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PHARMACOLOGICAL ACTION OF GARLIC

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ABSTRACT
Around the world, garlic (Allium sativum L.) is a bulbous herb that is utilized as a food, spice, and medicinal. The traditional knowledge that has been passed down from generation to generation informs its medical application. These days, scientists from a variety of fields are focusing their research on learning more about how garlic affects human health. Researchers' interest in garlic has been sparked by the need to find a medication with a wide therapeutic range and low toxicity, especially among medical professionals. According to recent research, garlic extract exhibits antimicrobial action against a wide variety of virus, fungus, and bacteria types. Many writers have praised the benefit of garlic in reducing cardiovascular disease. Studies on the chemical components of garlic have been conducted to treat hypertension, hyperlipidemia, and platelet aggregation.Many disorders, including antidiabetic, antioxidant, anti-inflammatory, hepatoprotective, antihelmentic, antibacterial, antiviral, antifungal, and wound healing, have been treated using garlic and its constituents. Alzheimer's disease, cancer, cardiovascular disease (including atherosclerosis, hypertension, thrombosis, and hyperlipidemias), dermatological conditions, stress, and infections are among the illnesses that garlic's therapeutic properties may help reduce. This article's goal is to provide an overview of the pharmacological properties, traditional use, and active ingredients of garlic. It may also be utilized as a likely natural source for the development of novel medications.
KEYWORDS: *Garlic(Allium Sativum L.), anti-inflammatory, antihelmintic, novel medications, thrombosis.*

INTRODUCTION

Garlic is one of the most ancient and significant herbs in the world, having been consumed and used by people for a very long time. It is native to northeastern Iran and Central Asia.. Garlic's therapeutic properties have reportedly been documented on the walls of ancient temples, and early Egyptians are reported to have employed it to treat diarrhea. Garlic contains a variety of phytochemicals, including organic sulfides, phenolic compounds, saponins, and polysaccharides, which are linked to numerous health benefits. It is used as a medicine to treat a number of common illnesses, including the common cold, the flu, snakebite, and hypertension.[1] Garlic's numerous therapeutic properties are attributed to its elevated content of sulfur compounds, including diallyl disulphide, S-allylcysteine, diallyl trisulfide, and allicin. It can be consumed raw, as fresh leaves or dried cloves, or processed into garlic oil, garlic extracts, and garlic powder, with the chemical makeup and amount of bioactive components varying depending on the form. Garlic was utilized as a medicine by the Babylonians, Egyptians, Phoenicians, Greeks, and Romans to treat intestinal problems, skin conditions, bacterial infections, wounds, and tumors. Garlic has been used to treat epidemic infections and amoebic dysentery before the advent of antibiotics.[2]



Figure No. 1

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Traditional Uses of Garlic

Due of its strong flavor, it is frequently used as a condiment or spice worldwide.
Garlic's pungent taste, lachrymatory properties, and spicy scent are caused by organosulfur compounds such diallyldisulfid and allicin. Foods taste better and are easier to digest when garlic is added. Both fresh and dried garlic are used as spices in the culinary business. According to Ahmad (1996), it is dehydrated to create a variety of products, including flakes, slices, and powders. [3]

