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EFFECTS OF GARLIC EXTRACT ON SOME BIOCHEMICAL PARAMETERS OF BLOOD IN MALE ALBINO RATS

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ABSTRACT
The prophylactic efficacy of garlic (*Allium sativum* Linn) (Alliaceae) extract was studied on some biochemical parameters in male albino rats. The rats were divided into four groups A, B, C and D, keeping group A as a healthy control. The garlic extract was tried in three different doses, 1mL, 2mL and 4mL/ kg body weight as low, medium and high dose respectively and given orally for the period of 7, 14, 21 or 28 days daily to the rats of group B, C and D as stated above. The observation clearly indicates that there was significant decrease ($p<0.01$) in glucose and cholesterol level at each dose and time period, whereas SGPT and SGOT level decreases significantly ($p<0.05$ and $p<0.01$) at low and medium dose at all the periods of treatment, but at higher dose its level increases significantly ($p<0.05$ and $p<0.01$) with respect to control. The above study clearly indicates the benefits and drawbacks of raw garlic.

INTRODUCTION

Medicinal use of garlic (*Allium sativum*) has existed for centuries, but its therapeutic and pharmacologic properties still needs more investigation. Epidemiologic studies in the past 10 yrs have revealed aninverse relationship between garlic consumption and the incidenceof certain forms of diseases, including stomach, colon and laryngeal cancers (Yu-Yan Yeh and Lijuan, 2001). The importance of garlic was recognized many centuries ago, in early Egyptian, Chinese and Indian civilizations as an herbal or traditional medicine. Today, in many parts of the world garlic is being used both as prophylaxis and for the cure of variety of diseases including acute and chronic infections, gastritis, dysentery, typhoid fever, cholera, tuberculosis, pneumonia, diabetes mellitus, heart disease and hypertension (Moayad *et al.,* 2006). Garlic is the most commonly used herbal remedies and is considered to have hypocholesterolemic as well as other cardioprotective properties (Mahmoodi *et al*., 2006). Because of these attributes, it was thought worthwhile to find out whether the raw garlic extract can alleviate some of the risk factors associated with the blood biochemical parameters in mammals.

MATERIALS AND METHODS

The Extract: Six months old (after harvest) garlic bulbs were collected from the local market. Garlic bulbs were separated, peeled and washed with distilled water. After drying in shed, about 500g of clean garlic bulbs were crushed with the help of electronic grinder. The extract was strained through muslin cloth after squeezing the crushed materials (Sonepati *et al*., 2001).

Experimental Animal: Healthy adult male albino rats weighing approximately 150 – 200g were selected for the experiment. All animals were acclimatized for a week in the laboratory before use (Parthasarthy and Prasanth, 2009). The animals were housed five per cage under controlled conditions of a 12 h light/dark cycle, 50% of humidity and 26ºC ± 2ºC and minimum noise levels (Nagaraja *et al.,* 2007). Animals had free access to tap water *ad libitum* and normal diet.

Experimental Design: The animals were divided into four groups. Group A animals, which served as healthy control, were given normal feed and tap water *ad libitum* throughout the experiment. Group B, C and D animals were fed with 1mL, 2mL and 4mL/kg body weight garlic extract daily for 7, 14, 21 or 28 days daily. In all the groups the extract was force fed with by using ball – tipped needle every day between 11.00 a.m. to 12.00 pm (Esra Cikler *et al.,* 2005; Thomson *et al*., 2006).

Biochemical Studies: On day 7, 14, 21 and 28 respectively, the rats were sacrificed. The blood was collected in plane glass bottle and allowed to clot, centrifuged at 3500 ×g for 30 minutes. The serum was separated and transferred in to BD Vacutainer® Serum bottles (made in USA) between 10a.m. and 11a.m. This Serum was used to determined cholesterol, glucose, Serum Glutamic Pyruvic Transaminase (SGPT) and Serum Glutamic Oxaloacetic transaminase (SGOT) levels (Thomson *et al*., 2006; Moayad *et al.,* 2006). All these parameters were analyzed by fully automated Biochemical Analyzer, Transasia ERA CHEM – 5 Plus (Model No: EC – 5^{+}) made in India.

