

EFFECT OF GARLIC (*ALLIUM SATIVUM*) ON BLOOD PRESSURE IN HEALTHY VOLUNTEERS

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ABSTRACT

The study was conducted on two groups of individuals. Group A (treatment) consisted of 10 healthy volunteers who were administered garlic (*Allium sativum*) for thirty days and then followed for another 30 days without garlic. Group B (control) 11 healthy subjects served as a control. Garlic ingestion significantly lowered ($p < 0.05$) in diastolic B. Pr. in male and total after 7 days and non-significantly ($p > 0.05$) in systolic B. Pr. on male, female and total. Significantly lowered ($p < 0.05$ and $p < 0.025$) in diastolic B.Pr. in male and total after 14 days respectively and non-significantly ($p > 0.05$) in systolic B.Pr. at male, female and total. Significantly lowered ($p < 0.025$ and $p < 0.01$) in diastolic B.Pr. in male and total after 21 days. Respectively and non-significantly ($p > 0.05$) in systolic B.Pr. at male, female and total. Significantly lowered ($p < 0.01$) in diastolic B.Pr. in total and non-significantly ($p > 0.05$) in diastolic B.Pr. at male and female whereas significantly lowered ($p < 0.01$) in systolic B.Pr. on female and non-significantly ($p > 0.05$) in systolic B.Pr. at male and female after 28 days. Non-significantly ($p > 0.05$) in diastolic and systole B.Pr. on male, female and total after 30 days without garlic.

INTRODUCTION

Allium sativum L (L) is hardly perennial with narrow flat leaves, small purplish white flowers and compound bulbs. The bulb is compound in nature and is separable into many small cloves which are covered by thin white or pinkish dry scales¹.

Garlic (*Allium sativum* L) is cultivated in Iraq as garden-crop or as secondary crop during the months of September-November the bulbs was mature in April-May¹.

Medicinally, garlic is reputed for along time and is used in various preparations of indigenous medicines. It is administered in the cases of pulmonary phthisis, bronchiectasis, gangrene of lung and whooping cough. Garlic juice is given in laryngeal tubercles, lupus and duodenal ulcers². garlic is reported to have antihyperlipimic³, and anti diabetic properties⁴, and many have an inhibitory effect on the process of atherogenesis^{5,6}. garlic is reported to have anti-atherosclerosis^{7,8}.

MATERIALS AND METHODS

Plant material. Garlic was collected from Basrah region in April 1999. The plant was potentially authenticated and voucher specimens 2885 were deposited in the herbarium of Basrah/college of science /University of Basrah.

Subject. A total of 21 subjects, 20-25 years of age, were selected for the study after given written informed consent. They were nonsmoker, apparently healthy volunteers. Their weight within the normal range. They have no family history of hypertensive, and no drug had taken in the past four weeks. The participants were mainly selected from undergraduate and post graduate students in the college of science, university of Basrah.

The volunteers were randomly allocated into two groups (11 subjects as control, 10 subjects as treatments). Group A received 900 mg/day garlic powder for 30 days and then followed for another 30 days without garlic. The dose was chosen according to previous

studies of garlic on healthy volunteers. Group B the control group received placebo. The level of B.Pr. was measured by right hand with normal state(horizontal).

Sphygmomanometer. mercurial-CE-0483. has scale 0-300mmHG, made in japan.

Statistical analysis. All values were expressed as the mean $\pm$ S.D, significance differences between treatment and control were determined using ANOVA:Two-factors without replication, Microsoft excel program. Difference were considered significant at the $p<0.05$ level.

RESULT

Garlic administration for level of Systolic B.Pr. after 30 days was non-significant ($p>0.05$) in male and total, however, high significant ($p<0.01$) in female (after 28days) as compared with control. After 60 days was non-significant ($p>0.05$) in each group as in table (1,2) figure(1,2,3). Whereas the effect on level of Diastolic B.Pr. after 30 days was non-significant ($p>0.05$) in female and significant ($p<0.01$, $p<0.05$, ($p<0.025$) in male and total, then after 60 days was non-significant ($p>0.05$) in each group with compared with control as in table (1, 2) and figure (4, 5, 6).

