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Study of medicinal value and chemical composition of allium sativum linn.

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ABSTRACT -India has a vast and inexhaustible resource of drugs of plant origin and India can supply these drugs to many other countries. The systematic investigation of these drugs used in indigenous medicine on modern scientific lines was started more than the thirty year ago and much has been accomplished during this short time. A number of medicinal plants prescribed by the Vaids and Hakims have been carefully investigated from every point of view. Their chemical composition has been determined, the pharmacological action of the active principle worked out by animal experimentation and it is only by such enquiry that the real merits of these drugs have been proved.

KEY WORDS- Drugs, Vaids, Hakims, medicinal plants.

INTRODUCTION- Garlic ,botanically known as Allium sativum Linn (Family Liliaceae) is one of the most commonly used spices. The plant is widely cultivated in India and most parts of the world .Garlic occurs as sub- globular ,compound bulb grayish white ,4 to 6 cms in diameter with several 8 to 20 cloves, the whole surrounded by 3-5 whitish papery membranous scales from leaf base of the previous year bulb and terminating in a thin papery out growth. The clove is attached to a flattened ,circular ,woody axis with numerous thin ,wiry roots on the underside and short ,sub -cylendrical out growth on the upper surface.

Each clove is ovoid,3 to 4 sided surrounded by two papery scale leaves, the outer one is whitish and loose ,the inner one is pink and adherent, but easily separable from the solid portion of the cloves. These papery scale enclosed two whitish ,fleshy scale, the inner one thinner and smaller than the outer. Two con duplicate half of the leaf is folded upon the left lengthwise foliage present in the centre . Odour when brushed strongly alliaceous. taste persistently pungent , aliaceous.

Under microscope, cloves show a number of concentric bublets. each bublets 5-10 mm. In diameter, consists of an outer scale. an epidermis, a ground tissue ,and a layer of lower epidermal cells. Dry scales consists of 2-2 layers of cells of reactangular in appearance but with broadly angular slant and walls. These cells certain plenty of rhomboid crystals of calcium oxalate. The upper epidermal cells next to the dry scale layer consist of reactangular to cubical cells of one layer next to which there are several layers of large parenchyamatous cells among which there are interspaced many vascular bundles each of which consist of xylem and phloem arranges alternately. Lower epidermis consist of cubic cells which are much smaller than the upper epidermal cells. The same series of arrangement of tissues is met within different bublets which are arranged in concentric adjustment. 2 to 3 such bublets are arranged concentrically (Mukerji,1953) .

Phytochemical work

Stoll and Seeback (1948) isolated the active principle of garlic in the pure crystalline form .This active principle ,named alliin,was found to be (+).8-allyl-crystein-sulphoxide with the following chemical formula (Stoll et al.195,1953).

$H_2C=CH-CH_2-*S-CH_2-*CH-COOH$ alliin

Sulphur and Carbon marked with asterisk in the chemical formula show asymmetric centres in the molecule so theoretically three optical isomers of alliin are possible, which have also been prepared synthetically.

Alliin (a non bacterial compound) is a precursor of highly bactericidal substance, alliin (Cavallito and Balley,1994.1945) Alliin is very rapidly decomposed to allicin, pyruvic acid and ammonia by the highly specific enzyme, allinase which is present in the garlic. Alliinase is capable of spiltting (-)-S-allyl-L-crystein isomer of alliin, the reaction rate being slower but is does not attach either of the D- crystein isomer (Stoll et al.1948,1949,1951).As soon as any part of the plant is damaged the enzyme allinase gets activated and spilts allliin with the formation of allicin which has characteristic odour of garlic. Further decomposition of alliin yields the violets sharply odourous allyl sulphide.

Beside this ,a number of other antibiotic principles have also been isolated, namely allistein I,allistein II,(Datta et al.1948)[8]and garlicin (Watt and Breyer-Brandwijk,1962)[9].

A brief account of the chemical constituents of garlic based on the information available in the literature is seen in Table 1.

Medicinal value of Garlic

The medicinal importance of garlic had been recognized by different schools of medicine both indigenous as well as foreign since time immemorial. Some of the important medicinal uses of garlic are as enumerated by Kirtikar and Basu (1935) are listed in Table 2.

To give a scientific basis for the ancient claims regarding the theraupeutic efficacy of garlic in various disease and disorders, a large number of experiments have been carried out on different experimental models. As result of these experiments garlic has been found to be value of both in human beings and animals in conditions like-

1) Cancer (Weisberger and Pensky.1957).Hartwell,1968)
2) Diabetes (Laland and Haverevoid,1933).
3) Hypertension (Leoper and De Bray,1921).
4) Arterioscleriosis (Watt and Breyer-Brandwilk,1962)
5) Angina pectoris (Fortunatov,1952).
6) Chronic colitis and gastritis (Fortunatov,1952).
7) Rheumatoid arthritis (Medicinal plants of India,vol.1,1962).
8) Helminthiasis (Rico,1928,Vinson,1941).
9) Amoebiasis and other protozonal infections (Watt and Breyer-Brandwilk,1962).
10) Bacterial and fungal infections (Datta, et al.1948,Dubrova,1950,Mukerji ,1953).

Result of these studies justify the multifarious roles played by garlic in the ancient systems of medicine.

Table-1.1 Chemical constituents of Garlic(expressed in gram per 100gm.of Except oterwise studies)

Sr.No.	Constituent	Percentage (%)
1.	Water	62.20
2.	Protein	06.30
3.	Fat 00.10	-do.
4.	Carbohydrates	29.00
	A. Reducing sugar	00.14
	B. Starch	08.22
	C.Sucrose	03.79
	D.Dextrin	07.69
	E.insulin	Not reported
	F.Sinistrin	-do.
5.	Volatile oils.	0.10-0.90
	A. Diallyl. Disulphide	60.00
	B.Allyl. propyl. disulphide	06.00
	C.Diallyl. trisulphide	Not reported
	D.Diallyl. polysulphide	-do.
	E.Diallyl sulphide	
	F.An unidentified higher boiling fraction	-do.
6.	Minerals	00.03
	A.Calcium	00.31
	B.Phosphorous	01.30mg
	C.Iron	01.00mg
	D.Zinc	(fresh bulb)03.17mg,(dry bulb)03.40mg (Ash)
	E.iodine	Not reported
7.	Vitamins	
	A.Vitamin C	13.00mg
	B.Vitamin A	Not reported
	VitaminB	-do.
	Vitamin D	-do.
8.	Enzymes and Hormones	
	A.Peroxidase	Not supported
	B.Catalase	-do.
	C.Allinase	-do.
	D.Male and Female hormones	-do.
9.	Nitrogen content	
	A.Non protein nitrogen	67.00
	B.Protein nitrogen	29.34
10.	Amino acids	
	A.Essential amino acid	
	B.Sulphur containing amino acids	230.00mg

Table 1.2 Medicinal uses of Garlic in indigenous System of Medicine

Sr.no.	Disorder of	Uses
1.	Gastro-intestinal tract	Carminative, antiflatulent, appetizer, gastric stimulant, digestive in atomic dyspepsin, duedonal ulcer, gastro intestinal cataarh, piles and others.
2	Respiratory tract	Expectorant in bronchitis, bronchial asthama, pulmonary pthisis, pulmonary tuberculosis, laryngeal tuberculosis ,gangrene of lung, whopping cough.
3.	Miscellaneous type	Rubefacient, counterirritant, anti-septic, tonic, anti convul sant, analgesic, anti-pyretic, anti-inflammatory.

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