

## The Anti-microbial Effect of Zataia Multiflora Drops on Three Bacterial Species Cause Gastrointestinal Disease

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### INTRODUCTION

Gastroenteritis is considered as one of the most important infectious disease of mankind [1, 2]. Several bacterial species, particularly enterobacterial members are involved in induction of this disease. The treatment is still done with administration of antibacterial agents. However, bacterial resistance is the major problem during the course of treatment. Therefore replacement of antibacterial agents with a herbal medicine may overcome this problem [2, 3].

Zataria is one the most reputable herbal medicine in Iranian traditional medicine. This medicine is practically useful for treatment of gastrointestinal infection [3-5]. Zataria is the member of Laminala family which is present in phenal evaporating oils [5]. The most effective components in this drug is Thymal and Caracrol which has anti - bacterial effect [ 3, 5].

Recently, Rameani and colleagues [1] have shown that the afore mentioned components have spasmodic and antimicrobial effects. This is very useful to eliminate the diarrhea as well as digestion discomforts. The most dangerous agents in causing gastrointestinal disease is *E. coli* Entrotoxigenic (ETEC) species [4, 7]. In addition, the high rate of disease prevalence may elevate the antibiotic resistance [8]. The above concerns encouraged us to conduct a research study on the effect of Zataria drop on three species of mentioned species involved in bacterial diarrhea.

### MATERIALS AND METHODS

3-4 colonies of species of *E. coli*, *S. enteritis* and *S. dysanteria* were suspended in three test tubes containing 0.5 ml of saline. Tubes were all incubated at 37°C for 24 h.

In order to standardize the number of bacteria, McFarland 0.5 standard was prepared by adding 99.5 ml of 1% sulfuric acid to 0.5 ml of 1.175% barium sulfate solution. Then the suspension of each bacterium was compared to McFarland 0.5 to obtain 1.510<sup>8</sup> bacterium per milliliter (CFU ml<sup>-1</sup>).

To determine the susceptibility of the mentioned bacteria, Muller - Hinton agar (Merk) was prepared and the surface of medium was inoculated with a swab of sample separately [10]. Then, using paustor pipete, a well was made on the medium in which 2 drops of filtered Tymul was poured.

Simultaneously, three antibiotics disks such as Ampicillin, Cipropheloxacin and Co-tremoxazole were embedded as recommended by Mahan CR [10]. Following incubation of media for 24 h at 37°C, the inhibition zone of Zataria and antimicrobial disks were measured and recorded. Note that the same procedure was repeated ten times and the average of results were recorded for statistical analysis.

### RESULTS

As Table 1 shows, the inhibition zone obtained for *E. coli* against Zataria, Ciprofluxacin were both sensitive (S), but it was found to be resistance (R) for both Ampicillin and Co-trimoxazole.

Zataria, Ciprofloxacin and Co-trimoxazol were all sensitive (S) for *S. enteritis* whereas resistance for Ampicillin.

For *S. dysenteriae*, the zone of inhibition was sensitive for all Zataria, Co-trimoxazole and Ciprofloxacin but resistance for Ampicillin.

Ciprofluyacin was found to be the most sensitive for all three species, but using t-test, the Zataria was

Table 1: Average of inhibition zone of bacterial species

<i>S. dysantheriae</i>		<i>S. enteritis</i>		<i>E. coli</i>		
S.D.	X <sup>-</sup> (mm)	S.D.	X <sup>-</sup> (mm)	S.D.	X <sup>-</sup> (mm)	Antibiotics
0.55	36.25 (S)	0.50	39.46 (S)	0.50	38.67 (S)	Zatarial drop
0.52	41.61 (S)	0.52	33.50 (S)	0.52	34.62 (S)	Ciproflaxacin
0.55	24.52 (I)	0.52	31.65 (S)	0.00	16.40 (R)	Co-trimoxazole
0.00	0.00 (R)	0.55	10.50 (R)	0.00	5.10 (R)	Ampicillin

I: Intermedaite R: Resistance S: Sensitive

significantly more sensitive when compared to Co-trimoxazole and Ampicillia (p=0.01).

## DISCUSSION AND CONCLUSIONS

Plants are considered as natural materials which are well-adapted to humans nature. In addition, Zatarra multiflora has been under extensive investigations by physicians and natural scientists [1, 5, 6]. In this study the anti-microbial effect of oral drop of Zataria multiflora contained 4.1 mg Thymol (manufactured by Barig Essence Co. Iran) on three bacterial species of *Salmonella enteritis*, *Shigella dysantriea* and *E. coli* causing gastroenteritis was investigated in full.

In 1999, Marrino and associates [11] studied the effect of Zataria flower as well as leaf extracts on six species of Gram positive pathogenic bacteria together with nine species of Gram negative bacteria. The results showed that Zataria flower extracts in comparing with the leaf extracts was more effective on bacterial species. Also, the direct application of Zatarra flower on bacterial species was effective as well. It was also noted that only a limited number of bacteria were able to have 50% of their metabolic activities. It was important to observe that *E. coli*, which is the main causative agent for gastroentritis in Iran, showed the highest sensitivity following application of Zataria flower extracts [7, 10]. Our results also proved that *E. coli* showed intermediate sensitivity following addition of Zataria drop. The difference between the results from Marrino's [10] and ours on *E. coli* pathogen may be due to low concentration of Thymal and Caracrol present in the oral drops. In addition, high potency of *E. coli* in mutation against drugas may be another reason which supports our findings [8]. Also, isolated species from different condition and even environment have their specific character which may domain their genetical properties [7, 8].

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