

## Effects of Ethanol Bulb-extract of *Allium sativum* on Serum Transaminase and Alkaline Phosphatase Activities in Albino Rats

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**Abstract:** The effects of ethanol bulb-extract of *Allium sativum* on serum transaminase and alkaline phosphatase activities were investigated on twenty male albino rats using spectrophotometric methods. The extract from *Allium sativum* was extracted with soxhlet apparatus in the presence of ethanol at 46°C. The rats were divided into four groups: A, B, C and D. Animals in groups A, B, C and D received the extract at the doses of 200mg/kg, 400mg/kg, 600mg/kg and 0mg/kg body weights respectively for two weeks by oral intubation. The rats in groups A, B and C had significant ( $p < 0.05$ ) elevations in body weights. The activities of serum alanine transaminase (ALT), aspartate transaminase (AST) and alkaline phosphatase (ALP) were significantly ( $p < 0.05$ ) reduced, hence the extract of *Allium sativum* could be hepato-protective.

**Key words:** Bulb-extract • *Allium sativum* • Serum transaminases • Alkaline phosphatase and albino rats

### INTRODUCTION

The International Standard Organisation (ISO) defined spices as vegetable products or mixture free from extraneous matter used for flavouring, seasoning and impacting aroma in foods [1]. Spices can also be defined as any aromatic vegetable substances having pleasant noticeable smell in whole or broken form whose significant function is seasoning and flavouring and from which no portion of any volatile oil or other flavouring substance has been removed [2].

Spices have been used since ancient days to flavour food, improve palatability and as perfumes [3]. They have also been employed in medicine especially in drugs that have been used for the treatment of coughs, diabetes and some cardiac problems [4]. Most spices possess anti-microbial properties which provide significant protection against many diseases [5]. They can also be used for the treatment of body pains, skin eruption, etc. [7]. Studies have been reported on spices, their effects and uses [8]. Some spices have anti-microbial activities and have been used to show therapeutic effects on bacterial infections [9]. Some examples of spices are garlic, pepper, ginger, etc [10]. The anti-microbial activities of these spices have been demonstrated to be caused by the potent phytochemicals which include carotenoids, saponins, etc. [4].

The needs of spices by man either for medication, flavouring, seasoning or any other purposes, call for research to examine the effects of the active biochemical ingredients in them and relate normal doses required by the body to avoid the risk of toxicity; hence the need to investigate the effects of ethanol bulb-extract from *Allium sativum* on serum transaminase and alkaline phosphatase activities using albino rats.

### MATERIALS AND METHODS

**Materials:** The chemicals and reagents were of analytical quality. Male Wister albino rats and fresh garlic bulbs were used.

#### Methods

**Extraction of Plant Materials:** The *Allium sativum* bulbs were washed and cut into small sizes before drying under mild sunlight. They were ground to powder with a blender. 50g of dried and ground *Allium sativum* bulbs was wrapped in a filter paper before placement in the soxhlet apparatus for extraction. 150ml of ethanol was used in the extraction at 46°C. The extract with the solvent were transferred to the hot air oven for evaporation of the ethanol to get the extract.

**Administration of the Extract:** Twenty male albino rats were divided into four groups (A, B, C and D). Groups A, B, C and D were administered with the extract by oral intubations at 200mg/kg, 400mg/kg, 600mg/kg and 0mg/kg body weights respectively for fourteen days.

**Collection of Blood Samples:** The blood samples were collected through heart puncture.

**Determination of the Activities of Transaminases and Alkaline Phosphatase:** The activities of alanine transaminase (ALT), aspartate transaminase (AST) and alkaline phosphatase (ALP) were measured by the methods of Reitman and Frankel (1957) [9].

**Measurement of Body Weights:** The body weights of all the rats were measured on daily basis with a weighing balance.

**Statistical Analysis:** Results were expressed as mean  $\pm$  standard deviation. The difference among means was analyzed by T-test. A value of  $p < 0.05$  was considered significant [7].

## RESULTS AND DISCUSSION AND CONCLUSION

The results recorded significant ( $p < 0.05$ ) reductions of serum transaminases and alkaline phosphatase activities in groups A, B and C (Fig. 1). These low levels of enzyme activities may be due to the presence of organosulphur compounds present in *Allium sativum* which reduces the rate of carcinogenesis in the liver and has inhibiting effects on the enzymes. Thus, similar observation was made by McNrindle *et al.* (2001) [6] when they studied garlic extract therapy in children with hypercholesterolemia.

The rats in groups A, B and C had significant ( $p < 0.05$ ) elevations in body weights. This, however, may be attributed to the administered extract from *Allium sativum* which had been found to be richer in adenosine (a nucleic acid base that forms the building blocks of DNA and RNA). This is consistency with an observation made by Warshafky *et al.* (2000) [10] that garlic increases the body weights of experimental animals. Ten different kinds of sugar are found in garlic which may be responsible for the increases in body weights of the animals. Block (2001) [2] made a similar observation when he administered garlic extract to albino rats.

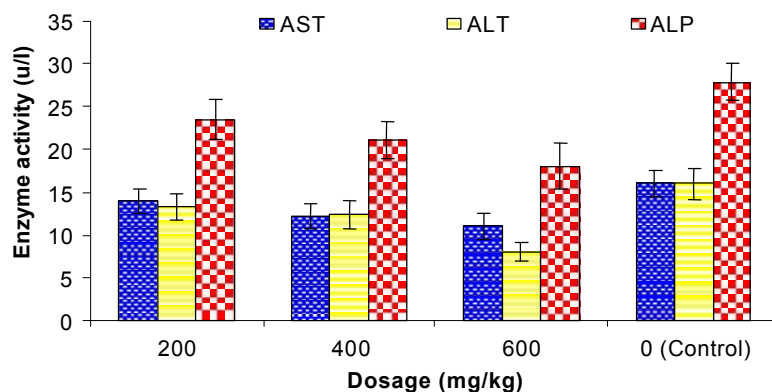


Fig. 1: Serum enzyme activities (u/l).

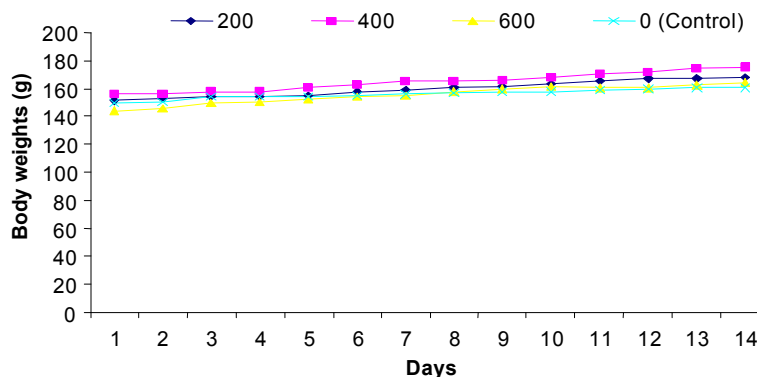


Fig. 2: Mean body weights (g) of the animals on daily bases within the two-week period of administration of the extract

In conclusion, *Allium sativum* bulb-extract significantly ( $p < 0.05$ ) reduced the serum activities of aspartate transaminase (AST), alanine transaminase (ALT) and alkaline phosphatase (ALP) and may be beneficial in the management of liver diseases.

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