



## Research Article

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### MEDICINAL BENEFITS OF ANISE SEEDS (*PIMPINELLA ANISUM*) AND *THYMUS VULGARIS* IN A SAMPLE OF HEALTHY VOLUNTEERS

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Received on: 07/05/17 Accepted on: 20/06/17

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DOI: 10.7897/2277-4343.083150

#### ABSTRACT

Herbal medicine plays an important role in recent therapeutic strategies in different diseases according to estimation of World Health Organization. Anise was first cultivated in Egypt and the Middle East, but was brought to Europe for its medicinal value. It used medicinally as a stimulant, carminative, and flavoring agent, coughs, flatulence, respiratory infections, asthma, indigestion as well as hormone replacement therapy for menopause. In addition, thyme is used widely for different ailments including abscess, acne, appetite stimulant, anxiety, arthritis, asthma, burns, cancer, cellulitis, depression, gastritis, colic, cystitis, dermatitis and many other disorders. The aim of this study is to evaluate the health benefits of both anise and thyme in a sample of healthy volunteers. Ten healthy volunteers were participated in this study with age 22-24 years. They allowed taking anise seeds and thyme leaves 2g twice daily as hot macerated drinks (tea) for 4 weeks. All biochemical parameters (FBS, CBC, lipid profile, liver, kidney tests and testosterone level) were taken before commencing the trial and after. Body weight and blood pressure were measured weekly. Outcomes of this study showed that most of the biochemical parameters were reduced especially liver, kidney function tests, FBS, lipid profile but insignificantly. Regarding to the blood pressure thyme had showed significant reduction in SBP, DBP and MAP. Both herbs improved the level of testosterone. From this study, it suggested that both herbs had health benefits for different ailments depending on the duration of consumption.

**Keywords:** Medicinal Benefits, *Pimpinella anisum*, *Thymus vulgaris*, Healthy Volunteers

#### INTRODUCTION

Plants have been used as food and for medicinal purposes for centuries, some of them have played a significant role in maintaining human health and improving the quality of human life for thousands of years<sup>1</sup>.

The World Health Organization estimated that 80% of the earth's inhabitants relies on traditional medicine for their primary health care needs and most of this therapy involves the use of plants extract or their active components<sup>2</sup>. Those extracts are specifically for their antiseptic properties and beneficial effects on the digestion<sup>3</sup>. Aromatic plants have been used traditionally in the therapy of some diseases worldwide for a long time. As an aromatic plants, anise (*Pimpinella anisum* L.), Cumin (*Cuminum cyminum*), Rosemary (*Rosemarinus officinalis*) is an annual herb in Iran, India, Turkey, Egypt and many other warm regions in the world. As a medicinal plants, all of them have been used as stimulating effect of digestion and anti-parasitic<sup>4</sup> antibacterial<sup>5,6</sup> and antifungal<sup>7</sup>. However, Anise also called aniseed,<sup>8</sup> is a flowering plant in the family *Apiaceae* native to the eastern Mediterranean region and Southwest Asia<sup>9</sup>. Its flavor has similarities with some other spices, such as star anise, [8] fennel, and licorice. As with all spices, the composition of anise varies considerably with origin and cultivation method. These are typical values for the main constituents. Moisture: 9-13%, Protein: 18%, Fatty oil: 8-23%, Essential oil: 2-7%, Starch: 5%, N-free extract 22-28% and Crude fiber: 12-25%. Essential oil yielded by distillation is generally around 2-3% and anethole makes up 80-90% of this<sup>9</sup>. The main use of anise in traditional European herbal medicine was for its carminative effect<sup>4</sup>, diarrhea, menstrual cramps<sup>10</sup> and colic<sup>11</sup>. The essential oil has reportedly been used as an insecticide against head lice and mites<sup>12</sup>. Additionally, Thyme is of the genus *Thymus* of the mint family (*Lamiaceae*), and a relative of the

oregano genus *Origanum*<sup>13</sup>. Oil of thyme, the essential oil of common thyme (*Thymus vulgaris*), contains 20–54% thymol<sup>14</sup>. Thyme essential oil also contains a range of additional compounds, such as p-cymene, myrcene, borneol, and linalool<sup>15</sup>. Thymol, an antiseptic, is an active ingredient in various commercially produced mouthwashes such as Listerine<sup>16</sup>. Other components including carvacrol, and other quantities of geraniol, terpineol, linalool, trans-tuayanol-terpineol. flavonoids: derivatives of apigenol and luteolol, phenolic acids: caffeic, rosmarinic. abundant tannins (10%), Saponosides<sup>17</sup>.

