Antibacterial Residues in Some Imported Chickens to Iraq

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Abstract

In this study three of trademarks of frozen chickens imported to Iraq were chosen to study the antibacterials residues in the chicken meat. The three trade marks were TM1, TM2 and TM3. Three chickens of each trade mark were bought from local market of Baghdad, from each chick a piece of muscle was cut from the thigh and the chest and from each piece four samples were tested for antimicrobial residues by using four plate test (FTP). The results showed presence of antibacterials residues in 49% of tested samples. For TM2 and TM3 the positive samples were 62.5% and 83% respectively while no antibacterials residues detected for TM1. Concluded from this study the presence of antibacterials residues in imported chickens to Iraq.

Key Words: Antibacterials Residues, Broiler, Four Plate Test, Chicken Thigh Muscle; Chicken Chest Muscle.

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Introduction

Antibacterials are natural microorganism products or identical synthetic products or semi-synthetic products which inhibit or kill microorganisms (Kirbis,2007). In veterinary medicine, antibacterials are commonly used in livestock and poultry processing as medicinal, prophylactic and growth stimulating agents and for nutritional reasons. Different antibacterials are extracted from the body over different amounts of time (Donoghue, 2003).

Antimicrobial compounds are categorized by chemical composition. Each class is distinguished by a standard core structure and different class members defined by a secondary chemical structure addition or elimination (Kennedy et al, 1998). Depending on the variety of bacterial species against which they are involved, or on their mode of action as bacteriostatic or bactericidal may be categorized as wide or narrow spectrum. The latter types come into four: synthesis of inhibition cells, disruption to the cell membrane structure, inhibition of nucleic acid synthesis or function and protein synthesis inhibition (Prescott et al, 2000).

In this study Microbial inhibition assay (MIA) was used to detect antibacterial residues, In general, the microbial screening strategies focused on bacterial growth inhibition in the sanitary regulation of antibacterial residues are based on a standardized strain bacterial colony susceptible to such antibacterials being checked by a section and/or sample extract. If the sample contains antibacterials, then the growth of the microorganism is well inhibited as growth inhibition zones are established (Diez, 1994).

In reality the existence in foods of animal origin of antibacterial residues arising from non-consistency of the withdrawal duration can trigger adverse allergic reactions in consumers and favor the multi-resistance selection of bacterial strain (MRBS) (Bada-Alambedjii, 2004).

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One of the incriminating factors again growing antibacterials resistance in human is the indiscriminate veterinary applications of antibacterials (Carson et al 1994).

Some antibacterials are directly toxic, which may cause fatal plastic anemia, while allergic reaction and toxic side effects may have fatal consequences (Popelka et al, 2003). Drug residues can influence the palatability, aroma and flavor of meat. Feed metabolites in animal drugs endanger human health with allergy, organotoxicity, mutagenicity, teratogenicity or cancer in acute or cumulative way (Aliu, 2004). The four plate test (FPT) is the authorized technique for detection of antibacterials residues in poultry meat in many counters which the food safety is a prime requirement for consumers (Aneses, 2016). It is commonly used for antibacterials residues screening (Kilinc and Cakil, 2008). This approach is a four platform research agar diffusion test that uses as indicator species two separate microorganisms *Bacillus subtilis* and *Micrococcus lutheus* (Bogaerts and wolf, 1980).

This study aimed to evaluate the presence of antibacterials in imported chickens to Iraq especially in presence of weak governmental procedures.

Materials and Methods

Three of trademarks of frozen chickens imported to Iraq were chosen to study the antibacterials residues in the chicken meat. The three trademarks were TM1, TM2 and TM3. Three chickens of each trade mark were bought from local market of Baghdad, from each chick a piece of muscle was cut from the thigh and the chest and from each piece four samples were collected.

The French protection department (AFSSA, LMV/90/01. V7) administered and checked the Four Plate Examination (FPT). Samples were obtained for 3 minutes at room temperature. With a jab, an 8 mm diameter center was taken from each sample and then sliced into 2 mm disks. Two disks with the same sample were mounted on each of the four plates diametrically opposite. After 24 hours of incubation, the findings were read at 37°C. The samples are deemed positive if an inhibition region of more than 2 mm is detected.

