

Studying the Hypoglycemic Effect of Omani Thyme : Pilot Study

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Abstract— *Diabetes Mellitus (DM) is a metabolic disorder with very challenging situations that can influence the whole body health status and may even have an impact on diabetic patients' life style. DM is recognized to affect a lot of the physiological body functions due to the associated hyperglycemia, hyperlipidemia, hyperaminoacidemia, and hypoinsulinemia.*

Continuous efforts using non-medicinal supplements have been tried to control, reduce the complications of diabetes or to reduce the dose of anti-diabetic medicinal treatments for diabetic patients.

Thyme in Oman, grows as an indigenous plant especially in mountains of Rustaq town, located in the Al Batinah Region of northern Sultanate of Oman. This Pilot study aimed to evaluate the hypoglycemic effect of thyme on subjects with type 2 diabetes mellitus using a daily dose of 1000ml/day thyme tea for 6 months. Preintervention and postintervention blood glucose levels, glycosylated haemoglobin (HbA1c) levels, and body weight of the diabetic subjects were measured.

Six months of using thyme tea resulted in an appreciable lowering of fasting blood glucose and postprandial blood glucose levels. A reduction in the HbA1c level was also observed, indicating improved long-term glucose regulation.

These findings suggest the beneficial effect of thyme in controlling and regulating blood glucose levels of subjects with type 2 diabetes mellitus.

Keywords— *Diabetes Mellitus, Thyme, glycosylated haemoglobin and antioxidants activities.*

I. INTRODUCTION

According to the International Diabetes Federation (IDF), 34.6 million people have diabetes mellitus in the Middle East and North Africa. The worldwide widespread presence of DM in the year 2010 among adults has been predestined to be 6.4%. In Egypt it was expected that at least 8.6 million adults suffered with diabetes by the year 2010 (Shaw et al 2010). IDF, predicted that by 2035 there will be double the number, to around 67.9 million if there will be no action occur to reduce the danger elements

stimulating the epidemic disease of diabetes all over the world (Tuama, 2016). Diabetes mellitus Type II (DM II) is defined as a gradual circumstance in which the body loses the ability to generate sufficient insulin in the pancreas (Yong Zhao et. al., 2011), (Yanling et. al., 2014)

Researchers interested in herbal medicines, believe that the use of herbal medicines is very ancient and dates back to the period when there were no modern medicine and no information about the cellular and molecular function of body was available (Bahmani et. al., 2015). Many common herbs and spices are claimed to have blood glucose lowering effects that make them valuable for the treatment of DM II. A few reports have declared that medicinal plants can decrease health changes caused by DM. Research concerned with the antidiabetic effects of medicinal plants led to an increase in the number of people who use these natural compounds to control their diabetes (Bahmani et. Al., 2015). Herbs and other plant products are considered more natural, and economical in the management of diabetes mellitus. Control of diabetes by herbal products is becoming widespread, popular and convenient especially in developing countries (Khan and Safdar, 2003).

Ojewole et.al. 2006, studied the anti-diabetic effects of ginger (*Zingiber Officinale* Roscoe, Zingiberaceae). Ginger ethanolic extract possesses analgesic, anti-inflammatory and hypoglycemic properties in animal study. Studies showed that ginger considerably lowered lipid peroxidation by maintaining activities for the antioxidant enzymes; Super oxide dismutase, catalase and glutathione peroxidase in rats suggesting hypoglycaemic activities for ginger (Ahmed et al 2000).

Thyme (*Thymus vulgaris* L.), is an aromatic plant of the Mediterranean flora regularly utilized for therapeutic reasons. Like other different kinds, thyme is conventionally utilized for its "antiseptic, anti-spasmodic, and antitussive effects". In addition, thyme has antimicrobial, anti-fungal, anti-oxidative, and anti-viral properties (Soliman et al, 2002) and (Rasha J. Tuama 2016).

Faramoushia, (2017), claimed that there are several considerations in the field of non-drug treatments in DM II, like physical exercises and thyme supplements. He declared that only small numbers of researches have studied and investigated regarding the influence of thyme on DM II.

Since some studies showed that traditional nutritional supplements/plants together with hypoglycaemic medicines offer efficient management for diabetic situations and lifestyle, it is important to investigate different anti-diabetic plant options. Those plants which are known to have glucose-lowering effects can be consumed on a regular basis for the patients who already treated with oral hypoglycaemic drugs.

This study hypothesised that Omani thyme has an antidiabetic effect and has the ability to reduce blood glucose. We aimed to estimate the anti-diabetic effects of Omani thyme in adult Omani diabetic's patients.

II. MATERIALS AND METHODOLOGY

A group (group 2) of five Omani diabetic patients 35-45 years of age were given 1000ml/day for 6 months of thyme tea together with their prescribed blood glucose control diabetes treatment. Preparations of the thyme tea were similar for all patients. 300g of dried thyme was added to 1000ml of hot already boiled water; the mixture was allowed to soak for 3 hours before being used. The mixture was then filtered. Patients were asked to divide the produced tea into three equal portions and drink it daily 3 times, one hour before each meal for 6 months. Another group (group 1) of five Omani diabetic patients, same age group were taken only their prescribed blood glucose control diabetes treatment without the intake of thyme tea. Blood glucose levels, glycosylated haemoglobin (HbA1c) levels were examined for all subjects as their regular blood glucose control follow-up routine. Pre-intervention and post-intervention blood glucose levels, glycosylated haemoglobin (HbA1c) levels, were done for all subjects as their regular blood glucose control follow-up routine and body weight was also included. Informed consent was obtained for all study participants.



