MINI REVIEW

CONSTITUENTS OF GARLIC (Allium sativum) AND THEIR EFFICACY IN DIABETES MELLITUS

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ABSTRACT

Diabetes affects a large number of populations worldwide and the prevalence of this disease is rapidly increasing. Despite the availability of allopathic medications for diabetes, traditional remedies are desirable and are currently being investigated. Garlic (Allium sativum) has been reported to have antidiabetic activity. Evidences suggest that garlic has antioxidant, anti-inflammatory and antiglycative properties due to which it plays an important role in preventing diabetes progression and the development of diabetes-related complications. Large scale clinical studies with diabetic patients have been carried out to confirm the usefulness of garlic in the treatment and prevention of this disease. This article briefly reviews on the above stated subjected and the papers have been collected from internet resources including Pubmed, American Journal of Medicine, New England Journal of Medicine, Google Scholar and Journal of Medicinal Plant Research.

Keywords: Garlic (Allium sativum), allicin, anti-diabetic activity, internet resources.

INTRODUCTION

Garlic (Allium sativum) is a member of the Liliaceae family, is one of the most popular herbs used worldwide to reduce various risk factors associated with several diseases\(^1\). Historically, garlic has been used in traditional folk medicine as a natural cure for diabetes\(^2\). Modern scientific research also lends support to this traditional use\(^3\text{-}5\). Garlic contains 0.1\textendash}0.36% of a volatile oil, 33 sulfur compounds like aliin and allicin (antimicrobials), ajoene (anti thrombosis, anti microbial, cholesterol lowering activities, potent as aspirin), allylpropyl diallyl trisulfide sallylcyistine (retards the growth of chemically induced and transplantable tumor), vinylthiinines S-allylcysteine and sallylmercaptocysteine\(^6\text{-}8\). There are many researches going on worldwide to test the anti-diabetic activity present in garlic which are discussed as follows.

METHODOLOGY

This mini review is based on a literature survey and articles were selected from different sources like Pubmed, American Journal of Medicine, New England Journal of Medicine, Google Scholar, and Journal of Medicinal Plant Research.

DISCUSSION

There are many sulfur containing compounds in garlic. One of them is S-allyl cysteine sulfoxide (SACS), which is the precursor of allicin which is present in garlic oil and has been found to show significant anti diabetic effects in diabetic rats\(^9\text{-}11\). Administration of allicin in a dose of 200 mg/kg body weight decreased the concentration of serum lipids and blood glucose level in rats significantly\(^10\text{-}14\). In a research conducted on a human population in Pakistan, garlic was found to be effective in improving the glycemic control at all doses whereas exceedingly significant decrease in blood glucose level was observed at higher doses of 900, 1200 and 1500 mg\(^15\). Oral administrations of the garlic extract is reported to decrease serum glucose, total cholesterol, and many other enzyme levels, while increase serum insulin in diabetic rats but not in normal rats\(^16\text{-}22\). In a comparative study between the action of garlic extract and glibenclamide (600 \(\mu\)g/kg), the anti-diabetic effect of the extract was
found to be more effective than that observed with glibenclamide.\textsuperscript{4} In another study, it was noted that the combination of garlic extract with glibenclamide produced synergistic effect which could result in lowering the dose and side effects related to the use of glibenclamide alone\textsuperscript{25}. In another comparative study between garlic extract with an anti-diabetic agent, gliclazide, it was observed that the use of garlic extract is beneficial in lowering the blood glucose and cholesterol levels as well as levels of many enzymes in blood. It was found that the level of insulin in blood was increased by the use of garlic extract\textsuperscript{24}. It was suggested in a study that allicin (Fig. 1) works as a sulfhydryl donor to prevent degradation of insulin, but no direct evidence has been presented to support this hypothesis\textsuperscript{25}.

![Chemical structure of allicin]

**Fig. 1.** Chemical structure of allicin.

The hypoglycemic action of garlic could possibly be due to an increase in pancreatic secretion of insulin from β-cells.\textsuperscript{26,27} It has been previously suggested that garlic (allicin) can enhance serum insulin by effectively combining with compounds like cysteine, which would spare insulin from SH group reactions which are a common cause of insulin inactivation.\textsuperscript{28,29}

**CONCLUSION**

It is concluded from the literature review that the garlic (*Allium sativum*) can be considered as an excellent anti-diabetic agent. When a safe amount of garlic is taken it can help in lowering the blood sugar levels and may keep it within normal range i.e., between (80–110 mg/dL).

**REFERENCES**

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