

Study the effect of Capparis Spinosa fruit extract on fasting blood sugar, lipid profile and BMI of Iraqi diabetic and obese patients

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Abstract

Objective: DMT 2 is the common metabolic disorders with highly impact on quality of life. The tsability of C. Spinosa fruits extract in reducing plasma glucose levels and serum lipids was tested . There is no study about the anti-diabetic , anti- obesity effect of *capparis spinosa* fruits in Iraq . Therefore, we aim to study the effects of the *C. spinosa* fruits on diabetic obese patients.

Patients and Methods:

Thirty-five obese patient with type 2 DM was distributed into two groups: the first one group n(15) was consumed fruits C.spinosa , and second group n(20) was taken placebo capsules for 12 weeks. Blood samples were drawn before taking drugs and at the end of the study. Weight (BMI) was measured weekly, fasting blood glucose levels, serum lipid profile were measured at the first and end of study.

Results: FBS levels have showed significantly decreased after treating with C.spinosa fruit (p=0.003). the C.spinosa fruit had significantly elevated HDL and decrease levels of LDL, total S. cholestrol and Triglycerides level respectively. A significant reduction of the body weight reduction BMI was recorded.

Conclusion: result of study showed that *C. spinosa* fruit was improve diabetic related metabolic instability such as hyperglycemia, dyslipidemia, and body weight regulation .

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Introduction

DMT2 is one of the most predominant and fastest increasing diseases in most of the world .(1). Apart from conformist antidiabetic therapy, numerous studies have shown that nutrition , medicinal plants, opposite and alternative medicine therapies was beneficial effects and improve glucose homeostasis .(2,3) *Capparis spinosa* L. (caper) fits to family Capparidaceae and possibly originated from dry regions in central Asia.(4)

The caper fruits and flower are used as a food by diabetic patients due to the confidence that they have hypoglycemic effects (5). The fruits of caper are eaten at the dose of (7) g daily as a medication by diabetic patients in Iraq. There are few study about the effect of this plant as benefit (6), few experimental studies confirmed the blood glucose lowering and hypolipidemic properties of caper (9). No clinical studies have been showed to determine the caper anti-hyperglycemic ability and safety in diabetic patients. This study was performance the ability of the fruit consumption on the level of diabetic patients .

The main objective of diabetes treatment is beginning of normal levels of glucose and avoiding or suspending of metabolic complications (Nesto *et al.*, 2001). While insulin is the key which used in type I and in some cases in type II diabetes .the scientist planning to find new treatment with minimal side effects (Khan *et al.*, 2003). Herbs, was easy to digestive and fewer side effects, have been the core for several diseases such DMT2 in antique medicine (Grover *et al.*, 2002). *Capparis spinosa's* fruits have many respected biochemical compounds such as flavonoids, , pectin, essential oils, tannins, and particularly glycosinolate and glycosides (and Ya ng, Liu, Wang, 2008). Some studies have exposed that within two weeks of oral administration, *C. spinosa* aqueous extract reductions of cholesterol and triglyceride levels in diabetic rats (Eddouks, Lemhadri, Michel, 2005). In another study, fruit extract of the plant in mixture with caraway (*Carum carvi*) exhibited hypoglycemic effect in diabetic animal models (Eddouks, Lemhardi and Michel, 2004).

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Materials and Methods

Patients, Materials and methods

Patients:

(inclusion criteria)

Thirty-five obese patients with type 2 DM of both gender. age from 25 to 50 Years , with FBS > 180 mg/dl and dyslipidemia of at least one abnormal reading of the following parameters (HDL< 40 mg/dl., LDL>150 mg/dl , total s. cholesterol > 200, triglycerides > 150 mg/dl and BMI > 30 .

