Effect of Garlic and Onions Extract Enriched with Honey Treatment on the Lipid Profile, Biochemical and Hematological Biomarker Status in Healthy Women

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ABSTRACT

The onion and the garlic are among the oldest cultivated plants, serving as food and medicinal uses. The present study was aimed to investigate the effect of honey, onion (*Allium cepa*) bulb and garlic (*Allium sativum*) clove extracts on the cardiovascular risk biomarker in healthy women. In a 15 days treatment, 20 women were divided into two groups (n=10), the first group is the group of control (reference) and the other group is women receive aqueous extract of mix compound (honey, garlic and onions) (test) for 15 days. Some biochemical and hematological parameters were analyzed. Results obtained show that Cholesterol ($p < 0.05$), Triglyceride ($p < 0.01$) and serum calcium level were significantly decreased in the test group compared to reference group however, the level of Creatinine was significantly increased ($p < 0.05$) in test group compared to reference group. Our results demonstrated also that there was no significant change ($p \geq 0.05$) in all hematological parameters levels in test group compared to reference group. From the results of the study we can conclude that onion, and garlic extracts enriched with bee honey have a protective effect on lipids profile. Thus, onion, and garlic are beneficial in the prevention of cardiovascular diseases.

Keywords: Onion, Garlic, Honey, Lipid profile, Cardiovascular Diseases

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INTRODUCTION

Nature is always a golden sign to show the prominent phenomena of coexistence. Natural products from plants, animals and minerals are the basis for treating human diseases¹. From ancient times, humankind has used self-created traditional methods for handling the illnesses and continues to use them along with modern medicine².

In recent years, there has been a lot of interest in alternative medicine and the use of natural, plant-

based sources to treat many diseases³. Plants and natural products were used by humankind over the years as food and medicines to cure and prevent diseases⁴. Medicinal plants have long played important roles in the treatment of diseases all over the world⁵. Plants are an essential source of many new effective compounds that are widely used to treat many disorders and diseases in traditional Arabic medicine⁶. The interest in phytomedicine and many medicinal plant species are being screened for

biological activities. Plants contain phytochemicals such as flavonoids, phenolic acids, used to show a remarkable biological activity⁷.

In many cases, secondary compounds are the substances responsible for the therapeutic effect of many plants spread around the world⁸. Many studies and scientific research have shown the close relationship between oxidative stress and the metabolic and physiological changes associated with many diseases⁹. Oxidative stress is a pathophysiological condition that can be defined as an imbalance between antioxidants and oxidizing substances in favor of the latter¹⁰. Plants have wide horizons in terms of their large number and spread across the world because of their activities and effectiveness against many diseases, which has been proven by many studies¹¹. The onion plant (*Allium cepa* L.) and the garlic plant (*Allium sativum* L.) are among the oldest cultivated plants, serving as food and medicinal uses. As these plants are an important source of many nutrients and active substances that have a curative effect for many diseases such as diabetes, high blood pressure and cancer, anti-bacterial such as staphylococcus¹². In our study we evaluate the effect of honey, onion (*Allium cepa* L.) bulb and garlic (*Allium sativum* L.) clove extracts on the cardiovascular biochemical marker and some hematological parameters in healthy women.

MATERIALS AND METHODS

Plant Material and Preparation of Herbal Juice

The crude drugs, onion (*Allium cepa* L.) and garlic (*Allium sativum* L.) and bee honey were procured from the local crude drug shop. We crush 500g of each onion (*Allium cepa* L.) bulb and garlic (*Allium sativum* L.) clove, then add 500 ml of purified water to get an herbal extract. After that, we add an appropriate amount of bee honey to get an herbal juice that we use in our study.

Study Subject

Ethical approval was requested and approved by the Ethics Committee of the Department of Cellular and Molecular Biology, Faculty of Natural Sciences and Life, University of El Oued. Our study was conducted on 20 volunteers their age between 19 and 40 years, which were divided into two groups (10 reference group and 10 test group) who were informed to

intake 10 mL of either the reference without or with herbal juice every day during the 2-week study period. All the volunteers in this study live in the El Oued area located in the southeast of Algeria.

Inclusion and Exclusion Criteria

Inclusion criteria for All women participants were in good health, based on their medical history, a medical examination, and normal results from clinical laboratory tests. Do not suffer from a chronic or acute disease and consume no drug vitamin/mineral supplements, or oral contraceptives for 30 days. Exclusion criteria were to eliminate the factors which might affect the parameter's study, we excluded all pregnancy women's, anemia, diabetics, arterial hypertension or any evidence of endocrine disorders in their medical history from all groups.

Laboratory Investigations and Methods

Blood samples were collected and placed into containing tubes. Blood was transferred into EDTA tubes for hematological markers and the serum were obtained after centrifugation at 3000 × g for 5 min, removed and retained for assay of biochemical parameters. Serum samples were stored at -20°C until analysis. Hematological analysis (FNS) is performed by the hematology autoanalyzer (Sysmex). Serum Triglyceride (TG), Total cholesterol (TC), urea, creatinine concentrations were measured using commercial kits (Spinreact), (refs: TG-1001311, TC- 1001090, and calcium-1001291). Serum enzymatic activities of Alanine aminotransferase (GPT), and aspartate aminotransferase (GOT) were measured using commercial kits (Spinreact) (refs: (refs: GOT-1001161, GPT-1001171).

Statistical Analysis

The values of the results were expressed as a percentage or an average ± ES (standard deviation). Student's t-test of independent samples was used. All data in this study were examined by Minitab 13.0 software. P < 0.05 indicates statistically significant difference.

