower than TC that given in fed. Because the TC serves as AGP (Antibiotic Growth Promoter). Other effects are also fat and cholesterol of meat is higher in the TC

that given in fed than control. Cholesterol in control treatment as research were 108 mg/100 g but in chicken with TC that given in fed 158.8 mg/100 g (Swastike, 2012)

Tetracycline content in all broiler meat samples analyzed (Figure 1) were above the maximum residue limits (MRL) of tetracycline in SNI (Number 01-636-2000) 0,1 mg / kg (ISO 2001) so that the meat is not safe to eat. The content of the residue that passes through the SNI limit will cause the meat is not safe to eat because it can cause allergic reactions, toxicity, and resistance to certain microbes (Bahri et al., 2005).

The detection of TC in our study may be due to their absorption and their distribution, since they are systemic antibiotics and absorbed from the intestines in substantial amount (Table 1). TC have been used widely at sub therapeutic and therapeutic concentrations in food-animal production, but increasing concern over their carcinogenic and mutagenic potential.

The inappropriate use and accountability of antibiotics in human and veterinary medicine and in agriculture are ; a shortened lifespan of an antibiotic's usefulness; additional complications in surveillance; the ability to predict resistance patterns, and the consequences for human health. From above it is important to say that antibiotic residues can be prevented from entering the food chain at the producer level if farmers and processors are educated about the potential hazards associated with antibiotic residues in foods of animal origin

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