Plant extract

Caper fruits were composed from the lands in the Babylon region in Iraq the first of May and identified by a botany department in Tikrit university .The fruits were wash away and dried in shade at room temperature. Total 5000 g of dehydrated caper fruits powder were extracted with 32 l of 70% aqueous ethanol using separation method at room temperature. The extracts was filtered through no.1filter paper and vanished to dryness under compact pressure at a maximum of 40 °C using a rotary evaporator tool.

Standardization of the plant extract (*Kim et al.2010*) .

The extract was homogenous through influential the total flavonoids and phenolics content. The flavonoids satisfied in caper fruit extract was measured using a colorimetric assay developed. 10 One milliliter of the aliquot of the suitably diluted caper fruit extract or standard solutions of rutin in methanol (50, 100, 150, 200 and 250 μ g/ml) were added to a 10 ml volumetric flask containing 4 ml of distilled water. At first, 0.3 ml of 5% (w/v) sodium nitrite was added to the flask. After 5 min, 0.3 ml of 10% (w/v) AlCl₃ was added and, then after 6 min, 2 ml of 1 M NaOH was also added to the mixture, followed by the addition of 3.4 ml distilled water. The absorbance of the pink color mixture was read at 510 nm against prepared water blank and flavonoids content was expressed as milligram rutin equivalent per gram of extract. Sample was analyzed in triplicate. The concentration of total phenols in caper fruit extract was measured by the method described by Kim et al. with some modification. Briefly, an aliquot (1 ml) of the appropriately diluted extract or standard solutions of Gallic acid in water (50, 100, 150, 200 and 250 μ g/ml) was added to a 25 ml volumetric flask containing 9 ml of distilled water. A reagent blank using distilled water was ready. One milliliter of Folin & Ciocalteu's phenol reagent was added to the mixture and shaken. After 5 min, 10 ml of 7% Na₂CO₃ solution was added by shaking. The solution was then directly diluted to volume (25 ml)

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with distilled water and mixed thoroughly. After incubation for 90 min at 23 °C, the absorbance versus prepared blank was read at 750 nm. Total phenols contents of the extract were expressed as milligram Gallic acid equivalent per gram extract. Sample was analyzed in 3 replications.

Blood sampling and biochemical analysis

before taking the drug and ..After 12weeks of treatment, blood samples were drawn from the patient centrifuged (1500 g for 10 min) and sera were separated and stored in the freezer until assay Levels of triglycerides, totals. cholesterol, LDL, HDL, were measured using commercial kits (Biosystems, Spain). Insulin level was assessed using rats insulin ELISA kit (Mercodia, Sweden).

Statistical analysis

All raw data were analyzed using one-way paired t-test and Tukey's post-hoc test using SPSS (version 18) and expressed as mean \pm SD. $P < 0.05$ was considered to be statistically significant.

Results

Effect of C.spinosa on the body weight was studied to determine the role of C.spinosa in weight reduction and the result showed difference between two groups .The group (G1) showed decreasing 7.57 % (6.97) kg from (92.92) to (85.88) and G2 showed decreasing 4.14% (3.4) kg from (91.28) to (87.5) figure 1. (there was a significant reduction $P < (0.05)$ in body weight between 2 groups.

