Van Vet J, 2019, 30 (2) 95-101

Van Veterinary Journal

http://dergipark.gov.tr/vanvetj

ISSN: 2149-3359 **Original Article** e-ISSN: 2149-8644

Bacterial Infections and Antibiogram Results of Farm, Pet and Other Some Animals in the Aegean Region

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Received: 31.01.2019 Accepted: 25.07.2019

ABSTRACT In this work, bacterial agents and anitibotic susceptibility patterns isolated from samples belonging to cattle, sheep, goats, avian species, fish, cat, dog and alternative species (deer, ibex etc.) sent to the laboratory from different provinces of Aegean region for diagnostic purposes between 2013 and 2014 are reported. The aim of this study was tos hare antibiogram data on bacterial diseases in the various animal, to contribute to more effective treatment and to draw attention to increasing resistance to antibiotics in animal diseases. Conventional microbiological methads, fully automatic identification devices and malecular methods were used in the study. Various Gram positive and negative bacteria were isolated and florfenicol was determined to be the most effective antibiotic for bacterial infections in many animal species. Bacterial isolates were found to be least susceptible to oxytetracycline and sulfamethoxazole+trimethoprim. Altough the findings of the study are compatible with the studies on the resistance of bacterium to antibiotics, it is different from many studies because it provides aggregate data.

Keywords: *Farm animals, Cats, Dogs, Bacterial infections, Disc diffusion method*

ÖZ

Ege Bölgesindeki Çiftlik, Pet ve Diğer Bazı Hayvanlarının Bakteriyel Enfeksiyonları ve Antibiyogram Sonuçları

Bu çalışmada 2013 ve 2014 yıllarında, Ege bölgesinden hastalık teşhisi amacıyla laboratuvara gönderilmiş olan sığır, koyun, keçi, kanatlı, balık, kedi, köpek ve alternatif türlere (geyik, dağ keçisi vs) ait numunelerden izole edilen bakteriler ve bunlara ait antibiyogram sonuçları verilmiştir. Bu çalışmanın amacı çalışmaya dahil edilen hayvanlardaki bakteriyel hastalıklarla ilgili antibiyogram verilerini paylaşmak, daha etkili tedavi yapılmasına katkı sağlamak ve hayvan hastalıklarında artan dirençli patojen bakterilere dikkat çekmektir. Çalışmada konvansiyonel mikrobiyolojik yöntemler, tam otomatik identifikasyon cihazları ve moleküler yöntemler kullanılmıştır. Elde edilen verilere göre Ege bölgesindeki pet ve çiftlik hayvanlarından çeşitli Gram negatif ve Gram pozitif bakteri türleri izole edilirken; florfenikol, pek çok hayvan türüne ait bakteriyel enfeksiyonda en etkili antibiyotik tespit edilmiştir. Bakterilerin en az duyarlı olduğu antibiyotikler ise oksitetrasiklin ve sulfametaksazol + trimetoprimin bulunmuştur. Bu çalışma ile Ege bölgesindeki çiftlik ve bazı pet hayvanlarında hastalık oluşturabilecek bakteriler ve bunlara karşı kullanılabilecek antibiyotikler hakkında güncel ve toplu bir veri ortaya konmuştur. Çalışma bulguları bakterilerin antibiyotiklere direnç geliştirmesi ile ilgili çalışmalarla uyumlu olmakla birlikte, toplu bir veri sağladığı için birçok çalışmadan farklıdır.

Anahtar Kelimeler: *Çiftlik hayvanları, Kedi- köpek, Bakteriyel enfeksiyonlar, Disk difüzyon tekniği*

INTRODUCTION

Penicillin is the first antibotic to be discovered in 1928. 12 years later, Abraham and Chain, reported the existence of the penicillinase enzyme in Escherichia coli and this was the first case of resistance against antimicrobials (Tenover 1996) Although many new antimicrobial compounds were discovered, almost every year many of these are seen to lose their effect due to development of resistance. According to National Fund for Infectious Diseases (NFID) annual cost of antibiotic resistance is about 4 million dollars and there are about 63.000 lives lost every year because of resistant bacteria (Anonymous 1). For this reason, antibotic use should be limited to necessary situations and proper dosage and period. Antibiotic use is very common in Turkey in both medicine and veterinary medicine. Veterinary antibiotic preperations are predominantly used in the respiratory system diseases of small and large animals, in colisepticemia (Boynukara et al. 2002; Ülker et al. 2002; Gökçe et al. 2010; Gümüssoy