Therapeutic Uses of Garlic

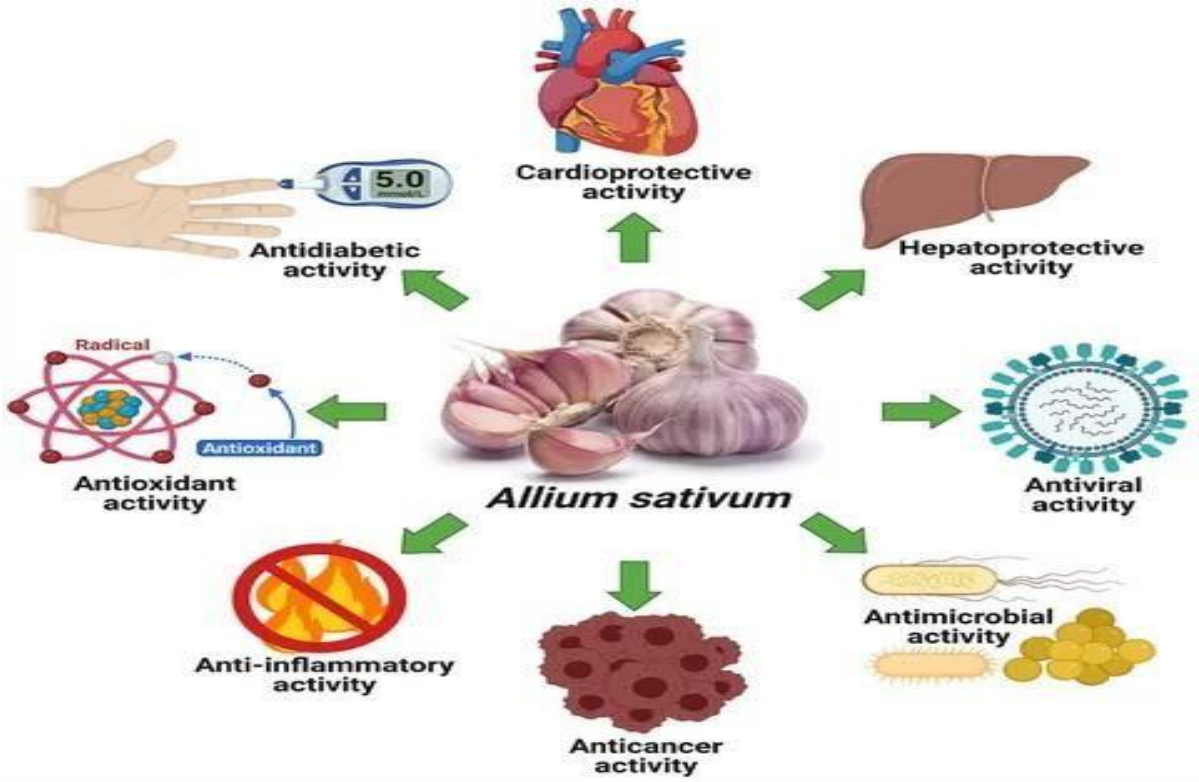


Figure no. 2

Nutritive Value of garlic

Table no. 1 :- Nutritive value of Garlic

Substance	Amount Found/100g	Substance	Amount Found /100g
Water	58.57%	Vitamin B6	1.235 mg
Carbohydrate	33.05 g	Vitamin C	31.2 mg
Sugars	1.00 g	Calcium	180 mg
Energy	149 kcl	Vitamin B9	1.235 mg
Dietary fiber	2.2g	Iron	1.6 mg
Protein	6.39 g	Phosphorus	152 mg
Fat	0.5 g	Magnesium	25 mg
Niacin	0.7 mg	Magnesium	1.672
Thiamine	0.2 mg	Sodium	17 mg

Pharmacological Effects of Garlic

Anticancer

A primary area of research and public health policy concern has been the relationship between nutrition and food and cancer risk. The etiology and prevention of cancer are significantly influenced by diet. It's interesting to note that dietary changes can significantly lower the incidence of cancer, according to numerous research. To gather enough evidence of a causal link between

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dietary alteration and cancer, many epidemiological designs have been used. This presents the opportunity to start primary and secondary preventive strategies for cancer control and prevention. Cancer is a multifaceted illness marked by aberrant cell proliferation and tissue invasion by neighboring cells. Numerous signaling pathways that are dysregulated are linked to the start, growth, and development of this illness. The major signaling proteins for different aspects of cell growth and survival include extracellular signal-related kinase (ERK), phosphatidylinositol 3kinase (PI3K), protein kinase B (commonly known as Akt), and mitogen-activated protein kinase (MAPK).[4]