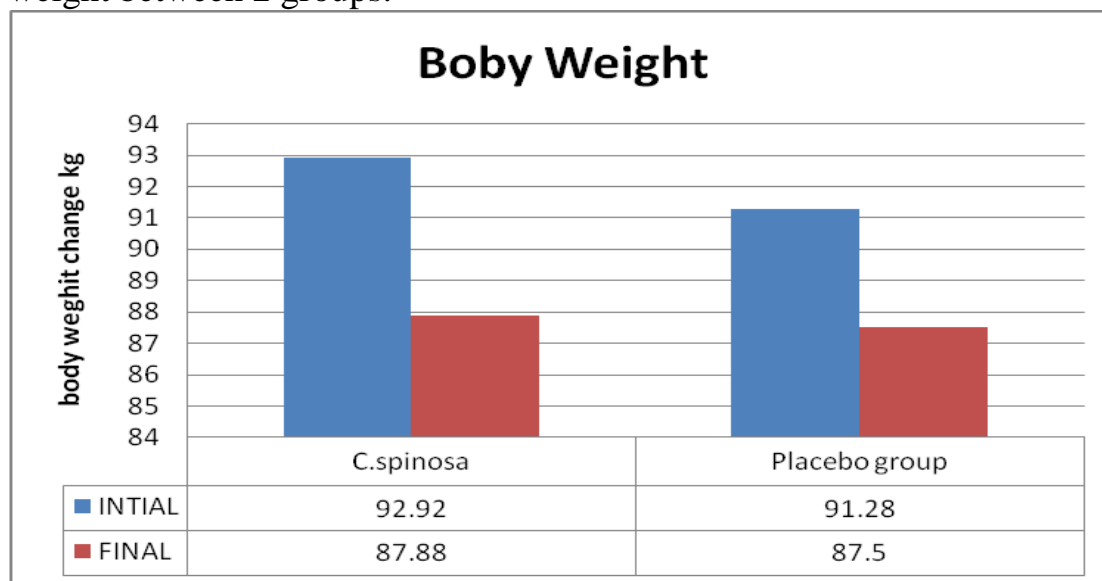


Figure 1: Effect of C.spinosa on the body weight .

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The study showed significant difference between groups in (G1) group showed decreasing 9% in the level of fasting blood sugar (FBS) while the G2 reducing in FBS by 2.62%,Figure 2

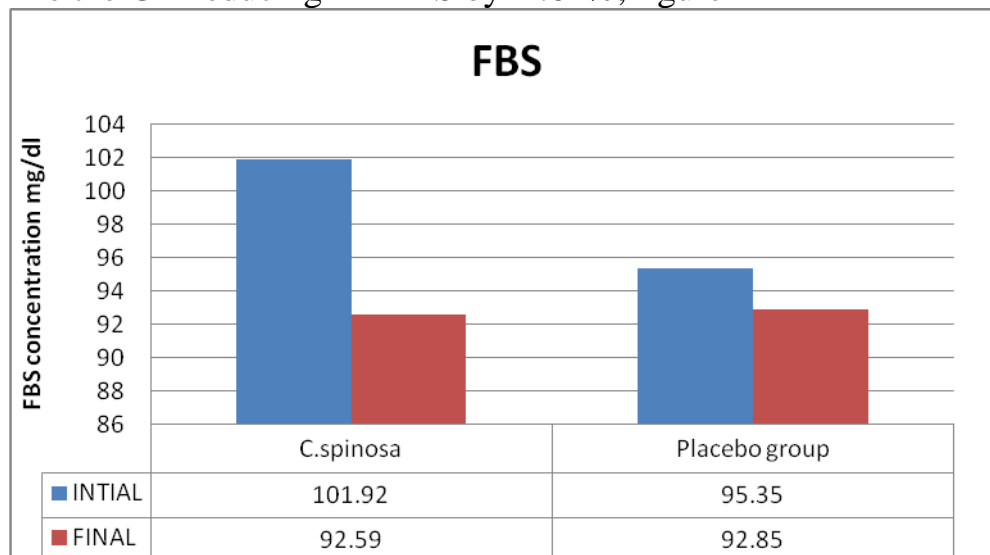


Figure 2 :Effect of C.spinosa on the Fasting blood sugar.

The effect of C.spinosa on s. cholesterol level was determined, the study showed decreasing in the total cholesterol in G1 (12.3%) from (172.7 to (151.33) and in G2 the level of cholesterol was decreased (1.28%) from (158.75) to (156.71) with highly significant difference between two groups in the level of cholesterol figure (3).