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2013) in mastitis cases (Akan et al. 2001); in bacterial diseases of avian species (Zhao et al. 2001), in bacterial diseases of marine and freshwater fish species (Austin and Austin 2012; Baydan et al. 2012; Dinç et al. 2013) in bacterial diseases of cats and dogs (Degi et al. 2012) and in diseases of alternative species (deer, ibex etc.). Animal husbandry and farming are popular economic acitivites in the Aegean Region of Turkey. In this region, dairy farming and poultry production are especially well-developed. 90% of all mariculture establishments in Turkey are located in this region as well. As a result, use of antibiotics to combat bacterial diseases is commonplace in this region. The antibacterials approved for veterinary use are listed in the web site belonging to the Ministry of Food, Agriculture and Livestock (Anonymous 2). Application of antibiotics in cattle, small ruminants, dogs and cats are with injections, in poultry they are generally administered through feed and water, and in fish through feed.

The aim of this work is to present the findings related to bacterial isolates and antibiotic susceptibility patterns obtained from farm and companion animals in the Aegean Region, to contribute the effort towards more efficient therapy options and to draw attention to antibiotic resistance problems in animals.

MATERIALS and METHODS

Samples

In this work, 1175 bacterial isolates from samples of cattle, sheep, goats, avian species, fish, cat, dog and other species (deer, ibex etc.) submitted to the laboratory between 2013-2014 for disease diagnosis were used. Information about the origins and numbers of isolates are supplied in Table 1.

Isolation and Identification

Internal organ samples (spleen, liver, kidneys, lungs) from animals sent for disease diagnosis were inoculated on general growth media; incubation conditions were 1-5 days in 22 °C for fish samples and in 37 °C for others. Bacterial colonies were generally identified with biochemical methods on a genus level (Arda et al. 1997; Austin and Austin, 2012). *Pasteurella multocida, Mannheimia haemolytica, Escherichia coli, Staphylococcus aureus, Staphylococcus epidermitis, Staphylococcus chromogenes, Streptococcus dysagalactiae* ssp. *dysagalactiae, Streptococcus galactiae* ssp. *agalactiae, Streptecoccus uberis, Aeromonas hidrophila / cavieae, Aeromonas sobria, Lactococcus garvieae, Vibrio alginolyticus, Vibrio vulnificus, Salmonella* group, *Pseudomonas aeruginosa, Heamophilus paragallinarum, Staphylococcus gallinarum, Escherichia fergusoni, Staphylococcus simulans, Staphylococcus lentus, Proteus mirabilis, Enterococcus gallinarum, Enterococcus faecalis, Streptococcus parasanguinis, Staphylococcus intermedius, Staphylococcus xylosus, Staphylococcus gallinarum, Streptococcus parasanguinis, Staphylococcus lentus, Staphylococcus vitulinus, Enterococcus faecium, Staphylococcus salivarius, Enterobacter cloacae complex, Proteus mirabilis* were identified with Vitek 2-Compact Identification System. *Listonella anguillarum, Yersinia ruckerii, Photobacterium damsale* subsp. *piscicida, Tenacibaculum maritinum* and *Vagococcus salmoninarum* were identified on a species level with Polymerase Chain Reaction (PCR) (Versalovi et al. 1991; Toyoma et al. 1996; Zlotkin et al. 1998; Rajan et al. 2003; Hong et al. 2007).

Antimicrobial Susceptibility Testing by The Kirby-Bauer Disc Diffusion Method

4-5 colonies from solid media were inoculated in sterile Physiological Saline and a suspension was made according to 0.5 Mc Farland ($1.5x10^8$ cfu/ml). 100 µl suspension was spread on Mueller-Hinton Agar with the exception of *Streptococcus* spp. and *Corynebacterium* spp. which were inoculated on Blood Agar (Koneman et al. 1997). Antibiotic discs were placed asceptically on the surface using a automatic disc dispenser. Isolates from fish samples were incubated under 22 °C, others under 37 °C for 24-48 hours. Inhibition zones were later measured and compared to reference values (NCCLS 2000; Alderman and Smith 2001). When antibiotic susceptibility test results were transferred into table, chickens, fish, cats, dogs and alternative species were grouped according to species while large and small ruminants were grouped according to respiratory diseases, mastitis and colisepticemia cases.