RESULTS

Biochemical Parameters

Results obtained in table 1 presented the different means of biochemical parameters, when the results showed a significant increase in creatinine levels ($p < 0.05$) in test group when we compared to the reference one. However, there are a significant

decrease ($p < 0.001$) in triglycerides, total cholesterol and serum calcium level and no significant difference in blood glucose in test group compared to reference group.

Table 1. Mean biochemical parameters level in test and reference groups

Parameters	Reference (n=10)	Test (n=10)	P-value
Blood Glucose (g/l)	0.84±0.044	0.87±0.047	0.584
Serum Triglycerides (g/l)	0.63±0.045	0.53±0.03	0.008
Serum Total Cholesterol (g/l)	1.02±0.032	0.96±0.022	0.020
Serum Creatinine (mg/l)	6.426±0.516	8.880±0.821	0.040
Serum Urea (g/l)	0.2380±0.0262	0.2260±0.0103	0.309
Serum calcium (mg/l)	87.20±3.04	78.60±3.31	0.050

Transaminases Activities

Our results showed a no significant difference ($p > 0.05$) in the GOT and GPT activities in test group as compared with references subjects (Fig 1).

Hematological Parameters

Concerning hematological parameters (Table 2), results demonstrated that there was no significant change in RBC, hemoglobin, hematocrit and PLT levels in test group compared to reference group. Concerning leukocyte line, the results showed a no significant variation of WBC and Lym levels in test group compared to reference.

Fig 1: Mean serum GOT and GPT activities in test and reference groups

DISCUSSIONS

This study investigated the effects of garlic, and onion on some biochemical and hematological parameters in healthy women. Garlic and onion

have been used as food and for medicinal purposes since ancient times. Garlic (*Allium sativum*) and onion (*Allium cepa*) are important medicinal plants that have an effective therapeutic role as they have been used in the past for more than 4000 years and

have proven effective for many diseases such as heart disease and tumors¹³.

Results obtained show that, there were a significant decrease in triglycerides, total cholesterol and

serum calcium level and no significant difference the other biochemical parameters in test group compared to reference group.

Table 2: Erythrocyte and Leukocyte line in test and reference groups

Parameters	Reference	Test	P-value
Red blood cell (10 ⁶ /μl)	4.29±0.03	3.91±0.16	0.070
Hemoglobin (g/dl)	11.02±0.20	10.08±0.35	0.056
Hematocrit (%)	33.68±0.46	31.16±1.06	0.076
Platelet (10 ³ /μl)	211.4±14.7	215.6±12.9	0.762
White blood cell (10 ³ /μl)	3.04±0.21	3.20±0.24	0.527
Lymphocytes (10 ³ /μl)	1.24±0.066	1.34±0.045	0.093

The effectiveness of onions (*Allium cepa*) and garlic (*Allium sativum*) are medicinal plants because they contain many effective compounds such as vitamins, amino acids and antioxidants, which reduce the oxidative stress caused by reactive oxygen species^{14,15} which interest for the prevention and treatment of various diseases including cancers, inflammatory diseases, diabetes, osteoporosis, cardiovascular and neuro-degenerative diseases¹⁶. These drugs are well known for their: hemostatic effects, fibrinolytic and hemodynamic effects, platelet effects, immunologic effects, lipid-lowering effects, anti-atherosclerotic effects, anti-oxidative effects, anti-cancer effects, vascular effects, anti-microbial effects among other health benefits¹⁷. Many experiments using rabbit and rat have shown that garlic consumption significantly decreased the content of total serum cholesterol, LDL, VLDL, and also increased the level of HDL¹⁸. Effendy, Banerjee and Maulik results show that treatment with aged garlic extract (AGE) in hypercholesterolemic rabbits significantly reduced accumulation of cholesterol in vessel wall and also inhibited development of arteriosclerotic plaques in the arterial wall¹⁹.

Many investigations have reported that polyphenol compounds, phenol and flavonoids are responsible for pharmacological activities of plants²⁰. In humans and animals' study allicin, and its derivative are known as the major active compound responsible for the hypocholesterolemic and hypolipidemic effects

of garlic²¹. In the other hand our results indicated that there was no change in activity of GOT and GPT in test group us compared to reference. Gluconeogenetic action of GOT and GPT played an important role in provide a new supply of glucose from other sources such as amino acids²². Our results demonstrated also that there was no significant change in all hematological parameters levels in test group compared to reference group. These results were opposite to what was reported by Alberto's study, as it found an increase in white blood cells in mice treated with garlic²³. WBC contribute to inflammation which is essential for the success of immune response²⁴. First, garlic and onion compounds seem to have a stimulatory effect along particular pathways on some haematopoietic growth factors (cytokines) which interact with specific receptors on the surface of haematopoietic cells, regulating the proliferation and differentiation of progenitor cells and the maturation and functioning of mature cells²⁵. The lymphocyte count is an important auxiliary diagnostic test as changes occur with systemic inflammation and other disease²⁶. Normal erythropoiesis for instant; is dependent on there being adequate amounts of erythropoietin among other factors²⁷.

CONCLUSION

From the results of the study we can conclude that onion, and garlic extracts enriched with bee honey

have a protective effect on lipids profile. Thus, onion, and garlic are beneficial in the prevention of cardiovascular diseases. Accordingly, through this study, we recommend to Complete studies to obtain results of the effect of garlic and onions on mice suffering from heart failure and oxidative stress.

CONFLICT OF INTEREST

Nil

AUTHORS' CONTRIBUTIONS

D.S. and B.I.: study design, data collection, data analysis, and manuscript preparation, and final edition.

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