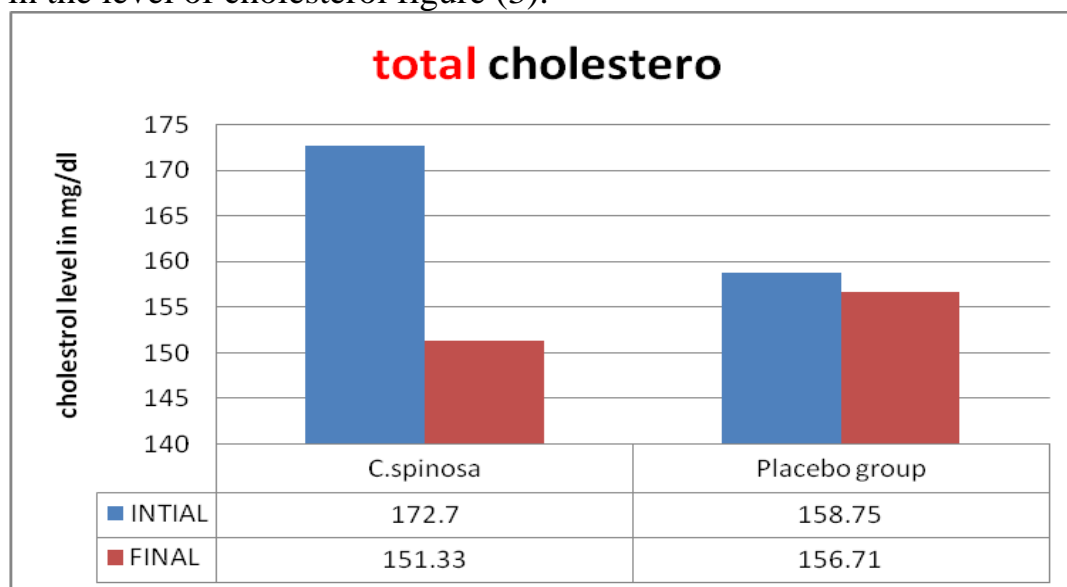


Figure 3 :Effect of C.spinosa on total s.cholesterol level .

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The study showed decreasing the triglyceride level (10.4%) in the G1 form (118.59) to (106.25) and increased in G2 0.4% from (102.71) to (103.21) with significant difference between two groups in the level of triglyceride figure 4

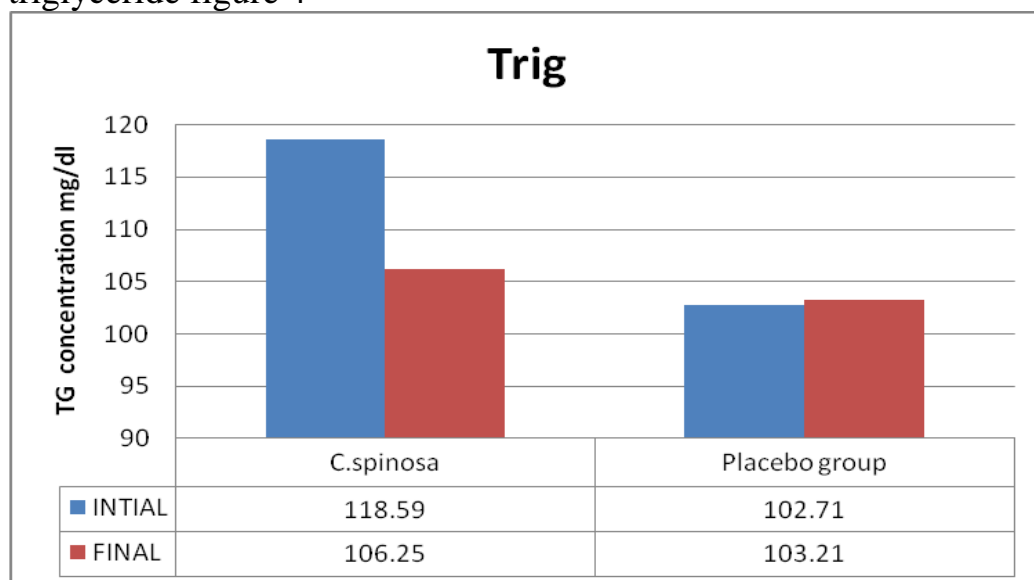


Figure 4 .Effect of C.spinosa on s. triglyceride level.