DISCUSSION

The study was a cronic type, and confirms results of other clinical studies on the pressure-lowering potency of garlic powder^{9, 10}, but it differs in materials, methods, and results, accompany with different results¹¹. The daily dosage of garlic which intake was depends on other studies¹².

In the present study the pressure-lowering effect were particularly observed regarding SBP (systolic blood pressure) in which the reduction was just highly significant in the female at the end of 28 days and non-significantly in the male group. A possible cause for such results probably due to low number of participates, high value S.D, and may be female more careful in the study, whereas, DSB (diastolic blood pressure) was significantly in male, high significantly in total and non-significantly in female, apparently, high sig. in total because of high number of participates but non-sig. in female due to high value to S.D.

Generally, from tables and figures the powder of garlic has significantly lowering effect on SBP and DBP with different results between them when contrast with control (placebo intake).Mainly studies certain the activity of garlic as lowering-blood pressure due to present volatile oil particularly allic in compound.

The exact mechanism of action for lowering blood pressure by garlic remains unknown. It may be because reduce potassium which increase blood pressure¹³ or by inhibiting ACE(angioter converting enzyme) by Anti-ACE peptides, this enzyme converts angiotensin I to angiotensin II a compound that increases both the fluid volume and the degree of constriction of the blood vessels. By inhibiting the formation of this compound, Anti-ACE peptides relex the arterial walls and reduce fluid volume^{14,15} or because increase CoQ10 (ubiquinone) is coenzyme essential for the proper functioning of the mitochondria it acts as "spark plug" during the production of ATP, the energy currency of all body processes. An increased efficiency in energy production results in a stronger heart muscle¹³ or because of garlic elevated VitC which increase HDL then reduce blood pressure¹³ or garlic lead to increase L-proline and L-lysine which reduce blood pressure.

Conclusion

The dry powder of garlic has ability to reduce level of systolic (more in female $p<0.01$ after 28 day) and diastolic (more in male $p<0.025$ after 21 day) of B.Pr. in healthy volunteers regarding daily intake (900mg/day) for 30 days.

Group A
Table (1) effect of dry powder of garlic on level of (B.Pr.) in healthy volunteers without garlic (control).

Sex	Age	No	Status	B. Pr. 0 day	B. Pr. 7 day	B. Pr. 14 day	B. Pr. 21 day	B. Pr. 28 day	B. Pr. 60 day
male	20-25	6	Systolic diastolic	109±5 70±3	113 ^a ±9 71 ^d ±5	111 ^a ±7 70 ^d ±5	112 ^a ±8 72 ^d ±7	115 ^a ±8 72 ^d ±5	113 ^a ±7 71 ^d ±6
female	20-25	5	Systolic diastolic	122±4 77±4	122 ^a ±5 81 ^a ±5	120 ^a ±6 75 ^a ±5	119 ^a ±5 77 ^a ±7	123 ^a ±8 80 ^a ±4	118 ^d ±4 80 ^a ±5
Total	20-25	11	Systolic diastolic	115±8 73±5	117 ^a ±9 76 ^a ±7	115 ^a ±8 72 ^a ±5	115 ^a ±7 74 ^a ±7	118 ^a ±9 76 ^a ±6	115 ^a ±6 75 ^a ±7

Group B
Table (2) effect dry powder of garlic on level of B.Pr. in healthy volunteers (treatment).

