

## HYPOGLYCEMIC EFFECT OF ALLIUM SATIVUM ON ORAL GLUCOSE TOLERANCE TEST IN RABBITS

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### ABSTRACT

The effect of crude garlic and its two organic extracts on blood glucose levels of rabbits have been studied. It was found that the petroleum ether extract and crude garlic juice had some hypoglycemic effect on the induced hyperglycemia in the experimental animals, whereas no effect was observed on the group fed on ethanol extract.

### Introduction

The therapy of diabetes has changed markedly in the past 20-25 years. Of some 2 million cases of diabetes diagnosed approximately 22% are controlled by diet alone, about 33% by insulin and about 45% by oral hypoglycemic agents (Burger, 1970). Except for insulin, none of the current therapeutic agents was available in 1957. The convenient oral therapy is based to a great degree on fundamental and significant discoveries of Watanabe (1918), Janbon et al., (1942), Frank et al, (1955), Loubatieres (1957) and others.

Many plants and natural product extracts and isolates from various areas of the world have been screened for their hypoglycemic activities. In some instances the desired effect was found, whereas sometimes, no significant results were obtained. Some of these substances also exhibited toxic effects on the liver of the experimental animal (Burger, 1970). *Allium cepa* (garlic) has also been tested various times for its hypoglycemic activity mostly in India.

Much work has been done by various workers to find the constituents of garlic and most of them have reported the presence of volatile oils as the active components (Nadkarni, 1976), (Fritz and Lehman, 1930). Effects of orally effective hypoglycemic agents from plants on alloxan diabetes were studied by Brahmachari and Augusti, (1962). Jain, Vyas and Mohatima (1973) reported the hypoglycemic effect of onion and garlic. Their work was based on the claim of Chopra et al., (1958) that domestic onion and garlic reduces the blood sugar level. Jain et al., reported that hypoglycemic effect of garlic juice and onion juice as compared to tolbutamide in oral glucose tolerance tests on four different group of rabbits, viz. the control group, garlic juice group, onion juice group and tolbutamide group. Some hypoglycemic activity was found in both garlic and onion as compared to tolbutamide and control groups.

## Materials and Methods

Newzealand white rabbits were used in this study having a body weight range in between 1-1.5 Kg, irrespective of sex. Glucose in blood plasma was determined by "DIRECT ORTHO-TOLUIDINE" method as proposed by Hultman (Richard and Donarld, 1974).

### *Extraction of Oils of Garlic:*

Cold extraction method was used for the extraction of garlic oils. Garlic cloves were crushed in electrical grinder after the removal of outer skin. It was then used to prepare ethanol and petroleum ether extracts of garlic, which is described below.

### *Preparation of Ethanol Extract:*

About 150 grams of wet minced garlic was placed in a one litre conical flask containing 500 ml of pure ethanol. The flask was then covered and kept at room temperature for 48 hours. During this period the flask was shaken occasionally. After 48 hours, the solvent containing garlic extract was filtered through glass wool. This filtrate was then subjected to vacuum evaporation at 40°C using a rotary evaporator for the separation of ethanol from garlic extract. The oily extract remaining in the flask was made moisture free by repeatedly dissolving in, and evaporating with benzene. The extract obtained was then stored in a small sample bottle which was tightly capped and kept in refrigerator at 4-8°C. This procedure was repeated with fresh minced garlic whenever the need for more ethanol extract arose.

### *Preparation of petroleum ether Extract:*

Method was essentially the same as described for the ethanol extract, except that petroleum ether was removed at a temperature of 25°C during vacuum evaporation.

## Results

The results obtained after comparing the glucose tolerance curve with and without the garlic extracts and juice (Fig. 1, 2 & 3), in the respective groups are stated below.

### *Group-I:*

This group was fed with garlic juice. Some blood sugar lowering effect was observed in this group. This effect was maximum after 60 minutes of glucose feeding.

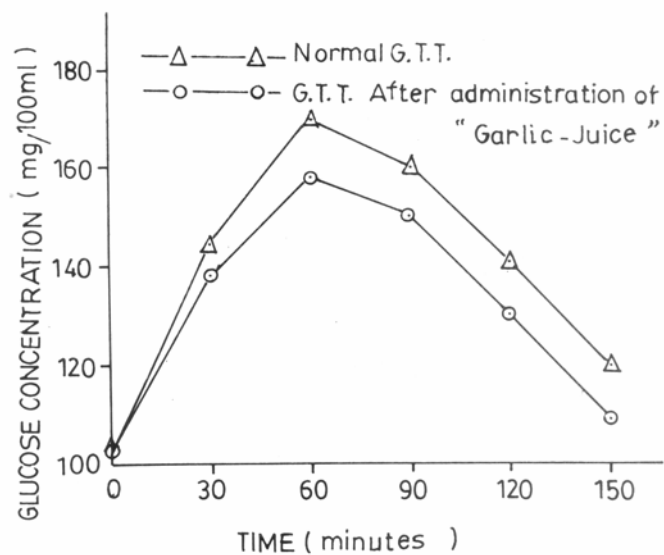


Fig. 1: Oral glucose tolerance curve for Group-I.