The level of HDL showed significant difference between two groups ,the G1 group showed increasing 30.67% from (37.55) to (49.07) and the G2 showed increasing 7.52% from (20.85) to (22.42).figure 5.

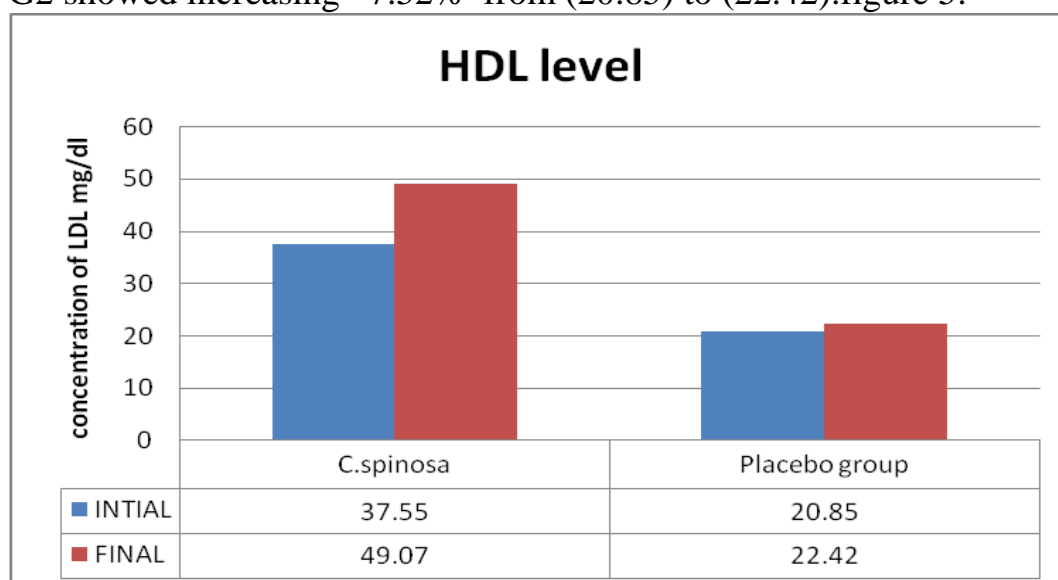


Figure 5 Effect of C.spinosa on HDL level.

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The study showed decreasing in the level of LDL by 29% from (109.29) to (77.5) with significant $p < 0.01$ in the G1 group , and the G2 showed decreasing in the level of LDL by 7.52% from (124.24) to (112.9) figure 6.