sex	Age	No	Status	B. Pr. 0 day	B. Pr. 7 day	B. Pr. 14 day	B. Pr. 21 day	B. Pr. 28 day	B. Pr. 60 day
male	20-25	5	Systolic diastolic	114±6 75±8	113 ^a ±6 70 ^b ±5	115 ^a ±8 69 ^b ±6	112 ^a ±6 66 ^c ±5	115 ^a ±5 70 ^d ±5	114 ^a ±5 75 ^d ±6
female	20-25	5	Systolic diastolic	115±6 75±6	116 ^a ±7 72 ^a ±8	114 ^a ±5 70 ^a ±7	112 ^a ±3 69 ^a ±6	108 ^a ±6 69 ^a ±5	117 ^a ±3 78 ^a ±3
Total	20-25	10	Systolic diastolic	114±6 75±8	114 ^a ±7 71 ^b ±7	115 ^a ±7 70 ^a ±6	112 ^a ±5 67 ^a ±5	112 ^a ±6 70 ^a ±5	115 ^a ±4 76 ^a ±5

a-- $P < 0.01$

b-- $P < 0.05$

c-- $P < 0.025$

B.Pr.—blood pressure

sex	Age	No	Status	B. Pr. 0 day	B. Pr. 7 day	B. Pr. 14 day	B. Pr. 21 day	B. Pr. 28 day	B. Pr. 60 day
male	20-25	5	Systolic diastolic	114±6 75±8	113 ^a ±6 70 ^b ±5	115 ^a ±8 69 ^b ±6	112 ^a ±6 66 ^c ±5	115 ^a ±5 70 ^d ±5	114 ^a ±5 75 ^d ±6
female	20-25	5	Systolic diastolic	115±6 75±6	116 ^a ±7 72 ^a ±8	114 ^a ±5 70 ^a ±7	112 ^a ±3 69 ^a ±6	108 ^a ±6 69 ^a ±5	117 ^a ±3 78 ^a ±3
Total	20-25	10	Systolic diastolic	114±6 75±8	114 ^a ±7 71 ^b ±7	115 ^a ±7 70 ^a ±6	112 ^a ±5 67 ^a ±5	112 ^a ±6 70 ^a ±5	115 ^a ±4 76 ^a ±5

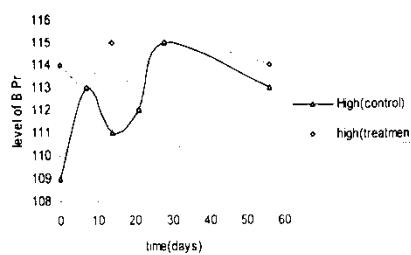
a-- $P < 0.01$

b-- $P < 0.05$

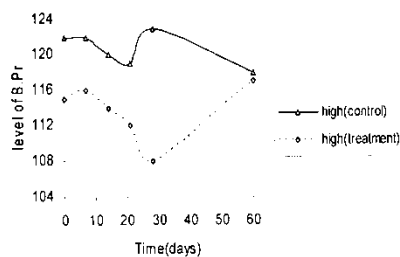
c-- $P < 0.025$

B.Pr.—blood pressure

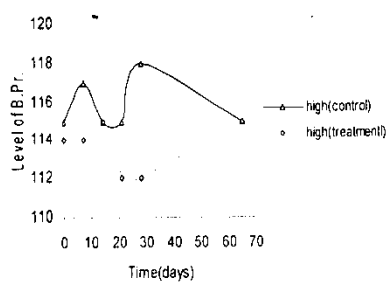
figar(1)the contrast in levels of high B.Pr between control and treatment in male.



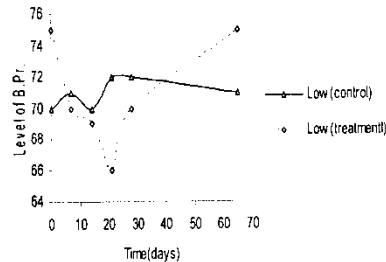
figar(2)the contrast in levels of high B.Pr between control and treatment in female.



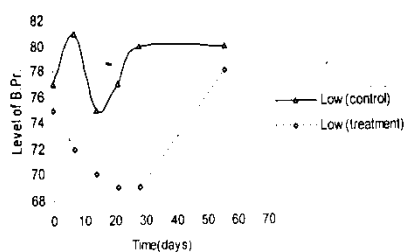
Fig(3)The contrast in levels of high B.Pr between control and treatment in total.