The aim of this study is to evaluate the health benefits of two famous plants anise seeds and thyme in a sample of healthy volunteers through measuring the following parameters: Complete blood count (CBC), Liver function enzymes (AST and ALT), and Kidney function tests (Creatinine and urea). Lipid profile (cholesterol, LDL, TG and HDL), Hormones (testosterone), Fasting blood sugar, Blood pressure (SBP, DBP and MAP) and body weight are also measured.

#### MATERIALS AND METHODS

**Plants:** Anise seeds (*Pimpinella anisum*) and *Thymus vulgaris* were purchased from special herbal store in Sana'a City and identified by Botanist in Faculty of Agriculture-Sana'a University.

**Participants:** 10 Yemeni males were participated in this study. Their ages range from 22-24 years old.

#### Study Design

Ten male Yemeni individuals participated in this study. Their ages range from 20-24 years old and the average weight was (60±2 kg), healthy and did not take any medications or herbal

remedies throughout the duration of this study. Food and drinks were kept in fixed situation. They were randomly divided into two groups. First group: consumed anise seeds 2g twice daily as a form of anise tea (n=5) and the second group: consumed thyme leaves 2g twice daily (n=5), the herbs should steep within the water for a period of 10 minutes and then strained. Studied parameters were measured before and after 4 weeks (duration of this study)<sup>18</sup>. Complete blood count (CBC)<sup>19</sup>, lipid profile<sup>20-22</sup>, Liver function enzymes (AST and total and direct bilirubin)<sup>23, 24</sup> Kidney function tests (Creatinine and urea)<sup>25,26</sup>, Hormones (testosterone)<sup>27</sup>, Fasting blood sugar<sup>28</sup>. Blood pressure (SBP, DBP and MAP) and body weight were measured weekly. University Ethics Committee approved this study and all the steps were covered the research ethics according to the guideline before commencing this work.

**Data Analysis:** Data entry and analyses were carried out using (SPSS) version 20.0 statistical program using T test with a significance level less than 0.05.

**RESULTS**

From the present study, it was found that both herbs had effects on complete blood count varied from increasing or decreasing the parameters of complete blood count as shown in Table 1.

With regarding the effect of both herbs on liver function tests, it was found that they improve liver function tests but insignificantly as shown in Table 2.

From the outcomes of the present study, it was found that either anise seeds or thyme had improvement effect on the kidney function enzymes, especially urea as well as testosterone hormone as shown in Table 3.

However, the effect of both herbs produced lipid lowering and hypoglycemic effects as shown in Table 4.

In addition, the results of the present study showed that anise seeds increased body weight, while thyme reduced it when they are evaluating weekly through this trial period as shown in Figure 1.

**Table 1: Effect of daily consumption anise seeds and thyme for 4 weeks on (Mean ±SE) Complete Blood Count (CBC) in healthy volunteers**

Parameters	Anise seeds		Thyme leaves	
	Before Mean ±SE	After Mean ±SE	Before Mean ±SE	After Mean ±SE
Hb g/dl	16.08±0.658	15.7500±1.01	17.16±0.478	17.16±0.639
T.WBC X10 <sup>9</sup> /L	5.0850±0.45	5.3000±0.514	5.50±0.64	5.47±0.496
Neutrophils %	30.88±2.60	35.3±3.05*	39.84±3.66	38.26±3.0
Lymphocyte %	51.96±2.41	46.72±3.81*	43.84±2.53	43.14±2.99
Monocyte %	9.02±0.629	8.66±0.75	9.02±0.711	8.50±0.920
Eosinophil %	5.32±0.954	4.580±0.83	4.88±0.63	4.120±0.908
Leucocyte%	2.700±0.108	2.30±0.318*	3.460±0.496	2.680±0.303*
Platelets X10 <sup>9</sup> /L	295.75±50.94	268.0±35.8	290.6±30.187	296.8±26.4

\*Significant as compared with control (before) at p< 0.05

**Table 2: Effect of daily consumption anise seeds and thyme for 4 weeks on (Mean ±SE) Liver function tests in healthy volunteers**

Parameters	Anise seeds		Thyme leaves	
	Before Mean ±SE	After Mean ±SE	Before Mean ±SE	After Mean ±SE
AST (U/L)	21.86±0.575	19.40±2.84	31.40±5.368	25.80±5.35
T. Bilirubin (U/L)	16.27±4.64	10.53±2.27	13.40±2.46	12.8640±2.786
D. Bilirubin (U/L)	4.050±.68130	3.60±0.573	4.74±.96364	4.260±0.818