As antibiotic discs; Florfenicol (30 µg), penicillin G (10 µg), streptomycin (10 µg), gentamycin (10 µg), oxytetracycline (30 µg), trimethoprim+sulfamethoxazole (25 µg), amoxycillin (25 µg), amoxycillin+clavulonic acid (30 µg), tilmycosin (15 µg), cefaperazone (75 µg), doxycycline (30 µg), enrofloxacin (5 µg), lincomycin+spectinomycin (10 µg),, neomycin (30 µg), erithromycine (15 µg), oxolinic acid (2 µg), flumequin (30 µg), colistin (10 µg), ceftiofur (30 µg), cloxacillin (5 µg), marbofloxacin (10 µg) (OXOID) were used.

RESULTS

Pictures of identification of isolates are supplied in Figure 1 (Certain VITEK results), and Figure 2 (Certain gel electrophoresis results) while the animal species from which the isolates were obtained are supplied in Table 1 and antibiotic susceptibility patterns are supplied in Tables 2-8.

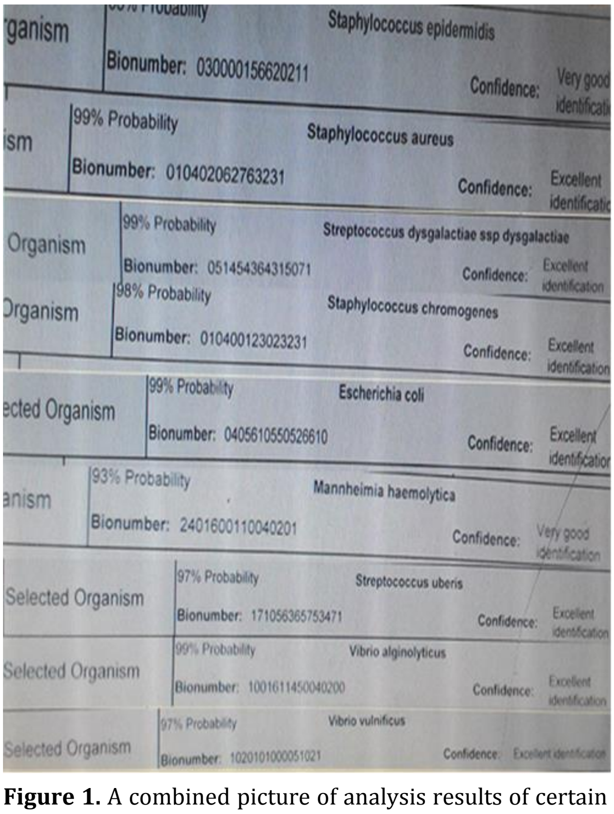

Figure 1. A combined picture of analysis results of certain isolates identified with the VITEK 2 Compact Identification System

Table 1. Animal species and cases sent to the laboratory between 2013-2014 from which the isolates were obtained