Bacillus subtilis was diagnosed and obtained from clinical pathology lab in the department of internal medicine / collage of veterinary medicine / university of Fallujah / Al-Anbar province / Iraq. After diagnosis the bacteria it cultured on nutrient agar and incubated for 24 hours at 37◦ C the a one colony was taken to a nutrient broth and in and incubated for 24 hours at 37◦ C and two loop full added to 500 ml of nutrient agar for inoculation of bacteria, 25 ml of the agar poured in each betray dish which left till solidification and the used (Salman,1997).

Statistics analysis was by Microsoft Excel, version 14.0.4760.1000, 2010.

Results and Discussion

The result showed that about 49% (35 samples) of all tested sample (72 samples) was positive, all these samples was in TM2 and TM3 because the results showed that there is no antibiotic residue in all samples of TM1. For TM2 the positive samples were about 62.5% (15 from 24 samples), the positive chest muscle samples were 66.5% (8 from 12 samples) while the positive thigh muscle samples were 58% (7 from 12 samples), Table (1).

Table 1. The number of samples and the results of TM2

Muscle type	Thigh Muscle			Chest Muscle		
Chickens	Chicken (1)	Chicken (2)	Chicken (3)	Chicken (1)	Chicken (2)	Chicken (3)
Samples No.	4	4	4	4	4	4
Positive samples	7 ≈ 58%			8 ≈ 66.5%		
Mean+SD (mm)	7.87+0.629	5.62+3.750	0	6.12+0.250	5.25+0.50	0
Mean+SE (mm)	7.87+0.314	5.62+1.875	0	6.12+0.125	5.25+0.25	0
Total positive samples	15 ≈ 62.5%					

The result for that no antimicrobial residues in samples of (chicken 3) may be due to that this chicken is from other field of poultry belong to the same trade mark but did not receive antibacterials closely to marketing.

For TM3 the positive samples were 83% (20 from 24 samples) while the positive chest muscle samples were 66.5% (8 from 12 samples), also the positive thigh samples were 100% (12 from 12 samples) as shown in table (2).

Table 2. The number of samples and the results of TM3

Muscle type	Thigh Muscle			Chest Muscle		
Chickens	Chicken (1)	Chicken (2)	Chicken (3)	Chicken (1)	Chicken (2)	Chicken (3)
Samples No.	4	4	4	4	4	4
Positive samples	12 ≈ 100%			8 ≈ 66.5%		
Mean+SD (mm)	9.25+0.645	7.87+0.853	7.25+0.866	6.12+4.210	2.12+4.250	9.37+1.376
Mean+SE (mm)	9.25+0.322	7.87+0.426	7.25+0.433	6.12+2.105	2.12+2.125	9.37+0.688
Total positive samples	20 ≈ 83%					

The reason for that the thigh samples in TM3 were all positive may be due to high blood supply in the hind limp of the bird (Elgammal, 2008).

In compare with other studies regarding antimicrobial residues in chickens meat, (Hakem et al, 2013) referred that 86.20% of the tested samples were positive, 64.83% of these samples detected with the presence of β-lactam and/or tetracyclines while 31.03% of samples containing sulfonamides and 11.72% detected with aminoglycosides and 37.93% containing macrolides.

In Senegal, 20% of the tested broiler poultry carcasses were positive with 4% of β-lactam and/or tetracycline and 3% with sulfonamides and 15% containing macrolides. (Nakaya, 2004).

(Farideh et al, 2014) referred that 22% of collected samples detected with sulfonamides residue while no sample was positive to β-lactam while 1% of samples detected with aminoglycosides. In a study by (Habib,2007) the residues levels of antibacterials like quinolones and tetracycline were higher in summer in comprise with winter, this may be due to hot weather which leading to make the drug concentrated in tissues because of low levels of fluids in the body.

Conclusions

1. Presence of antibacterials residues in imported chickens to Iraq.
2. Govermental procedures are weak with bad quality control.

Recommendations

1. More study should be applied to evaluate the drug residues in animal products ether local or imported products.
2. Govermental procedures should be applied firmly with good quality control applications.

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