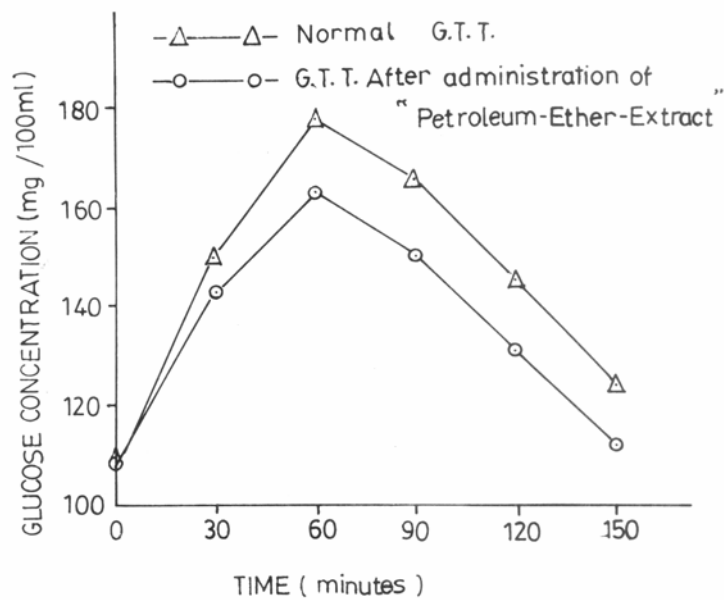


Fig. 2: Glucose tolerance curve for Group-II.

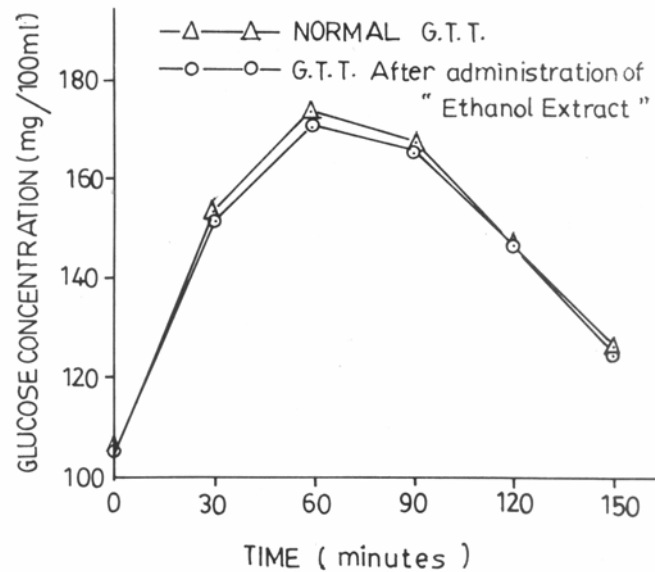


Fig. 3: Glucose tolerance curve for Group-III.

#### *Group-II:*

This group was fed with petroleum ether extract. A blood sugar lowering effect was also observed in this group. This effect was maximum after 90 minutes of glucose feeding.

#### *Group-III:*

This group was fed with ethanol extract. No blood sugar lowering effect was found in this group.

### **Discussion**

This study was aimed to find out the hypoglycemic effect of *Allium sativum* (garlic). The hypoglycemic activity of crude garlic juice along with ethanol and petroleum ether extracts was determined in three separate groups of rabbits.

For the evaluation of hypoglycemic activity, glucose tolerance tests were performed. The difference in the tests with and without the administration of garlic can easily be compared by plotting the respective tolerance curves.

Our results show that petroleum ether extract and crude garlic juice contain some substances which can be helpful in lowering the blood glucose level. This is well comparable with the finding of Jain et al. However, our ethanol extract

did not appear to produce some effect, in contrast to the findings of Jain and Vyas (1975), about ethanol extract having some hypoglycemic effect.

Although our results have shown that crude garlic and petroleum ether extract contain such substances which can bring down blood sugar level to some extent, *they* cannot be graded as strong hypoglycemic agents such as sulphonylureas or biguanides. However, these extracts showed some hypoglycemic effect as compared to salicylic acids, Luthra and Tayal (1962), etc.

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