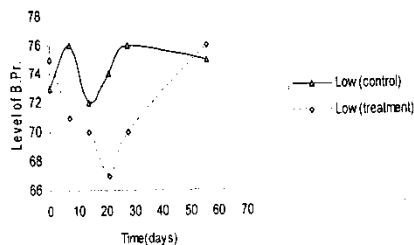
Fig(4)The contrast in levels of Low B.Pr. between control and treatment in male.



Fig(5)The contrast in levels of Low B.Pr. between control and treatment in female.



Fig(6)The contrast in levels of Low B.Pr. between control and treatment in total.



تأثير استخدام الثوم (*ALLIUM SATIVUM*) على مستوى ضغط الدم في الأشخاص الأصحاء

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الخلاصة

أجريت الدراسة على مجموعتين من الأشخاص الأصحاء، المجموعة الأولى، وتتكون من (١٠) الذين كانوا يتناولون مسحوق الثوم الجاف بمعدل (900mg/day) لمدة ٣٠ يوم ثم تركوه إلى ٣٠ يوم أخرى بدون تناول المسحوق الجاف، المجموعة الثانية تتكون من ١١ شخص وتمثل مجموعة المقارنة. لوحظ بعد ٧ أيام من تناول المسحوق الجاف، انخفاض معنوي ($p < 0.05$) في ضغط الدم الواطئ عند المجموعة الأولى (الذكور) والثالثة (كلى الجنسين) و غير معنوي ($p > 0.05$) عند المجموعة الثانية، بينما انخفاض غير معنوي ($p > 0.05$) في ضغط الدم العالي عند كل من المجموعتين الثالثة. أما بعد ١٤ يوم كان الانخفاض غير معنوي ($p > 0.05$) في كل من المجموعتين الثالثة على مستوى الضغط العالي، بينما على المستوى الواطئ فكان معنوي ($p < 0.05$)، ($p < 0.025$) عند المجموعة الأولى والثالثة وغير معنوي ($p > 0.05$) عند المجموعة الثانية. بعد ٢١ يوم من تناول المسحوق الجاف لوحظ انخفاض غير معنوي ($p > 0.05$) في كل من المجموعتين الثالثة على مستوى الضغط العالي و انخفاض معنوي ($p < 0.01$, $p < 0.025$) في المجموعة الأولى والثالثة على التوالي وغير معنوي ($p > 0.05$) في المجموعة الثانية على المستوى الواطئ. بينما بعد ٢٨ يوم من تناول المسحوق الجاف فإن الانخفاض غير معنوي ($p > 0.05$) في المجموعة الأولى والثالثة ومعنوي ($p < 0.01$) في المجموعة الثانية على مستوى الضغط العالي، أما تأثيره على مستوى الضغط الواطئ فكان غير معنوي ($p > 0.05$) في المجموعة الأولى والثانية ومعنوي ($p < 0.01$) في المجموعة الثالثة، كل تلك القياسات نسبتاً إلى مجموعة المقارنة. أما بعد ٦٠ يوم (٣٠ يوم من ترك تناول المسحوق الجاف) فكان الانخفاض غير معنوي ($p > 0.05$) في كل من المجموعتين الثالثة على المستويين العالي والواطئ، مقارنة مع مجموعة المقارنة.

الاستنتاج

يمتلك مسحوق نبات الثوم الجاف القدرة على خفض مستوى ضغط الدم عند الأشخاص الأصحاء وذلك بعد تناوله بصورة منتظمة ولمدة ٣٠ يوم بمعدل (900mg/day) وعلى المستويين العالي (أوضح عند مجموعة الإناث) ($p < 0.01$) بعد ٢٨ يوم من تناول المسحوق الجاف وكذلك الواطئ (أوضح عند مجموعة الذكور) ($p < 0.025$) بعد ٢١ يوم من تناول المسحوق الجاف.

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