	Isolated bacteria species (spp)	Total number of cases
Pneumoniae cases in small and large ruminants	*Streptecoccus* spp., *Staphylococcus spp.*, *Klebsiella* spp., *Pasteurella multocida, Mannheimia haemolytica, Corynebacterium* spp.	420
Mastitis cases in small and large ruminants	*Streptecoccus spp., Staphylococcus spp., Corynebacterium spp., Corynebacterium bovis, Pseudomonas spp., E. coli, Bacillus spp. Staphylococcus aureus, Staphylococcus epidermitis, Staphylococcus chromogenes, Streptococcus disagalactiae, Streptococcus agalactiae, Streptecoccus uberis*	253
Colisepticemia cases in small and large ruminants	*E. coli*	24
Bacterial Infections of Fish	*Listonella anguillarum, Vibrio algynolyticus, Vibrio vulnificus, Aeromonas hydrophila, Aeromonas sobriae, Aeromonas caviae, Micrococcus luteus, Pseudomonas flourescens, Streptecoccus iniae, Photobacterium damsale* subsp. *piscicida, Lactococcus garvieae, Tenacibaculum maritinum, Vagococcus salmoninarum., Sphingomonas paucimobilis.*	212
Bacterial Infections of poultry	*E. coli, Staphylococcus spp., Streptococcus spp., Pseudomonas aeruginosa, Heamophilus paragallinarum, Staphylococcus gallinarum, Bacillus spp., Escherichia fergusoni, Proteus spp., Staphylococcus simulans, Staphylococcus lentus, Proteus mirabilis, Enterococcus gallinarum, Micrococcus spp., Enterococcus faecalis, Streptococcus parasanguinis, Staphylococcus intermedius, Sphingomonas spp. Staphylococcus xylosus, Staphylococcus gallinarum, Streptococcus parasanguinis, Staphylococcus lentus, Staphylococcus vitulinus, Enterococcus faecium, Staphylococcus salivarius, Staphylococcus chromogenes, Enterococcus cecerum, Enterobacter cloacae complex, Staphylococcus aureus.*	243
Bacterial Infections of cats and dogs	*Streptecoccus* spp., *Staphylococcus* spp., *Photobacterium* spp., *Pseudomonas spp.*, *Corynebacterium* spp	23
Bacterial infections of other species (red deer, ibex etc.)	*Streptecoccus* spp., *Staphylococcus* spp., *Photobacterium* spp.	6

Table 2. Antibiotic susceptibility patterns of bacterial isolates from pneumoniae cases of small and large ruminants

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Florfenicol (30 µg)	396/420	Tilmycosin (15 µg)	305/420	Ceftiofur (30 µg)	302/420
Amoxycillin + Clavulonic acid (30 µg)	281/420	Enrofloxacin (5 µg)	264/420	Gentamycin (10 µg)	256/420
Erythromycine (15 µg)	162/420	Oxytetracycline (30 µg)	96/420	Sulfamethoxazole-Trimethoprim (25 µg)	89/420

Table 3. Antibiotic susceptibility patterns of bacterial isolates from mastitis cases of small and large ruminants

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Florfenicol (30 µg)	235/253	Amoxycillin + Clavulonic acid (30 µg)	230/253	Ceftiofur (30 µg)	212/253
Enrofloxacin (5 µg)	194/253	Lincomycin +Spectinomycin (10 µg)	171/253	Gentamycin (10 µg)	134/253
Cloxacillin (5 µg)	130/253	Neomycine (30 µg)	/253	Oxytetracycline (30 µg)	75/253

Table 4. Antibiotic susceptibility patterns of bacterial isolates from colisepticaemia cases of small and large ruminants

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Florfenicol (30 µg)	19/24	Gentamycin (10 µg),	17/24	Lincomycin +Spectinomycin (10 µg)	15/24
Enrofloxacin (5 µg)	14/24	Colistin sulfate (10 µg),	12/24	Amoxycillin + Clavulonic acid (30 µg)	9/24
Erythromycine (15 µg)	8/24	Oxytetracycline (30 µg)	5/24	Sulfamethoxazole-Trimethoprim (25 µg)	4/24

Table 5. Antibiotic susceptibility patterns of bacterial isolates from poultry infections

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Gentamycin (10 µg)	168/ 243	Florfenicol (30 µg)	132/243	Ceftiofur (30 µg)	92/243
Amoxycillin + Clavulonic acid (30 µg)	72/243	Colistin sulfate (10 µg)	70/243	Enrofloxacin (5 µg)	44/243
Sulfamethoxazole-Trimethoprim	44/243	Lincomycin +Spectinomycin (10 µg)	24/243		

Table 6. Antibiotic susceptibility patterns of bacterial isolates from infections in fish

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Florfenicol (30 µg)	199/212	Flumequin (30 µg)	125/212	Enrofloxacin (5 µg)	120/212
Oxolinic acid (2 µg)	96/212	Erythromycine (15 µg)	52/212	Doxycycline (30 µg)	24/212
Sulfamethoxazole-Trimethoprim (25 µg)	15/212	Oxytetracycline (30 µg)	11/212	Amoxycillin (25 µg)	7/212

