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HISTORICAL APPROACH OF GARLIC (ALLIUM SATIVUM) IN FOOD, SPICES AND IT'S PHYTOCHEMICALS AND THERAPEUTIC USES IN MEDICINE: A REVIEW

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ABSTRACT

Garlic *(allium sativum)* is most commonly used in food spices and as a medicine in lots of countries. It belongs to family *amaryllidaceae*. An essential oil is extracted from garlic clove which contains various chemical constituents like 33 sulphur containing compounds and 17 amino acids. There are mainly two methods are used for extraction of garlic one is by using water and another is by using ethanol. Garlic have many biological activities including Antihypertensive, Anticancer, Antiviral, Antibacterial, Antifungal, natural immunity booster, prevention of diabetes.

KEYWORDS: Garlic, *Amaryllidaceous,* Antihypertensive, Anticancer, Antiviral, Antibacterial, Antifungal.

INTRODUCTION

Garlic *(allium sativum)* is born in middle Asia, South Asia, or South-western Siberia. It is mostly use as food, spice and medicinal purposes. Garlic consists of bulb and clove belonging to family *Amaryllidaceous*. Garlic clove is used as extraction. An essential oil of garlic is extracted by process of steam distillation of garlic clove using solvents n- hexane or petroleum ether. Garlic oil contains sulphide as disulphide and dilly trisulphide. It is used as capsule preparation. Garlic is highly effective respiratory tract infections. Garlic have many

biological activities including Antihypertensive, Anticancer, Antiviral, Antibacterial, Antifungal, natural immunity booster, prevention of diabetes. In traditional system in India i.e. Ayurveda, Unani, Tibia make large scale use of garlic. The active component of garlic is sulphur contain compounds. 33 sulphur contain compounds are present in garlic.

There are 17 amino acid are present. It contains enzymes, minerals, copper, calcium, germanium, potassium, magnesium, selenium, zinc, vitamins, A, B1, C, fibber and water. Garlic is white in colour. Around white (G-41) variety cultivated in regions of Madhya Pradesh and Maharashtra. Yamuna safed (G-1) variety developed by NHRDF in white colour cultivated in regions of all over India.[1,5,6,7,8]

MORPHOLOGY

Leaves green in colour and 12-15 cm tall (some species can grow up to 60 cm tall). Garlic fruit is whitish or slightly yellowish in Colour with Pungent Garlic odour.

Depending on the variety, the long leaves are typically arising from a short hard stem above the bulb or emerge from a softer pseudo stem made up of overlapping leaf sheaths. The bulb of garlic is covered with membranous skin and encloses up to 20 edible bulblets called cloves.[1,12]

Fig: *allium sativum* (Garlic).

Taxonomical classification[1]

1. Kingdom : Plantae
2. Clade : Tracheophytes
3. Clade : Angiosperm
4. Clade : Monocot
5. Order : Asparagales
6. Family : Amaryllidaceae
7. Subfamily : Allioideae
8. Genus : Allium
9. Species : A.Sativum
10. Binomial name: Allium Sativum

Origin and Geographic distribution

Garlic is originated from central Asia (Kazakhstan, vzbkistan, and western China). This was confirmed by Phylogenetic analysis based on the molecular and biochemical market's, also indicating a secondary diversity centre in the caucus, garlic spread to the Mediterranean in ancient times, It was already grown in Egypt in 1600 BC and is an ancient crop in India and China no sooner than At present garlic is grown all over the world from the equator to latitudes of 50°c both hemispheres is most popular in China, the Mediterranean and Latin America, garlic is grown during the cold season in the Sahel and at high elevation in east and southern Africa. It was popular crop in the savaan zone, with a wide genetic varieties in local cultivate it is rarely, if ever, found in hot and humid low lands.[1,12]