Fig.1: This figure showing the Thyme used in this study which was collected from mountain of Rustaq the town located in the Al Batinah Region of northern Sultanate of Oman

Statistical Analysis:

The statistical SPSS program (version 20.0) was used for all the analysis. The data were analyzed by one-way ANOVA and two-way ANOVA. All the results are expressed as mean \pm standard error of the mean (SEM), and with the level of significance set at $P < 0.05$.

III. RESULTS

Table (1) shows characteristics of the subjects. There were one male and three females with duration of diabetes for 5 years for group 2 receiving the intervention.

Table.1: Characteristics of the investigated subjects

	Group 1*	Group 2#
Female	3	3
Male	2	1

Group 1* = diabetic patients receiving standard diabetic treatment; as a control group

Group 2 # = diabetic patients receiving herbal anti-diabetic intervention (thyme) and their standard diabetic treatment

Table.2: Body weights of subjects investigated

Groups	Body weight (Kg)
Group 1	50.45 \pm 1.00
Group 2: Before pre-intervention	49.96 \pm 1.66
Group 2: 6 months post intervention	50.52 \pm 2.10

No significant change was found in the body weights of the subjects of group 2 post intervention compared to the pre-intervention weights $p=0.08$. Also, there was no significant change as well when compared to the control group- group1, $p=0.09$.

Post intervention, fasting blood glucose serum levels of group 2 subjects, that used the Omani thyme, were significantly lower ($P < 0.001$) as compared to pre-intervention measurement of those patients and also in comparison to the fasting blood glucose serum levels for the control group (group1) ($P < 0.002$) as shown in figure 2.

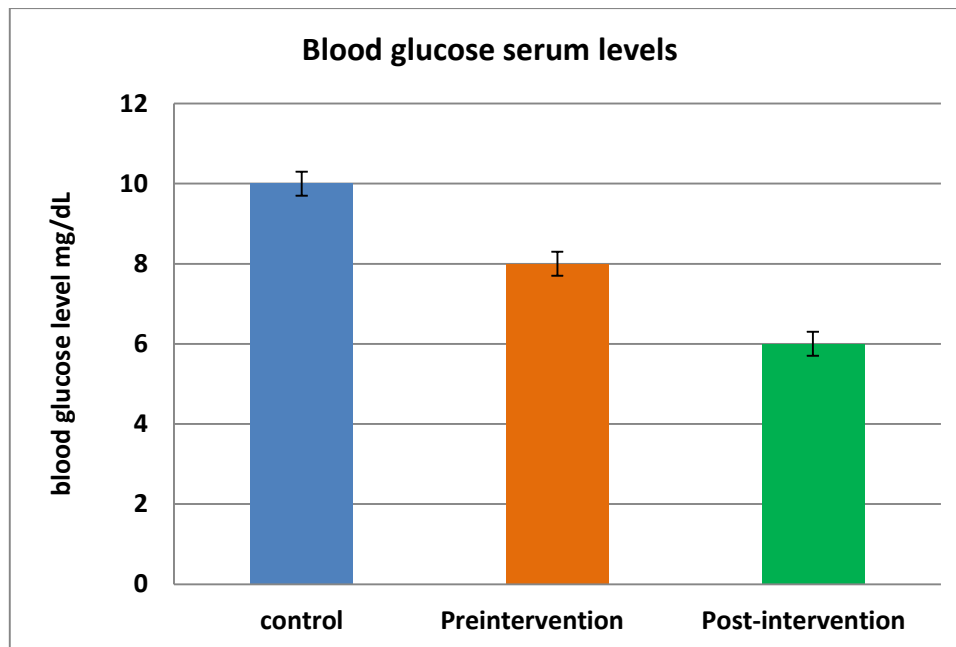


Fig.2: Fasting blood glucose serum levels.

Post intervention glycosylated haemoglobin (HbA1c) serum levels of the group 2 subjects treated with Omani Thyme were significantly lower ($P < 0.05$) as compared to pre-intervention measurement.

Table.3: Glycosylated haemoglobin serum levels.

Groups	HbA1c %
Group 1	6.3
Group 2: Preintervention	6.4
Group 2: Postintervention	5.7

IV. DISCUSSION

The current study hypothesised that Omani thyme has strong antidiabetic effects and has the ability to reduce blood glucose therefore in this study we aimed to estimate the anti-diabetic effects of Omani thyme in adult Omani diabetic patients.

This data of study revealed that thyme was able to reduce serum glucose level. Additionally this study showed a reduction in glycosylated haemoglobin serum levels of the subjects treated with Omani Thyme was significantly lower as compared to pre-intervention measurement. More recent animal study has supported these data their data showed a significant decrease in blood glucose (Rasha J. et al 2016) and (Faramoushia, 2017).

In general it was reported that herbal teas are known to contain antioxidants. These are viewed as promising therapeutic drugs for free radical pathologies in the

prevention of diseases associated with oxidative stress (Atoui, A.K., et al 2005) and thyme was proven previously to have a strong antioxidant activity (Lee, S.J., et al 2005). This result also confirmed by another animal study which reported that the antioxidant activity was correlated with the polyphenol content (Gallego et al 2013).

Therefore it's possible to suggest that effects of thyme reduction of serum glucose level that has been observed in these patients could be due to the strong antioxidant activities for the antioxidant enzymes such as superoxide dismutase, catalase and glutathione peroxidase and the high level of polyphenol content in this thyme but these markers need to be confirmed by future detailed biochemical study.

V. CONCLUSION

According to the results of the present study, thyme has an importance effects in reduction of serum glucose in diabetic's patients with no records of any side effects. Therefore diabetic patients could use thyme as spices on their food or added as a daily drink to easily manage their blood glucose level. Further studies will be required to use bigger sample size to confirm the results and also more details biochemical study to measure the antioxidants enzymes activities and also to characterize the active components of the crude extract of this Omani Thyme.

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