Medicinal properties of onion and garlic

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Therapeutic and Medicinal value of onion and garlic

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Introduction

Onion and garlic are beneficial herbs usually grown in annual. All parts of these plants produce a strong odour when crushed. Onion is one of the oldest cultivated herbs. Onion is believed to have originated in Central Asia, possibly in Iran- Pakistan region. Onions have been revered not only for their culinary use, but also for their therapeutic properties. As early as the 6th century, onions were used as a medicine in India. Onion was popular with the ancient Greeks, Romans and Egyptians for seasoning of foods. The pungency of onions made them popular among poor people throughout the world who could freely use this inexpensive vegetable to spark up their meals. Today China, India, the United States, Russian and Spain are among the leading producers of onions. Onion has great therapeutic value. They are stimulants and mild counter-irritant. It has been used as a herbal remedy for centuries in colds, coughs, bronchitis and influenza. Onions are well-known for their easily assimilable iron content. They are therefore beneficial in treating anemia. Recent researches establish that the Onion as an effective preventive against heart attacks. It is an effective remedy for cholera also. Onions are highly beneficial in the treatment of the disorders of urinary system. Onions are very effective in bleeding piles. Other uses of this herb are teeth disorders, ear disorders and tuberculosis.

Garlic has remained a very popular plant in traditional medicine in addition to its use as a condiment and food, since ancient times. There is evidence that garlic played a significant role in the diet and pharmacy of the Indians, the Chinese, the Russians and indeed most civilizations. The earliest recorded evidence of garlic consumption dates as far back as 2900 B.C. in the inscription of the Cheops pyramids of Egypt. The pyramid builders were given rations of garlic to increase their stamina, build their strength, and protect them from disease.

Western medicine system relies on medical practices, which overlooked preventative measures and concentrated on curing established ailments. But since past few decade the medical community has become increasingly aware of the importance of preventative medicine and herbs. The research has been

conducted throughout the world on curative and preventative properties of onion and garlic and promising results have been exhibited in prevention and cure of cardiovascular diseases, cancer prevention, inflammation, diabetes, immune system enhancement, antioxidant, detoxification, digestive disorders, anti-bacterial, fungal, and viral, allergies and asthma etc.

Onion and garlic in folk medicines

Onion has been used for healing both internally and externally. Internally, onion has been recommended to treat colds, cough, bronchitis, whooping cough, asthma and other respiratory problems. It is believed to helping in congestion in the lungs and expands the airways. Onion is also used internally to relieve excess gas and calm an upset stomach. A mixture of rue and onion is used to rid of parasites of the digestive system. Onion is also thought to stimulate appetite. When applied externally, fresh onion juice prevents bacterial and fungal infections. It can be applied to wounds and stings on the skin, to remove warts and to stimulate hair growth. It is even also used to reduce unwanted skin blemishes. Warm onion juice dropped in the ear is said to help relieve earache. Baked onion was used for the treatment of boils.

Garlic bulbs are the most frequently usedin many medicines. In India they are prepared in several ways including extracting the juice or making paste. This has been taken to relieve problems such as cough and fever, or applied externally to prevent the greying of hairs and to improve skin conditions such as eczema and scabies. It has even been applied to the noses of hysterical patients to calm them down. Garlic also features in traditional medicine in other parts of the world. In Nepal, East Asia and the Middle East it has been used to treat several types of illnesses including fevers, diabetes, rheumatism, intestinal worms, colic, flatulence, dysentery, liver disorders, tuberculosis, facial paralysis, high blood pressure and bronchitis. Extracts of the bulbs have been widely used in folk medicine. Whooping cough in children has been treated by administering a drink made with a hot water extract of the dried garlic bulb mixed with honey. Hot water extracts of garlic are also taken to kill intestinal worms. Garlic an extract is traditionally taken orally to settle the stomach, treat coughs reduce fever. Warmed garlic juice, or a mixture

made with oil and boiled bulb has been dropped into the ear to relieve earache and deafness. In Ayurvedic and Siddha medicine, garlic juice has been used to alleviate sinus problems. In Unani medicine, an extract is prepared from the dried bulb which is inhaled to promote abortion or taken to regulate menstruation. Unani physicians also use garlic to treat paralysis, forgetfulness, tremor, colic pains, internal ulcers and fevers.

