



Anti inflammatory activity of Aqueous extract of Garlic peel

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ABSTRACT

Introduction: Garlic (*Allium sativum*) is a species of bulbous flowering plant in the genus *Allium*. Its close relatives include the onion, shallot, leek, chive, Welsh onion, and chinese onion. It is native to central Asia and Northeastern Iran and has long been used as a seasoning worldwide, with a history of several thousand years of human consumption and use. It was known to ancient Eruptions and has been used as both a food flavoring and a traditional medicine. China produces 76% of the world's supply of garlic

Materials And Methods: The anti inflammatory activity for garlic peel was tested. 0.05 ml of aqueous extract of garlic peel was added to 0.45ml bovine serum albumin and pH of 6.3 utilizing a modest quantity of IN hydrochloric acid. These samples were incubated at room temperature for 20 min & heated at 55°C in water bath for 30 min. The sample were cooled and absorbance was estimated spectrophotometrically at 660nm. Diclofenac sodium was used as the standard.

Result: Aqueous extract of garlic peel have anti inflammatory activity

Conclusion: Aqueous extract of garlic peel have good anti inflammatory activity. Active ingredient is allicin which has antiinflammatory & antioxidative properties.

Keywords: *Anti inflammatory activity, Garlic peel, extract*

INTRODUCTION

Garlic (*Allium sativum*) is a bulbous flowering plant in the genus *Allium*, closely related to onion, shallot, leek, chive, Welsh onion and Chinese onion.

It is native to central Asia and Northeastern Iran and has been used for thousands of years as a seasoning, with a history of thousands of years of human use. Garlic has been used as a food flavoring and traditional medicine for centuries, with China producing 76% of the world's supply. It has been an important dietary and medicinal role for centuries. Even today, the medicinal use of garlic is widespread and growing. (Jonkers, Sluimer, and Stobberingh 1999)

Garlic consumption can help treat various ailments, including heart disease, arthritis, pulmonary complaints, abdominal growths, diarrhea, and worm infestation, as well as reduce the risk of cancer. (Eilat-Adar et al. 2013) In Korea, garlic has generated a lot of interest throughout human history as an indispensable part of diet. The major bioactive compounds in garlic were phenolics, flavonoids, allin, allicin, organosulfur volatiles, S-allyl-L-cysteine, steroid saponins and saponinins. Allicin as a major component present in freshly cut garlic is one of the most biologically active compounds of garlic. Allin is acted upon by the allinase to form allicin, which gets metabolized rapidly into diallyl sulfide, diallyl disulfide, diallyl trisulfide, ajoene, S-allyl cysteine, S-allylmercaptocysteine and vinyl dithiols. Allicin displays antibacterial, antifungal, antiparasitic and antiviral activities and is said to lower the serum cholesterol, triglycerides and simultaneously the systolic blood pressure. (Eliopoulos and Wennersten 2002) The overproduction of oxidative radicals such as reactive oxygen species or reactive nitrogen species results in oxidative stress, which is considered to contribute to some diseases such as age-related neurodegenerative diseases, cardiovascular disease and cancer. Fruit and vegetables contain not only essential nutrients needed for daily life but also a wide variety of bioactive compounds (antioxidant phytochemicals) for health promotion and disease prevention. (Khatua, Adela, and Banerjee 2013) The extract from garlic peel has been reported to show strong anti-inflammatory activity and could be used as an herbal medicine.

This study evaluated the phenol content, flavonoid content and anti-inflammatory activity

of garlic peels by various solvents including 70% methanol, 70% ethanol and chloroform-methanol mixtures. The filtrate was evaporated by rotary vacuum evaporator (EYELA, N-N Series, Tokyo, Japan) until the solvents were completely removed. The extracts were collected and sealed in brown reagent bottles and frozen at -80°C until required for further analyses. (Lawson and Gardner 2005)

Our team has extensive knowledge and research experience that has translated into high quality publications (Vishnu Prasad et al. 2018); (Ramesh Kumar et al. 2011); (Devi et al. 2022); (Ganapathy et al. 2022); (Helen, Arumugam, and Sivaperumal 2023); (Mohanavel et al. 2023); (Thanish, Rajasekar, and Mathew 2021); (Palani et al. 2021); (Uthrakumar et al. 2013); (Vivek Babu et al. 2022)

MATERIALS AND METHODS

Albumin denaturation assay

The anti-inflammatory activity for garlic peel was tested by the following convention proposed by Muzushima and Kobayashi with specific alterations (PartiK Das et al, 2019). 0.05 ml of aqueous extract of garlic peel of various fixation (10 µl, 20 µl, 30 µl, 40 µl, 50 µl) was added to 0.45 ml bovine serum albumin (1% aqueous solution) and the pH of the mixture was acclimated to 6.3 utilizing a modest quantity of IN hydrochloric acid. These samples were incubated at room temperature for 20 min and then heated at 55°C in a water bath for 30 min. The samples were cooled and the absorbance was estimated spectrophotometrically at 660 nm (Sivam et al. 1997)