Table 7. Antibiotic susceptibility patterns of bacterial isolates from cats and dogs

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Ceftiofur (30 µg)	21/23	Amoxycillin + Clavulonic acid (30 µg)	20/23	Marbofloxacine (10 µg)	19/23
Lincomycin+ Spectinomycin (10 µg)	17/23	Enrofloxacin (5 µg)	16/23	Penicillin G (10 µg)	9/23
Erythromycine (15 µg)	8/23	Sulfamethoxazole-Trimethoprim (25 µg)	6/23	Oxytetracycline (30 µg)	5/23

Table 8. Antibiotic susceptibility patterns of bacterial isolates from alternative species

Antibiotic	Susceptibility	Antibiotic	Susceptibility	Antibiotic	Susceptibility
Florfenicol (30 µg)	5/6	Ceftiofur (30 µg)	5/6	Amoxycillin + Clavulonic acid (30 µg)	4/6
Lincomycin +Spectinomycin (10 µg)	4/6	Enrofloxacin (5 µg)	4/6	Penicillin G (10 µg)	4/6
Erythromycine (15 µg)	4/6	Oxytetracycline (30 µg)	3/6	Sulfamethoxazole-Trimethoprim (25 µg)	3/6

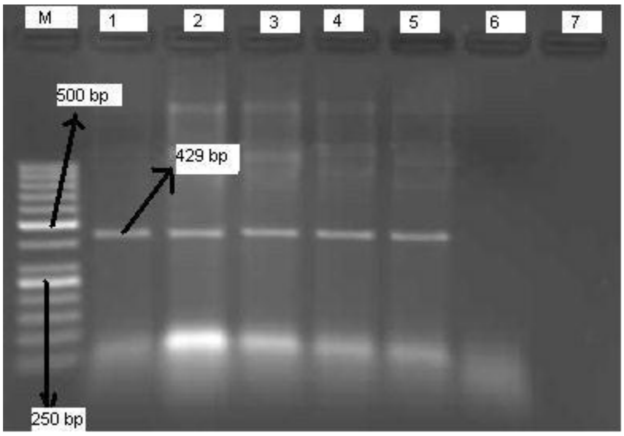

Figure 2: An example of gel electrophoresis carried out during the identification of isolates with PCR; Identification of *Listonella anguillarum* with primers specific to the *amiB* gene region. M: 50 bp Marker, 1: Positive control, *Listonella anguillarum* ATCC 19264, 429 bp; 2-5:isolates, 6: Negative control *Vibrio alginolyticus* ATCC 17749, 7: distilled water

DISCUSSION and CONCLUSION

Florfenicol is revealed to be one of the most efficient antibiotics by many reports on antibiotic susceptibility tests with various bacteria isolated from animals (Shin et al. 2005; Öztürk and Çorlu 2006; Erbaş and Kaya 2008; Önat et al. 2010; Akaylı et al. 2013; Güler et al. 2013; Özcan and Sarıeyyüpoğlu 2013). However, due to rapidly increasing florfenicol use, there are reports regarding resistence towards this antibiotic. Keyes et al. (2013), have found a resistence gene against florfenicol in an *E.coli* isolate from an avian species. The same gene region was also found in *Photobacterium damsale* subsp. *piscicida* which is a fish pathogen. (Kim and Aoki 1996).

Bacterial respiratory diseases in large and small ruminants cause serious problems in Turkey as well as the rest of the world; creating a need for the use of several antibiotics. Florfenicol has bacteriostatic effect and is recommended especially for respiratory diseases of cattle caused by *M. haemolytica*, *P. multocida* ve *Haemophilus somnus* (Shin et al. 2005). However tilmycosin is known to have stronger activity against *M. haemolytica* and *P. multocida*. Also, enrofloxacin, danofloxacin (Kaya 2007), amoxycillin + clavulonic acid, penicillin (Gifford 1998) and gentamycin (Kaya 2007) are among other recommended antibiotics for the treatment of respiratory diseases in cattle. Oxytetracycline and linosamides may also be used in respiratory diseases of cattle. Still, there have been reports about Oxytetracycline-resistant strains so; if there is no improvement after a 24 hour initial treatment period with oxytetracycline, continuation of therapy with tilmycosin is recommended (Kaya 2007). Despite the potentially serious side effects of Lincosamides, combination of Lincomycin+Spectinomycin can be used in the respiratory diseases of cattle. Respiratory disease agents in small ruminants are reported to be similar to cattle (Tel and Keskin 2010), and same antibiotics can be used in them with a few exceptions.

