Oxytetracycline And Sulphaquinoxaline Residues In Slaughtered Animals

Saleh, E.A. ; Hafez, A.E. and * Rofail, B.Y.
Food control Department, Fac. Med. Vet. , Zagazig univ.
* General Organization for Veterinary Service in Sharkia Governorate

ABSTRACT

The aim of this study was the detection of the antibiotic residues in different tissues and organs of the slaughtered food animals (cattle, sheep and camel)

Six hundred samples (50 from each of kidney, liver, muscle and fat) were collected from three animal species (cattle, sheep, and camel) which obtained from different butcher shops in Sharkia governorate for detection of antibiotic residues.

Positive samples of drug residues in cattle and sheep were detected but in camel samples residues failed to be detected and this is due to the camel more resistance to disease and also not take any medication.

It was found that the highest residue percentages were detected in the kidney of all examined carcasses, while the lowest one was found in muscles.

The percentage of residues is high in kidney sheep 18% for oxytetracycline and 12% for sulphaquinoxaline. While in kidney cattle 16% for oxytetracycline and 8% for sulphaquinoxaline.

INTRODUCTION

Antibiotic residues are the top of priority for the public health authorities all over the world. Antibiotics play an important role in the reduction of morbidity and mortality, they were used for thirty years ago and brought a great benefit to both human beings and animals *(1)*.

Moreover antibiotic residues may lead to mutagenic and carcinogenic effects on human consumers. So, antibiotics that might result in disposition residues in meat, milk and eggs must be permitted in food intended for human consumption. Recently many countries have become aware of the potential hazards for presence of drug residues in meat and have developed various methods for detection of such residues. Therefore many surveys have been carried out in many countries saving this purpose *(2)*. Nowadays all countries regulate using of the drugs and the chemicals by making programs and restriction to control the use of drugs in meat and poultry industries, so the human intake of such harmful residues in meat and poultry was minimized *(3)*.

Nowadays antibiotics are used in a large scale in veterinary field and farms as prophylactic measures uses and treatment of many infectious diseases as well as for growth promotion. Some of these antibiotic leave residues in the animal tissues and may cause some hazard to human health due to the ingestion of food stuffs of animal origin containing antibiotic residues these hazards represented by allergic phenomena, sensitization of any antibiotic resistance. In addition to the teratogenic, carcinogenic and mutagenic effects.

The importance of veterinary drugs especially the antimicrobial agents is shown not only as beneficial compounds for animal health and animal wealth, but as risks as well being potential sources of antibiotic residues in food of animal origin. Health for human and animal is of almost importance and the quality of food is considered as an important health factor *(4)*.

The control of residues in practice being confined to animal carcasses industry, especially with respect to oxytetracycline residues in meat either by means of food and

drug act or brought penilty schemes which operated by the meat working boards. Several countries introduced specific legislation requiring meat samples to be tested for the presence of the antibiotic residues *(5).*

Today it is almost impossible to produce food for human consumption of animal or poultry origin which is completely free from drugs or chemicals *(6).*

So our duty as meat hygienist is to protect the meat consumers from any possible hazards and the aim of this work is to find out the most reliable methods for detection of:

Drug residues (oxytetracycline and sulphaquinoxaline) in slaughtered animals (cattle, sheep and camel).

MATERIAL AND METHODS

Materials

Animals

A total of one hundred and fifty of slaughter animals, fifty from each one (cattle, sheep and camel) were collected from Sharkia Governorate. 200 samples were collected from each animal (50 each of muscle, kidney, liver and fat). The collected samples were transferred in sterile plastic bags to the laboratory under complete aseptic conditions without undue delay, and then analyzed for detection of oxytetracycline and sulphaquinoxaline residues by High performance thin layer chromatography.