All the experiments were adequately replicated and subjected to statistical two way analysis of variance (ANOVA), followed by student's t-test.

RESULTS AND DISCUSSION

Results clearly indicates that consumption of raw garlic caused a significant decrease ($p < 0.01$) in cholesterol level in male albino rats. It was 4.23% at 7th day, 6.76% at 14th day, 11.28% at 21st day and 14.77% at 28th day in group B rats., 5.94% at 7th day, 9.56% at 14th day, 14.63% at 21st day and 16.66% at 28th day in group C rats., while 9.13% at 7th day, 12.17% at 14th day, 17.24% at 21st day and 19.96% at 28th day in group D rats as compare to control (Fig. 1).It is evident that garlic extract can lower the blood cholesterol level thereby improves blood profile to a significant extent. It is assumed that garlic reduces blood cholesterol level by inhibiting the lipogenic enzymes (Gebhardt and Beck, 1996; Durak *et al*., 2004; Thomson *et al*., 2006; Mahmoodi *et al*., 2006).

The blood glucose level also followed a similar pattern. There was significant ($p < 0.05$ and $p < 0.01$) decrease in blood glucose level than that of the control. It was 3.18% at 7th day, 7.75% at 14th day, 11.26% at 21st day and 14.13% at 28th day in group B rats., 7.69% at 7th day, 13.33% at 14th day, 17.92% at 21st day and 22.99% at 28th day in group C rats., while 11.62% at 7th day, 17.64% at 14th day, 23.32% at 21st day and 27.14% at 28th day in group D individuals (Fig. 1). The results were consistence with the findings of Thomson *et al*., (2006); Mahmoodi *et al*., (2006); Ashour *et al*., (2007). It is assumed that rennin-angiotensin system (RAS) has been implicated in the development of diabetic vascular complications. Peptidyl-dipeptidaseA (angiotensin converting enzyme, ACE) has a major role in this regard. It is assumed that garlic extract administration significantly effect on serum glucose level; it strongly decreased the serum ACE activity (Hosseini *et al*., 2007).

The level of SGPT/ALT was changed significantly by administration of garlic extract in male rats. At low and medium dose the level significantly decreases ($p < 0.05$ and $p < 0.01$). It was 2.54% at 7th day, 5.91% at 14th day, 11.52% at 21st day and 13.81% at 28th day in group B individuals., 8.11% at 7th day, 12.73% at 14th day, 19.23% at 21st day and 19.75% at 28th day in group C but in group D individuals the SGPT level elevated significantly ($p < 0.05$ and $p < 0.01$) with respect to control, it was 1.69% at 7th day (n.s.), 2.91% at 14th day, 4.92% at 21st day and 7.47% at 28th day (Fig. 1).

The level of SGOT/AST also followed a similar pattern. At low and medium dose, there was significant decrease ($p < 0.05$ and $p < 0.01$) of 5.73% at 7th day, 8.09% at 14th day, 13.37% at 21st day and 16.18% at 28th day in group B individuals., 10.33% at 7th day, 13.31% at 14th day, 15.68% at 21st day and 18.28% at 28th day in group C, but in group D individuals