In this work, bacterial isolates from lung samples of cattle, sheep and goats were found to be susceptible to florfenicol, tilmycosin, ceftiofur, amoxycillin + clavulonic acid, enrofloxacin and gentamycin. These results are generally compatible to other reports from Turkey except oxytetracycline and sulfametoksazol + trimethoprim. These differences may be a result of different locations as well as a resistence development to these antibiotics.

Öztürk and Çorlu (2006) obtained 15 (% 25) *Mannheimia haemolytica*, 18 (%30) *Mycoplasma* spp., 2 (%3.3) *P. multocida*, 9 (%15) *Streptococcus* spp., 10 (%16.7)' *Staphylococcus* spp., 3 (%5) *Aeromonas hydrophilla* and 1 (%1.7) *E. coli*, *Klebsiella pneumoniae* and *Pseudomonas* spp. isolates each from the lungs of lambs with pneumoniae. They also investigated the antibiotic susceptibility patterns of isolates other than *Mycoplasma* spp. with the disc diffusion method and found that *Pasteurella* spp. were susceptible to amoxycillin+clavulonic acid, enrofloxacin and f1orfenicol at a rate of 100%, to ampicillin, danofloxacin and furazolidone at a rate of 94.11% and to oxytetracycline at a rate of 88.23%. *Staphylococcus* spp. were found to be susceptible to enrofloxacin and f1orfenicol at a rate of % 100, oxytetracycline, amoxycillin+clavulonic acid and danofloxacin at a rate of 90%, gentamycin and penicillin at a rate of 80 % respectively.

Erbaş and Kaya (2008), have reported that 28 *P. multocida isolates* from lungs of cattle with pneumoniae were susceptible to florfenicol at a rate of 93.0%, to enrofloxacin at a rate of 61.0%, to oxytetracycline at a rate of 54.0% . On the other hand, 82.0% of all strains were resistant to erythromycine and sulfamethoxazole and trimethoprim; 64.0% of them were resistant to gentamycin and 61.0% were resistant to amoxycillin-clavulonic acid. Tel and Keskin (2010) reported that out of 106 strains (76 *P. multocida*, 30 *M. haemolytica*) from lung samples of sheep with pneumoniae in the Şanlıurfa province, 74 (97%) were susceptible to norfloxacin and tetracyclin, 72 (95%) to ampicillin and amoxycillin, 70 (92 %) to sulfamethoxazole and trimethoprim and 66 (87%) to erythromycine, streptomycin and gentamycin, respectively. In another work with *P. multocida* isolates (Ülker et al. 2012) carried out in the Hatay province; they were found to be susceptible to amoxycillin, amoxycillin+clavulonic acid, sulfamethoxazole+trimethoprim, enrofloxacin and penicillin G at a rate of 100%. On the other hand, Tilmycosin was also found to be effective in experimental studies with *P. multocida* ve *M. haemolytica* (Gökçe et al. 1997).

Mastitis is an important animal health problem in Turkey as well as the world. As there are several mastitis agents, antibiotic susceptibility testing also reveals varying results. Isolates from milk samples presented to our laboratory have revealed çalışmaları florfenicol, amoxycillin + clavulonic acid, ceftiofur, enrofloxacin, lincomycin+spectinomycine and gentamycin as prominent choices for antibiotic treatment. These results are mostly compatible with other studies in our country. Yeşilmen et al.(2012), have found cefaperazone and ampicillin to have the highest susceptibility rate in their work with subclinical mastitis cases. In another study in the Southeastern Anatolia, (Ergün et al. 2009) isolates were found to be susceptible to sulfamethoxazole+ trimethoprim at a rate of 97.4% and this was found to be different from our results.