1.2. Solutions

1.2.1.Solvent of oxytetracycline *(7).*

1.2.2. Solvent of sulphaquinoxaline sodium: *(8).*

Chromatographic reagent *(9).*

Derivatization mixture *(8).*

Acetonitrile water 1 *(10).*

Acetonitrile water 2 *(10).*

Acetonitrile water 3 *(8).*

Methanol water 1 *(10).*

Methanol water 2 *(8).*

Standards *(11).*

Methods

Determination of sulphaquinoxaline residue in tissue samples *(9).*

Five grams of liver, kidney muscle and fat /were collected from each slaughtered animals (cattle, sheep and camel). Standard solution *(11),* extraction *(12)* and determination of sulphaquinoxaline in tissue was carried out as previously described *(12).*

Determination of oxytetracycline in tissue samples *(8):*

Five grams of liver, kidney muscle and fat /were collected from each slaughtered animals. Standard solution *(7),* extraction *(11)* and determination of *(12)* of oxytetracycline were carried out .

RESULT

Table 1. Incidence of oxytetracycline residues in examined samples of Cattle, sheep and camel by TLC (No. = 600 samples)

Examined animals	Number of examined animals	Positive samples							
		Muscle		Kidney		Liver		Fat	
		No.	%	No.	%	No.	%	No.	%
Cattle	50	8	16	8	16	5	10	UD.	--
Sheep	50	5	10	9	18	9	18	5	10
Camel	50	UD.	-	UD.	---	UD.	---	UD.	---

UD. = undetectable

Table 2. Statistical analytical result of oxytetracycline residues in examined samples of cattle and sheep by TLC (mg / kg) wet weight (No. = 400 samples)

Spear	Cattle				Sheep			
	Muscle	Kidney	Liver	Fat	Muscle	Kidney	Liver	Fat
Minimum	0.014	0.071	0.015	UD.	0.013	0.022	0.020	0.011
Maximum	0.065	0.098	0.095	UD.	0.051	0.093	0.077	0.022
Mean	0.056	0.091	0.083	UD.	0.032	0.077	0.062	0.015
S.E.	0.00045	0.0012	0.00011	UD.	0.00079	0.00010	0.0009	0.00021

UD.= undetectable S.E. = Standard error

Table 3. Incidence of sulphaquinoxaline residues in examined animals (cattle, sheep, camel) by TLC (No. = 600) samples.

Examined animals	Number of examined animals	Positive samples							
		Muscle		Kidney		Liver		Fat	
		Number	%	Number	%	Number	%	Number	%
Cattle	50	4	8	4	8	4	8	4	8
Sheep	50	6	12	6	12	6	12	4	8
Camel	50	UD	--	UD	--	UD	--	UD	--

Table 4. Statistical analytical results of sulphaquinoxaline residues in examined animals (cattle and sheep) by TLC (mg / kg) wet weight (No. = 400 samples)

Spear	Cattle				Sheep			
	Muscle	Kidney	Liver	Fat	Muscle	Kidney	Liver	Fat
Minimum	0.011	0.014	0.012	0.010	0.011	0.020	0.016	0.011
Maximum	0.050	0.099	0.054	0.018	0.048	0.056	0.050	0.023
Mean	0.025	0.042	0.026	0.011	0.029	0.043	0.031	0.014
S.E.	0.00035	0.0062	0.00036	0.00015	0.00041	0.00057	0.0043	0.00019

DISCUSSION

Nowadays, antibiotics are used in veterinary field in large scales as prophylaxis measures and treatment of different infectious disease. Also they may be used as growth promoters and feed additives.

The residues of these antibiotics appeared in the human on the food of animal origin and lead to many human troubles.

Antibiotic residues may cause allergic phenomena, sensitization and antibiotic resistance.

Detection of drug residues in slaughtered animals

1.Detection of oxytetracycline residues

It is evident from the results achieved in Table 1 that oxytetracycline residue was detected in muscle, kidney, liver and fat of cattle, sheep and camel with a percentages of 16%, 16%, 10% and undetectable respectively for cattle, meanwhile in sheep the incidence were 10%, 18%, 18% and 10% respectively. On the other hand all camel samples for oxytetracycline residue were undetectable and this means that slaughtered camel in Egypt usually imported from some African countries in which camels did not receive any medications. Nearly similar incidences was recorded ***(13)***, while higher incidences were reported ***(14)*** , ***(15)***. On the other hand, lower incidences were obtained ***(16-18)***.

The maximum values were 0.065, 0.098, 0.095 and undetected mg/kg wet weight. While minimum values were 0.014,

0.071, 0.015 and undetected mg/kg wet weight.

