

Isolation and Identification of Facultative Anaerobic Bacteria from Feces of Pet Dogs

SMA AL-Kubaisi¹, Omar-Althani Shareef Saed², Jassim Mohamed Suleiman², Mustafa Salah Hasan¹,
Maher Saber Owain², Ahmed Sami Jarad¹

¹Department of Internal and Preventive Medicine, College of Vet. Med., University of Fallujah, Iraq,

²Department of Internal and Preventive Medicine, College of Vet. Med., University of Tikrit, Iraq

Abstract

A fifty fecal swabs (25 from Anbar province and 25 from Salahuddin province) were collected from both sexes dogs with different global breeds, different ages. These swabs were cultured onto blood, nutrient and MacConkey agars, then the colonies were purified on nutrient and MacConkey agars. A gram stain and biochemical tests were done including catalase, oxidase and TSI. The results of isolation and identification showed that *Salmonella* spp. were isolated from 5 out of 14 puppies (35.7%), while *E. coli* from 9 (64.3%) and *Serratia* spp. from 1 (7.1%), whereas, from adults, *salmonella* spp. isolated from 9 (25%) dogs and *E. coli* from 24 (66.7%) out of 36 adult dogs.

It is concluded that *Salmonella* spp. and *E. coli* are the most prevalent in asymptomatic dogs and puppies in Anbar province and Salahuddin which means that the dogs are a reservoir for these bacteria and it is considered as a bad indication for transmission of this pathogen to human being and other animals.

Key words: Facultative anaerobic, dog, E. coli, Salmonella, puppies.

Introduction

Dogs are the pet animals that have been kept from 14 centuries, numerous studies have shown that pets play an important role in human life, and the infected pets threaten the lives of individuals, especially those immunocompromised, it has been found that pet dogs that live in contact with human have a significant role in transmitting diseases to their own^(1; 2).

Dogs transmit viral and bacterial diseases to humans being through saliva, contaminated feces and urine or via direct contact, and the most important bacteria that transmitted by dogs are *Salmonella* spp., *Yersinia* spp., *Capnocytophaga* spp., *Coxiella burnetii*, *Staphylococcus intermedius* and *Leptospira* spp., in addition to MRSA⁽³⁾. It has been documented that dogs are potential reservoirs of pathogenic *Salmonella* spp. and *E. coli*⁽⁴⁾. The most common sources of *Salmonella* spp. and *E. coli* in dogs are from chicken and meat that undercooked⁽⁵⁾.

The subclinical carrier cases in dogs are regarded as the common form of salmonellosis seen in dogs which shed these organisms in feces without showing clinical

signs and contaminate the surrounded environments⁽⁶⁾.

It has been reported that the prevalence of dogs which carry *E. coli* is 26.9%⁽⁷⁾, whereas⁽⁸⁾ reported that the *Salmonella* prevalence in dogs varies greatly between 5% to 70%.

The most prevalent bacteria isolated from dogs were *Salmonella*^(9; 10, 11, 12), *E. coli*^(13, 14, 15; 16).

This study was aimed to isolate the facultative anaerobic bacteria from canine feces.

Materials and method

Animals

From March 2019 to the end of April 2019, A fifty dogs (25 dogs from Anbar province and 25 from Salahuddin province) from different global breed and both sexes at 2 months-6 years of age were used in this study.

Examination of animals

All animals were examined clinically for

temperature, pulse and respiratory rates and for presence of any abnormal clinical signs.

Collection of the Samples:

A fifty fecal swabs with transport media were collected and transported anaerobically by special containers to the college of veterinary medicine, universities of Fallujah and Tikrit lab's for bacterial isolation and identification.

Bacteriological examination:

The isolation and identification of bacteria from samples were done according to (17), all swabs were cultured on nutrient, blood and MacConkey agars and incubated for 24-48 hours. at 37°C. in anaerobic jar with 10% CO₂. The colonies were subjected to Gram stain, then suspected isolates subcultured on MacConkey, EMB

and nutrient agars for purification and characterization of the colonies. Catalase, oxidase and other biochemical tests includes TSI, Indole and citrate were done for identification of the isolated bacteria.

Results

All animals that were clinically examined showed normal signs and parameters and appeared to be healthy.

1. Bacteriological isolation:

In the present study, culturing of faecal samples from 50 dogs and puppies revealed a presence of some gram negative bacteria including *E. coli*, *Salmonella* spp. and *Serratia* spp.