Harvesting

Harvesting take places when the leaves start turning yellow and being to dry up. This is 100-120 days after planning, depending on cultivar and growing conditions in an high lands garlic may take be dried in the field to avoid a bluish discoloration they should not be dried under direct sunshine and are therefore windowed with the leaves covering the bulbs of Garlic.[1,12]

Chemical constituents

Garlic bulb contains more than two hundred chemical compounds. Volatile oil with sulphur containing compound. Garlic is dividing into two groups a) sulphur compound b) sulphur free active substance allicin. Garlic bulk containing 65 % of water, 28 % of carbohydrates, 2.3 % of organosulfur compound, 2 % of protein (allinase), amino acid 1.2 % and fibber 1.5 %. garlic bulb contain 17 amino acid i.e lysine, histidine, arginine, aspartic acid threonine,

Swine, glutamine, proline, glycine, alanine, cysteine, valine, methionine, isoleucine, leucine, tryptophan, phenylalanine. Garlic contain of high concentration of sulphur compound. It contains at least 33 sulphur compound such as thiosulfonate (allicin) represent 70-80 % of thiosulfate form other thiosulfonate formed include allyl-ss (O) -methyl (6-16 % of total), trans -1-propenyl (0.2-0.4 %), trans -1-ss (O) methyl (2 %). Thiosulfate is related to crush garlic are reactive molecules and involving number of transformation depend on the temperature PH and solvent condition. Allyl-s-thiosulfonate (allicin) is stable eight thiosulfate. Half-life of allicin at room temperature is 10 days in 1 min, citric acid (PH3) 4 days in water, 48 hr. in methanol or chloroform, 24 hr. in ethanol, 24 hr. in hexane and 3 hr. in ether. Allyl methane thiosulfate is low polarity in solvent. Primary develops 1-3 vinyldithiin (2-vinyl- 4H-3-dithiin) (51 % of total), 1-2 vinyldithiin (3-vinyl 4H-1, 2-dithiin) (19 % total) less amount of Ajoene (E, Z-4, 5, 9-trithiododeca-1, 6, 11-trien-9-oxide) (12 % total) sulphides (18% of total).[1,2,3,5,7]

Constituents with their nutritional Values and Functions.[9]

Garlic, raw	Nutritional value per 100 g (3.5 oz)	Metabolic function
Carbohydrates	33.06 g	Play key roles in the immune system, fertilization
Sugar	1 g	Sugar good for human health
Dietary fibber	2.1 g	Production of healthful compounds
Fat	0.5 g	Membrane synthesis, tissue
Protein	6.36 g	Build body tissues
Thiamine B1	17 % (0.2 mg)	Synthesis of acetylcholine
Riboflavin (B2)	9 % (0.11 g)	Forms the coenzyme FAD
Niacin (B3)	5 % (0.7 g)	Forms the coenzyme NAD
Pantothenic acid (B5)	12 % (0.596 g)	Forms coenzymes involved
Vitamin B6	96 % (1.235 mg)	Coenzyme in chemical reaction
Folate (B9)	1 % (3 µg)	Induce DNA synthesis
Vitamin C	38 % (31.2 mg)	Promotes protein synthesis
Calcium	18 % (181 mg)	Matrix component of bone
selenium	(14.2 µg)	Cofactor of glutathione oxidase
Sulphur	16 %	Antimicrobial

EXTRACTION PROCEDURES OF GARLIC ACTIVE CONSTITUENTS

MATERIAL AND METHODS

Plant material used for extraction and fresh garlic gloves *(a. sativum)* of three different garlic verities. All garlic verities obtained by vegetable's crops. Demineralised water and ethanol were used for extraction garlic preparation for garlic extraction.[4,5,7]

Method 1: Preparation of water garlic method

Fresh (90 g) Extract were mixed with in demoralized water (200 g) and grinded in a blender for 15 min. The solid parts of the garlic were removed by filtration sterile gauze follow by centrifugation at 4500 rpm for 30 min at 20 degree c. The supernants was filtrated though filter paper a using vacuum pump. The sample extract was collected stored in refrigerator the 4°c.