Anti-Inflammatory

Because IL-10 dysregulation and decreased IL-12 synthesis occur in inflammatory bowel disease (IBD), the anti-inflammatory activity of garlic extract inhibits the production of IFN- by preventing IL-12 from attaching to its receptor on T and NK cells. Chronic hyperproduction of NFkB and/or COX or LOX results in excess inflammation and is a contributing factor to chronic pro-inflammatory disorders such diabetes, cardiovascular disease, and other conditions . Additionally, LOXproduced messengers have the ability to either promote or inhibit programmed cell death. Cancer can result from insufficient cell death, whereas excessive cell death plays a role in conditions like neurological diseases.[5] It has been observed that phytochemicals associated to garlic and garlic extracts have antiinflammatory properties. According to a study, garlic extracts significantly reduced the damage and inflammation to the liver brought on by Eimeria papillate infections. According to observations made by Hobauer et al. and Gu et al. garlic's anti-inflammatory properties result from its ability to prevent neutrophilic granulocytes from emigrating into epithelia. The anti-inflammatory properties of aged black garlic (ABG) may be attributed to its strong antioxidant activity. Tumor necrosis factor-α (TNF-α)-induced NF-κB activation in human umbilical vein endothelial cells is decreased by the ABG chloroform extract.[6]

Antifungal

Significant antifungal activity was found in numerous in vitro and in vivo investigations.[7] The interesting herb garlic (Allium sativum) is said to have several uses, from repelling vampires to treating fungus infections, which has just now been documented. Infections by fungi are becoming a significant component of contemporary infectious illness treatment. The increased use of immunosuppressive and cancer chemotherapeutic drugs, the creation and use of broader-spectrum antibiotics in recent times, or the longer longevity of immunocompromised people could all be contributing factors to the ubiquity of fungi as pathogens. Extracts of A. sativum are frequently utilized in the People's commercial system to treat patients with systemic fungal diseases. Researchers discovered evidence in favor of using A. sativum to treat cryptococcal meningitis.[8]

Antidiabetic

The hallmark of diabetes mellitus, a complicated metabolic illness, is hyperglycemia brought on by deficiencies in either insulin action or secretion, or both. Anomalous lipid, protein, and carbohydrate metabolism is another important risk factor for diabetes and its sequelae. Studies have demonstrated the significant impact of garlic on blood glucose regulation and the reduction of problems related to diabetes. Numerous research studies have demonstrated the effectiveness of garlic in lowering blood glucose levels in both human and animal models of type 1 and type 2 diabetes.[9]We designed a study to assess the hypoglycemic effects of garlic in patients with type 2 diabetes mellitus in comparison with the standard antidiabetic agent metformin and placebo because prior clinical trials have cast doubt on the proposed hypoglycemic effects of garlic and there is no prior trial showing the effects or benefits of garlic at different doses on blood glucose in patients with diabetes. We also took into account the high incidence of diabetes in Pakistan and the general public's widely held belief that garlic has beneficial effects on various cardiovascular risk factors.[10]

Antioxidant

Antioxidant phytochemicals found in aged garlic extract (AGE), which is made from fresh garlic extracts kept for an extended length of time, shield the garlic from oxidative damage. Garlic extracts age over a period of up to 20 months through the modification of unstable molecules with antioxidant activity, like allicin, and the increase of stable and highly bioavailable water-soluble organosulfur compounds, like S-allylcysteine and S-allylmercaptocysteine, which give the extract antioxidant properties. According to reports, disorders where ROS are thought to be the primary cause can be effectively treated with garlic. The risk of atherosclerosis, cardiovascular disease, and cerebrovascular illness is raised by oxidative alteration of low-density lipoprotein (LDL). Oxidized low-density lipoprotein (LDL) develops novel antigenic characteristics that the host immune system identifies as "foreign". Thus, oxidized low-density lipoprotein (LDL) triggers multiple novel biological reactions that lead to artery thickening and narrowing, the primary process of atherosclerosis. Borek and Amagase have referenced multiple studies that show

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garlic's antioxidant qualities. In rat heart, liver, and kidney, raw garlic homogenate increased endogenous antioxidants and decreased basal lipid peroxidation in a dose-dependent manner.[11]

DISCUSSION

The king of medicinal plants, garlic, is incredibly beneficial to poultry. The performance of the birds has improved when garlic is added to poultry feed, which eventually increases the potential for production. Garlic also lowers the amount of harmful germs, including Salmonella, Clostridium, E. coli, and Campylobacter. Benefits to the consumer's immunity are evident. Therefore, it can be utilized to successfully substitute the growth promoter that is antibioticbased in poultry feed. Despite the abundance of studies in this field, rules for the use of garlic in chicken feed still need to be established. More study is required on this economically friendly supplement to achieve this goal.

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