Cultural and biochemical characteristics of different species of bacteria isolated from faecal samples of affected dogs are depicted in figure 1.



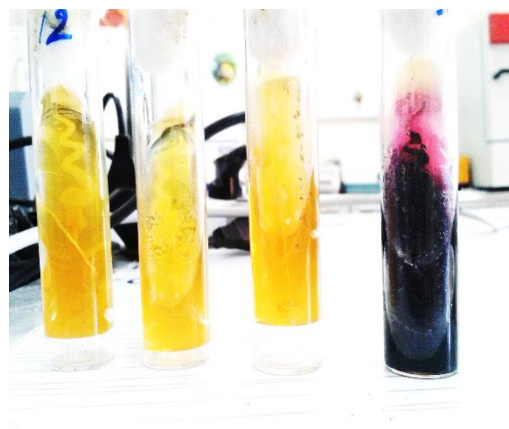
a) *Salmonella* spp. on SS agar



b) *E. coli* on EMB agar



c) Indole for *E. coli*



d) TSI, *Salmonella* spp. on right and *E. coli* on left

Figure 1. Different cultural appearance and biochemical tests

2. Rate of infection

Out of 14 puppies, only 5 (35.7%) had a subclinical infection with *salmonella* , 9 (64.3%) with *E. coli* and 1(7.1%) with *Serratia* spp., while the adults revealed 9(25%) dogs with *salmonella* spp. and 24 (66.7%) with *E. coli*, while there was not infection with *Serratia* spp. (Table 1).

Table (1) Rates of subclinical infection with *Salmonella* spp., *E. coli* and *Serratia* spp. of puppies and adults.

Animals	No. of animals	Animals positive For <i>Salmonella</i> spp.	%	Animals positive For <i>E. coli</i>	%	Animals positive For <i>Serratia</i> spp.	%	Animals negative for culturing	%
Puppies	14	5	35.7	9	64.3	1	7.1	0	0
Adults	36	9	25	24	66.7	0	0	2	5.6
Total	50	14	28	33	66	1	2	2	4

Discussion

Many studies were done to estimate the incidence of *Salmonella* spp. in puppies and dogs, Carter and Quinn⁽¹⁸⁾ and Sanchez *et al.*⁽⁶⁾ found that the percentages of *Salmonella* in clinically appeared healthy dogs was ranged between 0- 44 % , this results were in agreement with our results.

At the opposite side, the current results were disagree with many researches, the study of Shimi *et al.*⁽¹⁹⁾ in Iran was performed to detect *Salmonella* in feces of 181 dogs, they found that 28 (15.5 %) were carry the *Salmonella*. Also, Kocabiyik *et al.*⁽²⁰⁾ found that dogs positive for *Salmonella* were 11 % in Turkey, also , Fukushima *et al.*⁽²¹⁾ examined stray dogs that appeared healthy and found that the percentages of carrying *Salmonella* was 5.9 % in Japan. While the percentages of *Salmonella* in feces of stray dogs found in Taiwan were 6.3 %⁽²²⁾.

The reason for presence a higher percentages of *Salmonella* as observed in our study may be due to the potentially higher exposure of dogs to this genus of bacteria.

The results of the current study are compatible with the results of Ojo *et al.*⁽⁷⁾ who showed that the percentage of *E. coli* in apparently healthy dogs was 26.9% , while the presented results were disagree with Beutin⁽²³⁾ who examined the healthy dogs for presence of *E. coli* and they found that the percentages of this bacteria ranged

from 3.2 to 12.3%. Also, it has been reported that the percentages of *E. coli* was 1.1% in healthy dogs⁽²⁴⁾, while in Japan was 0.16%⁽²⁵⁾.

Serratia spp. and *Escherichia coli* were also isolated from bacteriological culture of fecal swabs obtained from dogs^(26;27).

Hancock *et al.*⁽²⁸⁾ reported that the higher percentages of *E. coli* and other bacteria is due to younger age susceptibility, transport, sudden alteration in feed and using of antimicrobial therapy which may lead to disorder in microflora of intestine.

Conclusion

These results refer to that large percent of dogs that appear clinically healthy may carry *E. coli*, *Salmonella* spp. or other bacteria and may be act as a source for infection to human being and other animals , and this is considered as a bad indication for transmission of these pathogens to human , and the dogs act as a good reservoir.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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