E. coli isolates from this work were found to be susceptible to florfenicol, gentamycin, lincomycin+spectinomycin and enrofloxacin. Other studies support these results. *E.coli* isolates in Turkey were still susceptible to enrofloxacin. Dursun and Kaya (2010) reported experimental treatment of 25 lambs with diarrhea and 20 of them were completely healed within 2 days. Aydın et al. (2001), also reported that 21 *E. coli* isolates were found to be susceptible to enrofloxacin, danofloxacin, gentamycin, streptomycin, kanamycin and tetracycline.

In this work, gentamycin, florfenicol and ceftiofur were found to be the most effective antibiotics in poultry. While our findings comply with some reports (Kaya et al. 2008), they differ from others (Aydın et al. 2001). In a study carried out in the Isparta province *E. coli* isolates were found to be susceptible to Gentamycin at a rate of 82 % while 89 % of samples were susceptible to Amoxycillin, 87 % of *Klebsiella* spp. to Gentamycin and 64% of the same to Amoxycillin. In the same study, 35% of *Enterococcus* spp. were susceptible to streptomycin, 45% were to tetreacycline, 55% to erythromycin, 61% to clindamycin, and 91% to chloramphenicol and ciprofloxacin. (Aydın et al. 2001), found out that within *E. coli* isolates from broilers; 37.5% of them were resistant to kanamycin, 100% to ampicillin and cefalotin, 87.5% to chloramphenicol, 81.25% to sulfamethoxazole-trimethoprim and erythromycine and 62.5% of them to amoxycillin+clavulonic acid, respectively. Differences between findings may be a result of regional differences. On the other hand, gentamycin was found to be the most effective antibiotic for poultry. The reason for this may be a lack of an oral solution for this antibiotic and the impracticality of adopting an injection method.

Fish isolates in this study were found to be most susceptible to florfenicol, flumequin, enrofloxacin and oxolinic acid. These results were found to be similar to other reports with the exception of oxytetracycline. Avsever and Ün (2014), in a previous study, reported that oxytetracycline resistance had been building up within the last ten years in the aquaculture sector. Still, this might also be due to regional differences as well. For example, in a study in the Aydın province (Akşit and Kum 2008), all 37 isolates (6 *Aeromonas salmonicida*, 13 *L. garvieae*, 7 *L. anguillarum* and 11 *Y. ruckeri*) were susceptible to florfenicol and enrofloxacin although there was resistance to others such as oxytetracycline and amoxycillin. Despite this; in another study carried out in the Marmara region on *Y. ruckeri*, *L. anguillarum* and *Pseudomonas flourescens* isolates, they were found to be susceptible to oxytetracycline (Akaylı et al. 2013). Also, in an antibiotic susceptibility testing carried out by Özcan and Sarıeyüpoğlu (2013) in the Elazığ province on *Flavobacterium psychrophilum* isolates obtained from trout samples; oxytetracycline was found to be more effective than enrofloxacin and florfenicol which also had strong inhibitory effect.

In this work, ceftiofur, amoxycillin + clavulonic acid, marbofloxacin, lincomycin+ spectinomycin were found to be highly effective against the bacterial isolates from cats and dogs. The studies in Turkey also support these findings. Babacan et al. (2011) have found that within *E.coli* isolates from urogenital infections of cats and dogs; 84.4% were susceptible to amoxycillin, 88.8% to cefalexin, 53.3% to cefalotin, 86.6% to ciprofloxacin, 75.5% to enrofloxacin, 97.7% to gentamycin, 71.1% to trimethoprim+sulfamethoxazole, 68.8 % to tetracycline and 64.4% to nalidixic acid. Also, Özkanlar et al. (2005), reported to have found *E. coli* and *Proteus mirabilis* isolates to be susceptible to cefadasine, penicillin, ampicillin, enrofloxacin and trimethoprim.

Antibiotic susceptibility testing from alternative species were seen to yield better results than farm and companion animals. The reason for this might be due to their lack of exposure to antibiotic treatment. On the other hand, in this study there have been few samples of this kind.

As a result, in this work, bacterial isolates and antibiotic susceptiblity patterns from samples of cattle, sheep, goats, avian species, fish, cat, dog and other species submitted to the laboratory between 2013-2014 for disease diagnosis are presented with the aim of contributing to treatment options and to draw attention to increasing antibotic resistance.

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