**Table 3: Effect of daily consumption anise seeds and thyme for 4 weeks on (Mean ±SE) Kidney function and hormone tests in healthy volunteers**

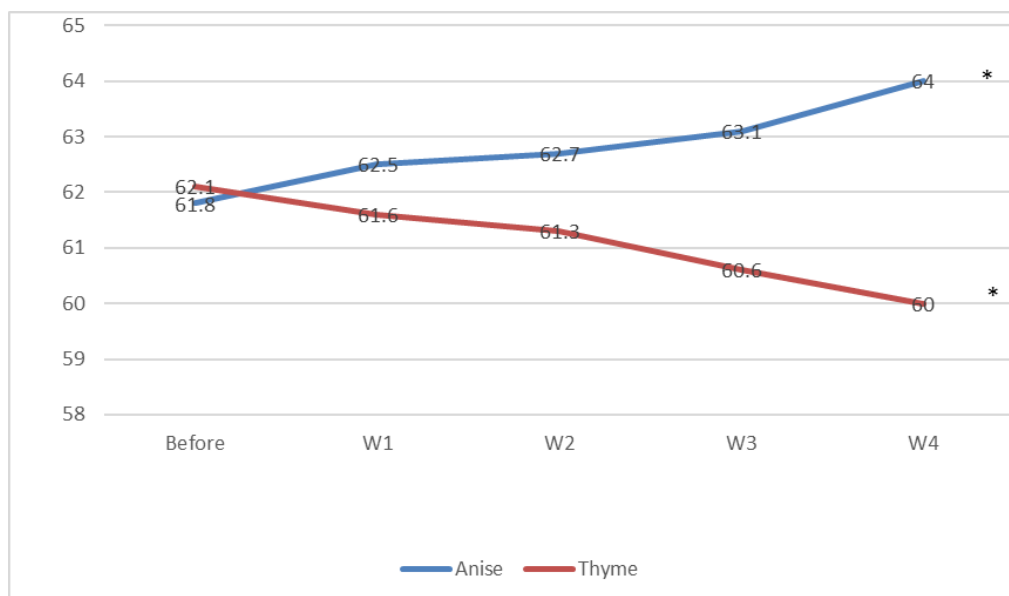
Parameters	Anise seeds		Thyme leaves	
	Before Mean ±SE	After Mean ±SE	Before Mean ±SE	After Mean ±SE
Creatinine (mg/dl)	60.48±9.779	63.1000±7.22138	66.06±3.305	61.08±4.808
Urea (mg/dl)	23.25±2.69	21.00±2.429	25.00±3.406	21.20±2.083
Testosterone (ng/dl)	6.56±1.308	7.60±.93702	7.316±1.236	7.78±1.264*

\*Significant as compared with control (before) at p< 0.05

**Table 4: Effect of daily consumption anise seeds and thyme for 4 weeks on (Mean ±SE) Lipid profile and fasting blood sugar in healthy volunteers**

Parameters	Anise seeds		Thyme leaves	
	Before Mean ±SE	After Mean ±SE	Before Mean ±SE	After Mean ±SE
T. cholesterol (mg/dl)	160.9±5.632	156.2±11.1	159.9±8.160	157.0±10.04
LDL-c (mg/dl)	104.2±5.847	97.43±10.549	95.04±9.965	93.80±10.42
TG (mg/dl)	102.34±12.57	80.92±7.058	117.1±24.01	107.70±21.65*
FBS (mg/dl)	4.80± 0.201	4.45±0.170*	4.78± 0.109	4.64±0.24

\*Significant as compared with control (before) at p< 0.05



**Figure 1: weekly evaluation of (Mean  $\pm$ SE) body weight (kg) through daily consuming anise seeds and thyme leaves for 4 weeks**

\*Significant as compared with control (before) at  $p < 0.05$

Both herbs produced beneficial effects on blood pressure but it was significantly with thyme group as it reduced all the components of blood pressure (DBP, SBP and MAP) as shown in Table 5.

