



Original Contribution

STUDIES ON THE RESIDUE LEVELS OF TOBRAMYCIN IN STORED POULTRY PRODUCTS

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ABSTRACT

Studies were carried out on the residue levels of tobramycin (tobramycin sulphate) in poultry products stored at -18°C . The residues of tobramycin were determined over a period of 60 days using microbiological method. We generally found a decreasing level of this drug during this period of storage. Snapshot of levels of this drug shows initial higher levels in the liver, followed by breast and thigh muscles, with no residues in the muscles on the 30th day. In the case of the liver the rate of decrease was slower, with 25% of the drug left in this tissue on the 30th day. Subsequently, the level fell to 14% on the 60th day.

Key words: tobramycin, residues, poultry products

INTRODUCTION

The presence of veterinary drugs residues in the foodstuffs of animal origin poses risks to consumers. This has informed the enacting of the relevant European Community legislation detailing maximum residues limits (MRL) [1].

In this connection there are a number of studies referring to the dynamics of the residue levels of antibiotics in meat during cold storage

Doneva and Donev [2] studied tylosin and ampicillin residue levels, Pavlov et al. [3] – amoxicillin and Boison et al. [4] – benzylpenicillin.

Few papers about the aminoglycoside antibiotic tobramycin is to be found in the literature data. There are studies by Jernigan et al. [5], Lashev and Dimitrova [6] and Dimitrova et al. [7], but they concern the kinetics of the antibiotics in different animal species. Campagnolo et al. [8] point to the inherent threat to the consumers' health over increasing use of antimicrobial drugs in poultry feeding.

Because of the growing interest in tobramycin as a means of poultry treatment we have decided to investigate tobramycin residues in meat and liver of broiler-chicken during cold storage.

MATERIALS AND METHODS

Investigations on changes of tobramycin residue levels in meat and liver were carried out on twelve 45-day old chickens with body weight around 1 kg. They were injected intramuscularly in the right breast muscles with tobramycin sulphate (5% water solution) at a dose of 5 mg/kg b.w.

Ninety minutes after the treatment all birds were killed by decapitation and processed according to the instruction on the technology of producing poultry meat [9].

The untreated part of the breast muscles, thigh muscles and the liver were divided into four parts packed and then stored at a temperature of minus 18°C until the time for antibiotic determination. The samples were defrosted at a temperature of $0-4^{\circ}\text{C}$ immediately before the analysis. The study for residue presence was performed using microbiological method with a test culture of *Bacillus subtilis* ATCC 6633 described in our previous works and the limit of quantification was $0.04\ \mu\text{g/ml}$ [3, 10].

RESULTS AND DISCUSSION

The data are presented on **Table 1**. They show that on the first day tobramycin contents in the samples ranged from $0,09\ \text{mg/kg}$ in the thigh muscles to $0,61\ \text{mg/kg}$ in the liver samples. The concentrations at the beginning in liver were two times higher than those in the breast

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muscles and 7 times than those in the thigh muscles.

Table 1. Tobramycin residues in different tissues of chicken (mg/kg)

Days		Breast muscles	Thigh muscles	Liver
1	Number of samples	12	12	6
	Average value	0,26	0,09	0,61
	± Standard deviation	0,22	0,03	0,16
	Standard error	0,08	0,01	0,06
15	Number of samples	10	12	6
	Average value	0,12	0,06	0,47
	± Standard deviation	0,05	0,02	0,14
	Standard error	0,02	0,01	0,05
30	Number of samples	10	10	6
	Average value	-	-	0,16
	± Standard deviation	-	-	0,04
	Standard error	-	-	0,01
60	Number of samples	10	10	6
	Average value	-	-	0,09
	± Standard deviation	-	-	0,01
	Standard error	-	-	0,005

It was estimated that on the 15th day of storage tobramycin residues were lower in all the tissues investigated. Results in the order the tissues were mentioned above are: 0,12, 0,06 and 0,47 mg/kg.

After 15 days storage at the temperature lower than -18°C residues were found only in the liver samples. On day 30 antimicrobial substances were not found in the muscles but in the liver they were 0,16 mg/kg and on day 60 the reduction was to 0,09 mg/kg.

Our data could be compared with those stated in our previous investigations made with amoxicillin and kanamycin [3, 9]. Both substances were reduced to a lower degree in chicken tissues stored at minus 18°C .

Other data show [2, 11] that some antibiotics were active for more than 100 days at minus 18°C (tylosin, tetracycline and oleandomycin). Merser [12] reported similar findings for the oxytetracycline. Boison et al. [4] showed that at minus 20°C there was a decrease of benzylpenicillin levels in bovine offals to about 50% at third month of storage and a negligible decrease at lower temperatures.

Although we cannot recommend meat freezing as a method of eliminating antimicrobial drugs, it is necessary to underline that these results sustained by our previous studies [8] show sharply decreasing tissue drug concentration during 1 or 2 months storage at minus 18°C .

On the basis of this study we could conclude that there is a significant decrease of tobramycin levels in poultry meat and liver

during cold storage. Breast and thigh muscles were with zero level at 30th day in the drug treated chickens and immediate slaughtering. This situation would be very ineligible situation in the practice but real. We propose here lower initial doses in the meat and liver will lead to faster and more effective decrease of residues. More studies will, however, be needed to show this.

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