Method 2: Ethanol garlic extract

The recipe for the preparation of ethanol extraction used in an work originates from ancient times, It was a folk remedy few days the composition based on the recipes is a commercially available in the from an of drops (Bio capillary Kali, prirodana far) for an the preparation fresh garlic bulbs (300 g) were chopped into the small pieces mixed with an (96 %) ethanol (300 g) and left to 10 days in the dark glass bottle tightly closed container protected from the light at room temperature. With occasionally mixed the solid part removed by filtration though sterile gauze centrifuged at 4500 rpm for 30 min 20 degree c. Finally filtration vacuum extraction with stored in dark bottle before same procedure lyophilisation process employed for the water garlic extraction sample of same procedure of Water garlic extraction were evaporated

Method 3: Aqueous garlic extraction (AGE)

Fresh garlic was purchased from local market the aqueous garlic extraction was a prepared according to lawlokun BA' method the cloves were separated peeled obtained edible portion fifty gram of an edible portion was chopped homogenate was filtration though 25 um pore size.

Pharmacological role of garlic in treatment of various diseases[1,2,4,6,9,11]

1. Anticancer

Organosulfur compound have shown many health benefits involving its immunomodulatory properties in cancer. Allicin shows antitumor activity. Cell treated with tamoxifen and supplemented with allicin. Garlic has many synergistic effects that either prevent or possibly may fight cancer. Inhibition of cell proliferation hormonal stimulation invasion and metastasis. dially sulfide (DAS), dially disulphide (DADS), and di allyl trisulfide (DATS) derived from garlic have been show exhibit anticancer activities. DATS used apoptosis in many human cancer cells. S-allyl cysteine is used prostate cancer treatment allicin biological active compound in freshly crushed garlic extract.

2. Antibacterial

Garlic is a broad spectrum antibacterial. Allicin and other sulphur compound responsible for Anti- microbial effect. Garlic is effective against gram negative and gram positive bacteria i.e staphylococcus, salmonella, vibrio, mycobacteria and Proteus species. Extraction of garlic used of chloroform, ethanol inhibits the growth of pathogenic bacteria. Allicin shows antibacterial activities against multidrug resistance.

3. Antiviral

Garlic and it's sulphur constituents shows antiviral activity against coxsackievirus species, herpes simplex virus types 1 and 2, Influenza B, para- influenza virus, human immunodeficiency viruses type 1 and human Rhinovirus type 2.order of compound presents in garlic for veridical activity was Ajoene > allicin > allyl methyl thiosulfonate > methyl allyl thiosulfonate. Allicin is used treatment of common cold virus.

4. Antifungal

Ajoene is topical antifungal agent. Garlic is shown inhibit the growth of fungal disease. Ketoconazole is tested on the fungi, malassezia, furfur, candida albicans, aspergillus, Cryptococcus and other candida species. Garlic oil is used treatment of ring worm, skin parasites and warts, it apply externally.

5. Antioxidant activity

Garlic have strong antioxidant properties, garlic extract direct shows the antioxidant effect and increase the serum level of two antioxidant enzyme. Row garlic is a strong antioxidant activity than cooked garlic.

6. Cardiovascular protection

Garlic is used cardiovascular disease treatment and garlic is one of the most promising candidates. Garlic powder is effective reduce blood pressure. Total cholesterol, low density lipoprotein cholesterol and other disease related to the cardiovascular system.

7. Antihypertensive activity

Garlic shows reduce oxidative stress, increase production of NO and hydrogen, sulfide (H2S) inhibit the angiotensin converting enzymes there is lowering of hypertension.

8. Role of garlic against multi-drug resistant tuberculosis (MDR-TB)

Garlic is effective against MDR-TB. Garlic oil is effective in tubercle bacilli. High potential garlic extract was revealed to inhibit the growth of mycobacterium tuberculosis and M. tuberculosis. Anti- tubercular activity of garlic was performed in Nigeria. Disc diffusion method is used compared with standard antibiotics.