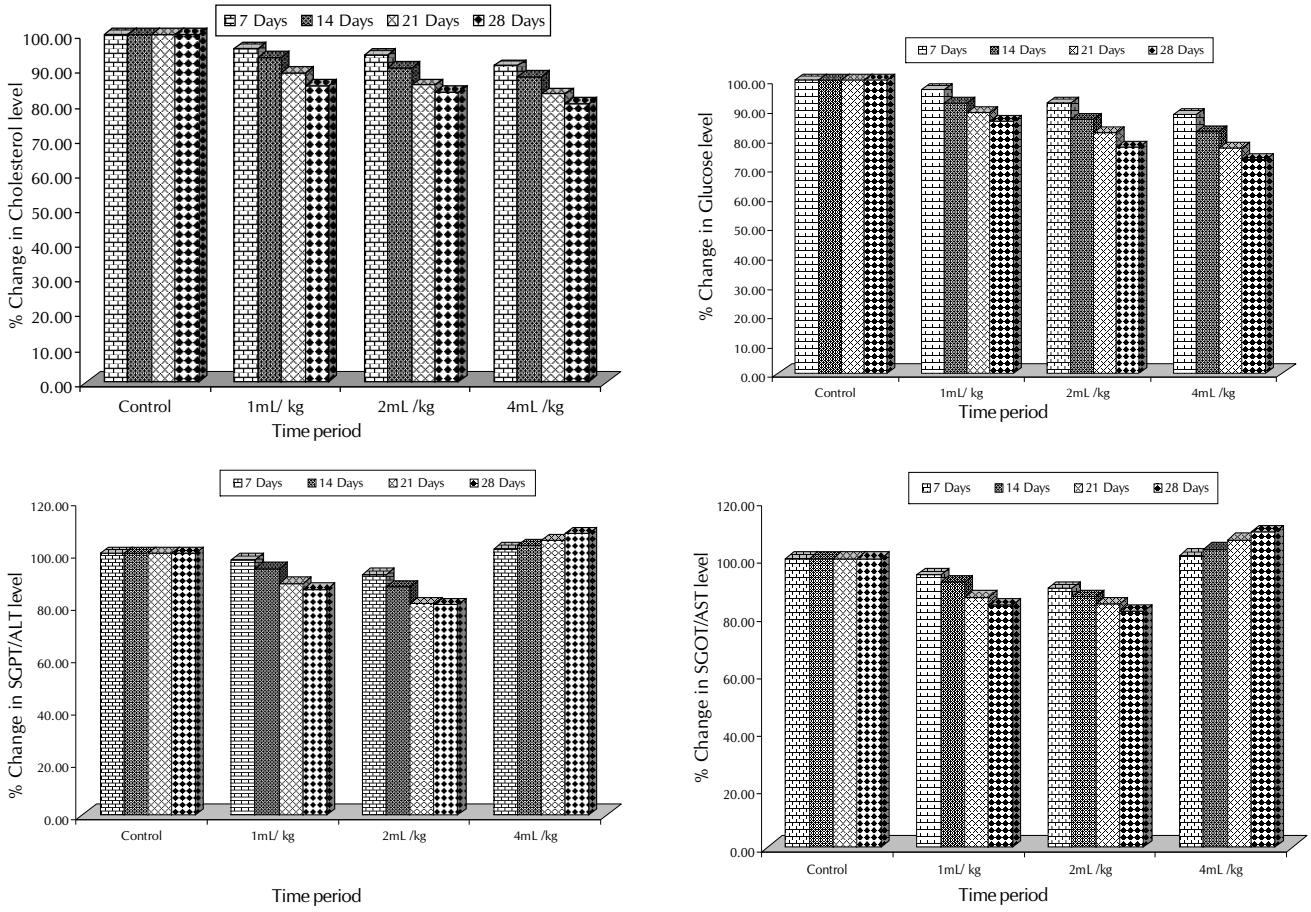

Figure 1: Change in percent level of Cholesterol, Glucose, Serum Glutamate Pyruvate Transaminase Enzyme (SGPT/ALT) and Serum Glutamate Oxaloacetate Transaminase Enzyme (SGOT/AST) in male albino ratsafter fed with different volumes of raw garlic extract for 7, 14, 21 or 28 days daily

the level elevated significantly ($p<0.05$ and $p<0.01$) with respect to control, it was 1.05% at 7th day (n.s.), 3.21% at 14th day, 6.44% at 21st day and 9.27% at 28th day (Fig.1). These observations are in consistence with the results of Eidi *et al*., (2006) and Moayad *et al*., (2006). SGOT/AST is widely used to assess the liver function. SGPT/ALT is a cytoplasmic enzyme which increases in acute hepatitis (Viral or toxic), Jaundice and liver cirrhosis, while SGOT/AST is found both in cytoplasm and mitochondria. SGOT/AST is increased in myocardial infarction, liver diseases, liver cancer and liver cirrhosis (Khan *et al*., 2008).

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