



Review of Pharmacological Effects of *Zataria multiflora* Boiss. (Thyme of Shiraz)

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ABSTRACT

Herbs were always important in supplying hygiene and society health regarding the treatment and diseases prevention and it still does. Traditional medicine has been used since a thousand years ago for the therapeutic objectives and among them using essences and herbal plants has a considerable position. Our study showed thymol and carvacrol are main effective combinations of thyme and can influence warm positive and negative bacteria. *Zataria multiflora* Boiss. is a perennial plant which mainly grows in Iran, Pakistan, and Afghanistan. *Zataria multiflora* Boiss. is used in Iranian traditional medicine for its various effects including antiseptic, analgesic, and carminative properties. New researches showed it has analgesic, antispasmodic, antioxidant, antibacterial, antitussive, and anti-inflammatory impacts.

Keywords: *Zataria multiflora* Boiss., Thyme of Shiraz

INTRODUCTION

Herbs play important role in supplying hygiene and society health regarding the treatment and diseases prevention and it still does. This part of the natural source is as old as the humankind and was considered as the most important sources for food and pharmaceutical supplying during last generations. Historically, plants were important in the societies' development and there were lots of investigations regarding products and natural pharmaceutical material finding in the history, but the important point is that less than 10% of 250,000 world plant types were used for more than biological aims. The society's tendency toward herbal treatment and generally natural products treatment has increased specially in last years and its main reason is that the side effects of drugs and environmental pollutions are proven which threat the health of the earth. They had to use different chemical materials to refine plants due to the variety of influential biological materials. According to the survey of WHO, more than 80 per cent of people in developing countries or poor and far areas use herbs to treat their diseases.

Thyme of Shiraz

One of the ways to resist bacteria is using herbs instead of antibiotics and one of them is the thyme of Shiraz. The dry leaves of it are used in the food products as retentive and flavour [1] which constrains the innate security [2] and prevents from the progress of some microorganisms like bacteria and fungus [3]. Using natural flavours as antibacterial combinations is a good solution to control pathogenic bacteria and increasing the time of processed foods durability and causes the hygienic dangers and economical damages to increase which are due the progress of microorganism cause of the nutritional sources [4].

This herb is used as the flavour in lots of Iranian foods and is antioxidant, antibacterial and disinfectant [4]. This herb is made from the tree and is one of the branches of mints and is traditionally used as the flavour in foods. The aromatic essence of it is one of the most effective antioxidant and antimicrobial essences which is due to having monoterpenes combinations [5]. Thymol is one of the important combinations of the oxide monoterpene and is antibacterial and

antifungal and avoids mycotoxins production which is found in the essence of thyme and lots of other herbs [6]. Nowadays, investigators attend to the herbs usage as diseases treatment due to the side effects of chemical drugs, one of them is thyme of Shiraz which is descendent from the Labiatae family and its scientific name is *Zataria multiflora* and its effective materials are thymol and carvacrol [7]. This herb has lots of positive features like it helps the digestion and its syrup eliminates the dyspepsia [8]. According to relics of past doctors, this herb is influential in treating convulsion, respiratory diseases, muscles spasm and indigestion [9] its most common effects include antispasmodic of muscles and antimicrobial feature [10].

Analgesic and anti-spasmodic activity

According to an empirical study, the effect of thyme in the treatment of IBS was analysed and according to the results, the 2 per cent thyme essence is more effective in the treatment of the mentioned disease in comparison with the 1, 3 and 4 per cent of it [11].

According to the searches, there was no overall pharmacological and clinical investigation about this herb due to its absolution in the west. This herb is native of Iran and its essence is similar to the essence of thyme oil of Europe and its antispasmodic and anti-digestive property is proven [12].

Studying the thyme effect on straight muscles of the pig trachea, confirm the antispasmodic and alpha F2 in the thyme [13]. According to the results, this herb is able to control well the contradiction from the cellular polarization and so is capable of controlling spasm with different sources [11].

As mentioned before, in the initial dysmenorrhea, the contradiction of straight muscles of the uterus made by prostaglandin causes some colic pain, spasmodic and pains similar to the parturition in the stomach underneath part and back. These contradictions might take about various minutes and make some inner uterus pains higher than 60 mmHg [14]. So, it seems that antispasmodic effects of thyme could treat the pain of patients suffering from the initial dysmenorrhea. So, the antispasmodic features of this herb are attributed to its phenol combinations and the main part of it is thymol [15]. So, its antispasmodic effects could be due to the thymol but it should be analysed more. Flavonoid of this herb can control well contradictions due to the cellular polarization and it blocks the calcium channel [16]. According to 16 studies about rats, the extract of thyme of Shiraz has some analgesic and anti-inflammatory effects (chronic and intense) [17].

Analgesic effects of the blue extract and essence of this plant is proven [18]. Ramezani et al. analysed about the analgesic effects of this herb on rats and resulted that thyme works through affecting the opioids, release control of prostaglandins and effecting pain receptors [19].

Gharib naseri et al. investigated about the anti-contradiction effects of the extract of thyme of Shiraz on the uterus of rat and understood that the effect of thyme blue extract on the uterus contradiction was not due to the adrenergic agonist, anti-cholinergic and opioids and it seem that the extract shows the controlling effect through the obstruction of calcium channels dependent on the voltage and controlling the calcium release from inner cellular sources [20]. So, these studies confirm the antispasmodic and analgesic features of thus herb that were mentioned in the traditional medicine.

Anti-microbial activity

According to past studies, the extract of thyme of Shiraz can avoid anti-haemorrhagic *Escherichia coli* of *Salmonella*, *Shigella*, *Staphylococcus aureus*, *Klebsiella*, and *Enterococcus* [21]. Also, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Alcaligenes* and *Cryobacterium meningospeticum* are in the group of non-fermentative bacteria cannot progress by this extract [22-31].