9. As natural blood thinner

Garlic has natural anti- clotting effect. Platelets and fibrin shows great role in blood clotting and higher amount of fibrin in blood can cause heart attack. Garlic is help reduced fibrin formation and fibrin existing in blood better than aspirin. Row garlic is adding diet it can help breakdown fibrin.

10. Prevension of diabetes

Garlic reduces the glucose level in blood. It reduces the streptozotocin. It shows Antidiabetic effect, garlic is more effective than Glibenclamidel.

Some other uses of garlic[7, 11]

- Natural immunity booster,
- Atherosclerosis and Hyperlipidaemia,
- Dermatologic,
- Anti-parasitic,
- Drug Toxicities and pharmacokinetics,
- Reduces stress,
- Renal protection,
- Neuroprotection,
- Anti- obesity activity,
- Digestive system protection,
- Suppressing cell growth and proliferation,
- Anti – inflammatory

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CONCLUSION

From these all studies it is concluded that Garlic *(allium sativum)* has number of use in medicine and home remedies to treat number of different diseases. Due to its chemical constituents in future there are so many researches will be done for finding new drug.

REFERENCES

1. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. Forty Second Edition, Mumbai, India, 2008; 11-52.
2. Gebreselema G and Mebrabta G. Medical values of Garlic: A-Review. International Journal of medicine and medical science, 2013; 5(9): 401-402.
3. Yusuf, Abaygarli, Fagburo SS and Fajemilehin. Chemical composition, phyto Chemical and mineral profile of garlic (Allium satvium). Journal of bio-science and Biotechnology Discovery, 2013; 3(3): 101-107.
4. Abdul HK, Muhanmmal KU, Tahir, Mehwishraja MU, Usman QT, Romeeza J and Mehwish S. Inhibitory effect of aqueous garlic allium sativum extract against clinical isolates of salmonella. Hphi African journal Microbiogical research, 2012; 6(21): 4475-4480.
5. Jelena B, Branislava N, Suncica KT, Alena T, Anamarija M, Jelica GV, Slobodan V, Milena V, Marija R. Extraction of Different Garlic Varieties (Allium sativum L.) – Determination of Organosulfur compound and Microbiological Activity. IV International Congress Food Technology, Quality and Safety, (4): 104-109.
6. Hussein JH, Imam HH, Mohammed YH. A Review: Anti-microbial, Anti-inflammatory effect and cardiovascular effect of garlic (Allium sativum). Research J Pharm and Technology, 2017; 10(11): 4069-4078.
7. Ali RF, Mohsen SN. Physicochemical characteristic of Garlic (Allium Sativum.L) oil: effect of extraction procedure. International journal of Nutrition and food science, 2014; 3(6): 1-5.
8. Vinay KS, Dinesh KS. Pharmacological Effect of Garlic (Allium sativum -L). ARBS Annual Review of Biomedical science, 2008; 6-26.
9. Ravikant U. Garlic:A Potential Source of pharmaceutical and pesticides: A Review International journal of Green Pharmacy, 2016; 1(10): 1-27.
10. Abhilash N, Anil K, Amandeep H, Malik CP. Garlic: It's Importance and Biotechnological Importance. International Journal of life Science, 2013; (2): 72-89.
11. Divya BJ, Summan BL, Lakshmana KM, Venkata S, Eswari B and Tyagarjuna KN. The Role of Allium Sativum (Garlic) In Various Diseases and it's Health Benefits: A review. International Journal of Advanced Research, 2017; 5(8): 592-602.
12. Azene T, Mengesha W. Traditional Uses, Phytochemistry and Pharmacological Properties of Garlic (Allium Sativum) and its Biological Active Compounds. International Journal of Research in Science and Technology, 2015; 1(5): 142-148.