On the other hand, mean values were 0.056±0.00045, 0.091±0.0012, 0.083±0.00011 and undetected in muscles, kidney, liver and fat of cattle, respectively while in sheep samples the maximum values were 0.051, 0.093, 0.077 and 0.022 mg/kg wet weight, while the minimum values were 0.013, 0.022, 0.020 and 0.011 mg/kg wet weight, with mean values of 0.032 ± 0.00079, 0.077 ± 0.00010, 0.062 ± 0.0009 and 0.015 ± 0.00021 mg/kg wet weight, respectively in muscles, kidney, liver and fat. These data cleared that the highest concentration of antibiotic residues was in kidney samples, followed by liver then muscles (Table 2).

This is attributed to *(19)* and *(20)*, the presence of the active materials and the metabolites which mostly excreted through the kidney and the comparatively low level in the liver and muscles is due to transformation of the compounds in these organs mainly in the liver, either by combination with other metabolically active materials or without any change to be excreted by the kidney.

2.Detection of sulphaquinoxaline residues in slaughtered animals

It is evident from the results achieved in Table 3 that sulphaquinoxaline residue was detected in muscle, kidney, liver and fat of cattle, sheep and camel with percentages of 8%, 8%, 8% and 8% for cattle, respectively, meanwhile, in sheep the percentages were 12%, 12%, 12% and 8%, respectively. All camel samples were failed to detect sulphaquinoxaline residue. camels did not receive any medication, the maximum values were 0.050, 0.099, 0.054 and 0.018 mg/kg wet weight, while the minimum values were 0.011, 0.014, 0.012 and 0.010 mg/kg wet weight and on the other hand the mean values were 0.025±0.00035, 0.042±0.0062, 0.026±0.00036 and 0.011±0.00015 in muscles, kidney, liver and fat of cattle, respectively while in sheep samples the maximum values were 0.048, 0.056, 0.050 and 0.023 mg/kg wet weight, while the minimum values were 0.011, 0.020, 0.016 and 0.011 mg/kg wet weight and on the other hand the mean values were 0.029±0.00041, 0.043±0.00057, 0.031±0.0043 and 0.014±0.00019, respectively, in muscles, kidney, liver and fat of sheep. These results revealed that the highest concentration of antibiotic residues located on kidney samples followed by liver, muscles and fat (Table 4). Lower incidences were recorded *(18)*.

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الملخص العربى

بقايا الأوكسى تيتراسيكلين والسلفا كينوكزالين فى ذبائح الحيوانات

عصام عبد المتعال صالح ، عبد السلام الديداموني حافظ ، بهجة يوسف روفائيل*

قسم مراقبة الاغذية ، كلية الطب البيطري ، جامعة الزقازيق

***الهيئة العامة للخدمات البيطرية بمحافظة الشرقية**

أجريت هذه الدراسة لتحديد وجود بقايا المضادات الحيوية فى لحوم الحيوانات الكبيرة باستخدم جهاز الفصل الكروماتوجرافي (الشرائح الرقيقة) فى الكشف على متبقيات الأوكسي تتراسيكلين والسلفاكينوكزالين صوديوم فى انسجة وأكباد وكلى ودهون ذبائح الحيوانات

تم تجميع عينات من ١٥٠ حيوان من الأبقار والأغنام والجمال (٥٠ حيوان من كل نوع) من محلات القصابين من أماكن مختلفة من محافظة الشرقية حيث تم تجميع ٥٠ عينة من كل من الأكباد والكلى والعضلات والدهن من كل ذبيحة وتم فحصها للبحث عن متبقيات كلا من مضادات الأوكسى تتراسيكلين ومركبات السلفا كينوكزالين صوديوم حيث اتضح ما يلى:

وجود أعلى نسبة فى عينات الأغنام من متبقيات الأوكسى تتراسيكلين ١٨% فى الكلى ومركبات السلفا ١٢%. وأعلى نسبة فى عينات الأبقار من متبقيات الأوكسى تتراسيكلين فى الكلى ١٦% ومركبات السلفا ٨%. اما فى ذبائح الجمال فلوحظ عدم تواجد أى متبقيات من الأدوية وقد عزى ذلك إلى مقاومة الجمال العالية للأمراض وبالتالي عدم استخدام هذه العقاقير.

هذا وقد تم مناقشة هذه النتائج