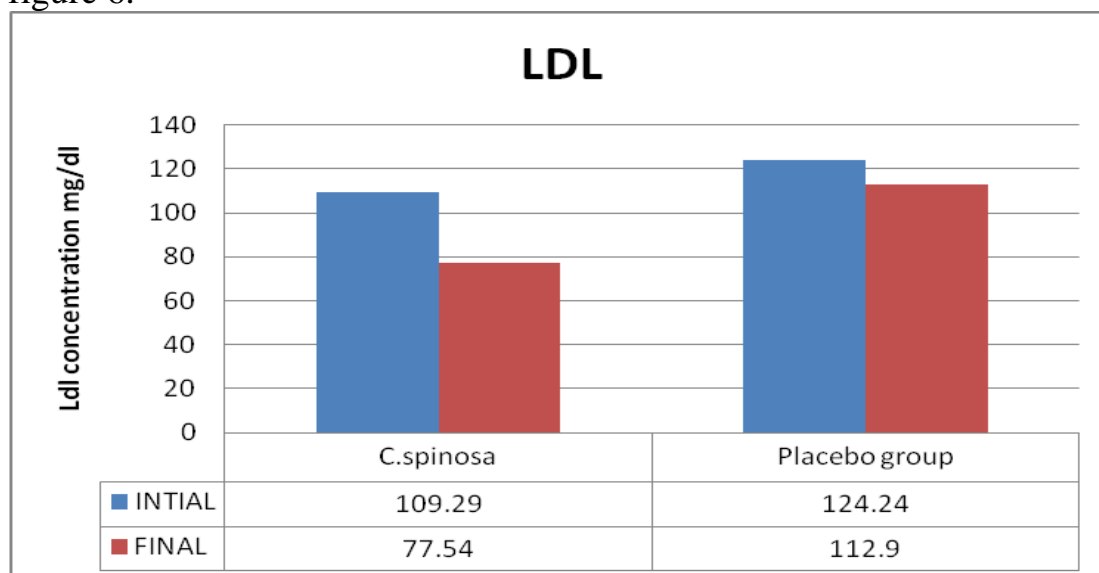


Figure 6 .Effect of C.spinosa on the LDL level.

Discussion

The results suggest that caper fruit safely improves hyperglycemia and hypertriglyceridemia in type 2 diabetic patients. The findings of the present study agree with the traditional use of caper for treatment of diabetes (7) and previous animal studies demonstrating its anti-hyperglycemic and hypolipidemic effect (8) .The exact mechanisms of caper blood glucose-lowering and hypolipidemic effects are unknown. In a study it was reported that caper had hypoglycemic activity with-out effect on insulin secretion in diabetic rats.(7) In other studies hypoglycemic and lipid lowering effect of caper have been reported but their mechanisms have not been determined.(11) In diabetic patient's elevation of glucose and free fatty acid levels leads to generation of reactive oxygen species and oxidative stress.(12)These metabolic abnormalities not only induce late diabetic complications but also lead to insulin resistance, cell dysfunction and impaired insulin secretion.(13) The favorable effects of sub-stances with antioxidant properties on diabetic profile have been reported in other studies.(14) However, the antioxidant properties of caper fruits due to the presence of appreciable levels of phenolic compounds, tocopherols, carotenoids and vitamin C may explain caper effects on diabetic patients.(15) Caper fruits also contains compound such as rutin and lectin, with favorable effects on

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glucose and insulin metabolism.(16) Furthermore many bioactive compounds such as saccharides, glycosides, alkaloids, terpenoids, volatile oils, fatty acids, steroids and several minerals present in caper may directly or indirectly influence glucose or insulin metabolism.(17)

Considering the present study and previous data, caper can be used as an adjuvant agent for treatment of diabetic patients but this requires more additional validation studies. However it should be also noted that small sample size and lack of identification of the active constituent(s) responsible for the effects of caper fruit extract are limitations of the present study. In conclusion, more clinical trials are recommended to evaluate the long-term efficacy and safety of caper in diabetic patients.

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دراسة تأثير خلاصة نبات الشفاح على مستوى السكر والدهون لدى مرضى السكري والسمنة

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الخلاصة:

تم دراسته التأثير الايجابي لمستخلص نبات الشفاح المتواجد كثيرا في وسط وجنوب العراق على مرضى المصابين بداء السكري والسمنة المفرطة من حيث قياس بعض المؤشرات الحيوية مثل مستوى الدهون ومستوى السكر التراكمي وكذلك وزن الجسم. تم اختيار عينه عشوائيه من المرضى المصابين بداء السكري وفراط السمنة والذين يراجعون مركز علاج السمنة في كلية طب الكندي جامعه بغداد (15) مراجع واجراء الدراسة عليهم.

اظهرت الدراسة ان لاستهلاك الخلاصة النباتيه لبنات الشفاح اعطى تاثيرا معنويا في مستويات انخفاض السكر والدهون الضارة والدهون النافعه والكوليستول والدهون الثلاثيه على التوالي. وايضا اظهرت الدراسة التأثير الايجابي على الانقاص من الوزن الذي العينه المستهدفه.