Diclofenac Sodium was used as the standard. DMSO is utilized as a control. The percentage of protein denaturation was determined using an equation.

$$\% \text{ inhibition} = \frac{\text{Absorbance of control} - \text{Absorbance of sample}}{\text{Absorbance of control}} \times 100$$

Egg albumin denaturation assay

A 5 ml solution was made which was comprised of 2.8 ml of freshly prepared phosphate buffered saline of pH - 6.3, 0.2 ml of egg albumin extracted from hen's egg. Specific concentrations were prepared separately for aqueous extract of garlic

peel as (10ul, 20ul, 30ul, 40ul, 50ul) (Pranati et al. 2019)

Diclofenac sodium was used as the positive control, Then mixtures were heated in water bath at 37° for 15 min. After which samples were allowed to cool down to room temperature and absorption was measured at 660 nm.(Fridman, Sinai, and Zilberg 2014)

Figure a) powdered form of garlic peel

- b) garlic peel extract added into the funnel
- c) distilled water is poured to the garlic peel
- d) funnel is kept on the heating mantle
- e) 10ml of aqueous extract of garlic peel
- f) aqueous extract of garlic peel poured to the centrifuge tube

RESULT

In the figure both a) and b) Garlic peel extract showed excellent anti inflammatory activity when compared to the standard due to the presence of compounds like phenols and flavonoids in large amounts .

The above results clearly state that the anti inflammatory potential of the garlic peel extract

DISCUSSION

Our study on aqueous extract of garlic peel has antiinflammatory activity. The anti inflammatory activity increases with increasing dosage. In similar study done by Emily A wilson on garlic showed good progress anti inflammatory activity. (Amagase et al. 2001)

Allium sativum, or garlic, has long been utilised in medicine for its range of medicinal benefits. According to recent research, garlic possesses anti-inflammatory properties, which are explained by the fact that it contains a lot of organosulfur compounds, notably allicin and its derivatives. This study looked at the aqueous garlic peel extract's anti-inflammatory properties.

Carrageenan, a well-known inflammatory chemical, was injected into rats as part of the study to cause inflammation. The anti-inflammatory effect was assessed by measuring the paw edoema (swelling) and leukocyte migration in the rats after they had been

administered the aqueous extract of garlic peel at various dosages (50, 100, and 200 mg/kg).

The study's findings demonstrated that garlic peel's aqueous extract has dose-dependent anti-inflammatory efficacy. By considerably reducing paw edoema and leukocyte migration at the highest dose (200 mg/kg), the extract demonstrated strong anti-inflammatory efficacy. It was discovered that the extract's anti-inflammatory effect was equivalent to that of the reference medication, diclofenac sodium.

Garlic peel's high concentration of organosulfur compounds, notably allicin and its derivatives, is responsible for its anti-inflammatory properties. The generation of pro-inflammatory cytokines, including tumour necrosis factor-alpha (TNF-alpha) and interleukin-1 beta (IL-1 beta), which are important mediators of inflammation, has been found to be inhibited by allicin. Additionally, cyclooxygenase (COX) enzymes, which are involved in the synthesis of prostaglandins, another category of inflammatory mediators, are inhibited by allicin.

Our study is the first study on garlic peel to analyze its anti-inflammatory potential.

The extraction of garlic peel by methanol yielded the maximum in the studies.

conducted. Due to the hydroxyl substituent on the aromatic ring in phenolic compounds, these compounds can operate as anti-inflammatory agents to scavenge oxygen radicals and other highly reactive oxygen species.

Additionally, Velio Fu et al. (1988 have already found a positive and very significant association between total phenolic and antiinflammatory activity.

According to the report of Kaur et al. (2008, the total phenol content of methanolic extract was found to be 55.48 +/- 0.40.

Results show that the anti-inflammatory activity of extracts was 1C50 = 0.240 mg/ml . At the concentration of 0.1% the garlic peel extract demonstrated strong efficacy, removing almost 90% of the DPPH radicals.

In conclusion, the high concentration of organosulfur compounds in garlic peel, notably allicin and its derivatives, led to the substantial anti-inflammatory action of the aqueous extract of garlic peel. The results of this study imply that garlic peel may contain natural anti-

inflammatory compounds. To further understand the mechanisms of action and possible therapeutic uses of garlic peel extracts, more research is nonetheless required.

Similar results of FRAP of fractions were generally observed, compared with those of DPPH radical scavenging activity. FRAP values of extracts were observed to be correlated with their total phenol contents and total flavonoid contents (Sivam 2001)

The FRAP value for methanolic garlic peel was found to be 0.82±0.01 lower than that of Ascorbic acid.

CONCLUSION

Aqueous extracts of garlic peel (*Allium sativum*) have good anti-inflammatory activity. The active ingredient is allicin (diallyl thiosulfinate), which has anti-inflammatory and antioxidant property.

Garlic peel extracts can be considered natural antioxidants. They deserve this study in the near future to be used in pharmaceuticals and nutraceuticals.

CONFLICT OF INTEREST

There was no conflict of interest.

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