According to investigations in 2002, the thymol and carvacrol are the effective factors and they affect gram positive and negative bacteria [32]. Generally, the higher amount of phenolic substance, the antibacterial property against nutritional pathogens will be more. The antibacterial activities of different types of thyme regard the phenolic combinations like carvacrol and thymol and then linalool and parasmyn [33].

Probably the mechanism of effect of phenol combinations includes these items; the disorder of the cytoplasmic tissue, proton dynamic force distribution and electronic flow, cellular content coagulation [34,35]. Avoiding the production and activity of toxins by the herbal essences could be indirectly made by the function of some factors like copy and

translation or indirect inactivation of toxins. So, herbal essences are better than antimicrobial substances, effecting the objective place due to the multidimensional property. On the other hand, the natural state of herbal essences has caused consumers to prefer them to chemical antimicrobial and synthetic substances [36].

There were lots of analysis regarding the synergist effect of herbal essences different details in different nutrition to increase the antimicrobial effect for example the summed effect of carvacrol and thymol is more than their separated effect [34,37,38].

The antimicrobial effect of thyme of Shiraz and sumac was analysed against *Bacillus cereus*, *Staphylococcus* and *Fylukukus*, *Escherichia coli* and *Salmonella typhi* [37]. We analysed the effect of several plants volatile oil (thyme, tarragon, oregano, mint, and cumin) against *Staphylococcus aureus* and *Escherichia coli* and it got clear that these combinations are anti-microbial and the most effect regards thyme if Shiraz to treat mentioned bacteria [38]. Also, we analysed the effect of thyme of Shiraz on *Staphylococcus aureus* and *Salmonella typhimurium* and according to the results, the increase of density of this essence, the logarithm of studied bacteria decreases in the same situation [39].

According to the investigation of Osman Sangelic in 2003, the essence of thyme is able to avoid some bacteria like *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Also, An Saing investigated about the avoiding property of thyme essence on haemorrhagic *Escherichia* [32,40].

In a recent article by Aghili et al. [41] they showed *Zataria multiflora* extract has antimicrobial effects and might be applied for disinfection of elastomeric ligatures [42,43].

A study showed that *Zataria multiflora* Boiss. was able to remove *Candida* cells which adhered to the denture surface like nystatin [44]. Also, other articles showed the same results [45-47].

Effect on Reproduction

According to recent studies, herbal plants are capable of effecting all body organs including the reproduction system [48] and the extract of some of them can show its effect during the pregnancy [49] or the childbirth time which shows the importance of mother nutritional diet importance. Thymol is anti-cumulatively active and avoids the cohesion of bacteria strongly and could be effective in the prevention of thrombosis and atherosclerosis [50]. The high amount of thyme usage has many toxic effects and could make some disorders in the discipline of the period time. Although it is free to use it during pregnancy and milking with normal density, that should not be used largely in the pregnancy time [51,52].

The most important period of the pregnancy is its second third in which most of organs are being made and damaging substances in this period can cause the foetus to abort or be mentally retarded [53,54]. Investigators study about the effect of different factors like plants extract in this period of the pregnancy [55-57].

According to an investigation by Domaracky et al. on the extract of some plants like *Salvia officinalis*, thyme, oregano on the progress of rat foetus before the in plantation, none of the added plants are effective in the foetus progress [56].

According to Samejima et al., the existent Luteolin in the thyme extract is anti-mutagenic [57]. Also, according to Ipek et al., the separated carvacrol from thyme does not increase the sisterhood chromatid exchange in human Leukocytes [58]. On the other hand, according to Buyukleyla and Rencuzogullar, the low density of thymol in the thyme increases the sisterhood chromatic exchanges in human Leukocytes and chromosomal abnormality in the human leukocytes [59].

According to Aydin et al., just high densities of thymol and gamma-terpinene of thyme damage DNA [60]. According to Azirak et al., thymol and carvacrol damage the chromosome depending on the time and density and decrease the cellular division of marrow cells of rats [61].

Marzieh Sodouri et al. [62] showed that *Zataria multiflora* Boiss. did not have effect in premenstrual syndrome. But in another study *Zataria multiflora* was effective in the treatment of primary dysmenorrhea [63].

CONCLUSION

Traditional medicine has been used since a thousand years ago for the therapeutic objectives and among them using essences and herbal plants has a considerable position. Recently using harmless combinations and active natural biologic ones is considered as the most important combinations because it is possible to apply substances from

essence and plant extracts to maintain and keep nutritional material and as some therapeutic substances for new diseases and microbial infections [64,65]. There are lots of studies using essences and aquatic and alcoholic extracts of thyme on different bacteria. According to this investigation, thymol and carvacrol are main effective combinations of thyme and can influence gram positive and negative bacteria [42,66].

Since herbal plants using is more harmless than artificial drugs it seems logical to use the extract of thyme of Shiraz as herbal plant to treat the initial dysmenorrhea specially for people suffering from digestive diseases. It is recommended to do some other researches regarding determining the best effective dose of thyme of Shiraz to treat the initial dysmenorrhea.

Zataria multiflora Boiss. is a perennial plant [67] which mainly grows in Iran, Pakistan, and Afghanistan [68]. *Zataria multiflora* Boiss. is used in Iranian traditional medicine for its various effects including antiseptic, analgesic, and carminative properties [69]. New researches showed it has analgesic, antispasmodic, antioxidant, antibacterial, antitussive, and anti-inflammatory impacts [19,25,70].

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