## DISCUSSION

In Middle East, especially Egypt anise seeds are used widely as a hot drink given daily for mothers when they are nursing for more production of milk and for many other health purposes<sup>29</sup>. In addition, thyme is used traditionally for health disorders starting from dental plaque end with diuretic effect. The outcomes of the present study showed that both herbs (anise and thyme) had potent health benefits. They improved liver, kidney function tests as they reduced the important parameters including AST, total and direct bilirubin, creatinine, urea, and CBC. This effect is referred to the active constituents present in both herbs especially essential oil. Anise fruits, called anise seed, contain around 1.5 to 5.0% essential oil, which is composed of more than 90% volatile phenylpropanoids like trans-anethole followed by  $\gamma$ -himachalene, methyl chavicol (estragol), anisaldehyde,  $\beta$ -himachalene and  $\alpha$ -zingiberene<sup>30</sup>. The main essential oil presence in anise seeds is anethole, estragol, p-anisaldehyde, anise alcohol, acetophenone, pinene and limonene. Besides that, anise seeds are considered as rich sources of pyridoxine, calcium, iron, copper, potassium, manganese, zinc and magnesium. 100 g dry seeds contain 36.96 mg or 462% daily-required levels of iron. Potassium is an important component of cell and body fluids that helps control heart rate and blood pressure<sup>31</sup>. However, pods of anise contain the most important chemical substance that has potent antiviral activity known as shikimic acid that manufactured Tamiflu which is active against avian and swine flu<sup>32</sup>. One study agreed with outcomes of this study as anise seeds have different effects on blood pictures. They stimulate spleen for more production of RBCs, besides that they increase WBCs which determine the availability the immunological system that fight bacteria, viruses, parasites or even poisons by pathological state the superiority of nutrient stimulation of cytokines secretion<sup>33</sup>.

On the other hand, anise showed lower concentration of lymphocytes and monocytes, lymphocytes divided to T and B-lymphocytes. They are granulomatous WBCs and taken as indicator for immunological state of human<sup>34</sup>. B-lymphocytes formed antibodies (Ab) for the most invasive pathogens, which called immunoglobulin to form humeral immunity. T-lymphocytes matured in thymus gland and formed cellular immunity by cytokines secretion that will stimulates macrophages, Eosinophil, basophiles and Neutrophils<sup>35</sup>. With regarding to thyme, it composed from high level of thymol which is one of the important essential oil, that is responsible for the most health benefits, especially that for respiratory congestion, bronchitis, whooping cough and catarrh (inflammation of upper respiratory tract mucous membranes)<sup>36</sup>. Additionally, thyme contains many other volatile oils including carvacol, geraniol and borneol as well as zea-xanthin, lutein, pigenin, naringenin, luteolin, and thymonin which they are the important antioxidants phenolic flavonoid present in thyme. Minerals existing in thyme leaves have many roles in the body, iron is important in blood formation particularly red blood cells, while potassium controls heart rate and blood pressure<sup>37</sup>. However, thyme is considered as a rich source in vitamins that play an important role in immune system against infections and inflammation and as a stress reliever though stabilization the brain neurotransmitters especially GABA<sup>38</sup>

In the present study, anise seeds consumed for four weeks increased body weight while thyme reduced body weight. In addition, both herbs reduced blood pressure (SBP, DBP and MAP) but it was significantly with thyme. Many studies are supported this findings as they found that thyme can produce hypotension in human as well as in experimental animals<sup>39, 40</sup>. Reduction of body weight and hypotension accompanied with thyme uses, may referred to the potent diuretic effect of this herb that removed excess fluid and salts as well as toxic materials from the body<sup>41</sup>. Additionally, both herbs increased the production of many hormones. Some studies showed that essential oil of both herbs is used for many purposes including milk production in female and relief dysmenorrhea, ease childbirth, increase sexual drive as well as treatment of menopause symptoms<sup>42, 43, 44</sup>. Shanoon A.K and Mahdi S J, 2012 were found that thyme has androgenic activity as it increased in

ejaculate volume, sperm concentration, counts, movements and a significant decrease in motility and abnormality and significant increase in testis weight<sup>45</sup>.

## CONCLUSION

From the outcomes of this study, it is suggested that both herbs have closely beneficial effects on human health through improvement of the measuring functional parameters of the most important organs used in this study. Thyme showed more reducing effect especially in body weight, lipid profile especially triglycerides and blood pressure, contradictory anise seeds were shown more improvement in fasting blood sugar and increasing in body weight. Both herbs had strengthened the immunological system as well as hormonal activity. Further studies are needed in this field that focuses mainly on persons suffering from some ailments taking in considerations the sample size.

## ACKNOWLEDGMENT

Author would like to thank all volunteers who were participated in this study.

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**Cite this article as:**

Ibrahim Doa'a Anwar. Medicinal benefits of Anise seeds (*Pimpinella anisum*) and thymus vulgaris in a sample of healthy volunteers. Int. J. Res. Ayurveda Pharm. 2017;8(3):91-95 <http://dx.doi.org/10.7897/2277-4343.083150>

Source of support: Nil, Conflict of interest: None Declared

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