Chemical compositions

Onion and garlic are members of the Alliaceae family. Onion has been used as a herbal remedy from time immemorial. It is high food value with low fat, protein and carbohydrates and rich calcium and riboflavin. The chemical composition of onion varies from variety to variety, cultural practices and climatic conditions. Onion contains essential oil and organic sulphides. It is rich in powerful sulfur-containing compounds that are responsible for their pungent odors and for many of their health-promoting effects. Onions contain *allyl propyl disulphide* and many others derivatives of allyl propyl di sulphides. In addition, onions are very rich in chromium, a trace mineral that helps cells respond to insulin, plus vitamin C, and numerous flavonoids, most notably, quercitin.

Similar to onion, garlic has also been used as a herbal remedy from time immemorial. It is high food value, low in protein, fat and carbohydrates and rich calcium and riboflavin. The chemical composition of garlic varies from variety to variety, cultural practices and climatic conditions. Garlic contains about 62 percent water 6.0 percent protein, 29 percent fats, sucrose traces amount of Ca, Fe, Zn and phosphate salts and small amounts of thiamin, riboflavin, niacin and ascorbic acid. Garlic contains 0.06 to 0.1 per cent oil and di allyl di sulphide is the major constituent of this oil. Besides this small amount of allyl propyl disulphide is also present. The chemical composition of onion and garlic is given in Table 1.

Table 1:Chemical composition of onion and garlic (raw)

Nutrients	**Onion**	**Garlic**
Water (g/100g)	78.32-87.31	56.2-62.3
Food energy (Calories) (Kcal/100g)	38-46	130-165
Protein (g/100g)	1.12-232	5.67-9.06
Total Lipids (g/100g)	0.5-0.9	0.4-0.7
Ash (g/100g)	0.3-0.4	1.3-1.8
Carbohydrates (g/100g)	7.64-12.13	30.76-38.76
Total dietary fibers (g/100g	1.0-1.8	1.8-2.4
Calcium (mg/100g)	18-25	150-200
Iron (mg/100g)	0.15-0.24	1.4-2.0
Magnesium (mg/100g)	8-12	22-30
Phosphorus (mg/100g)	25-30	140-160
Potassium (mg/100g)	120-175	350-450
Sodium (mg/100g)	2-4	15-20
Zinc (mg/100g)	0.15-0.2	1.1-1.2
Copper (mg/100g)	0.03-0.04	0.28-0.31
Manganese (mg/100g)	0.12-0.14	1.5-1.7
Selenium (u/100g)	0.4-0.6	12-15
Vitamin C(mg/100g)	10-70	7.32-10.26
Thiamin(mg/100g)	0.04-0.06	0.18-0.22
Riboflavin (mg/100g)	0.02-0.03	0.1-0.12
Niacin (mg/100g)	0.080.09	0.6-0.8
Pantothenic acid (mg/100g)	0.12-0.13	0.55-0.6
Vitamin B-6 (mg/100g)	0.14-0.15	0.22-0.24
Folate (ug/100g)	15-22	2-4
Vitamin B12 (ug/100g)	0	0
Vitamin A (ug/100g)	2-6	0
Vitamin E (ug/100g)	0.01-0.03	0.009-0.011
Vitamin K (ug/100g)	0.03-0.05	1.3-1.5
Saturated fatty Acid (g/10	0.02-0.04	0.08-0.09
Monosaturated fatty Acid (g/100g)	0.02-0.04	0.01-0.015
Poly unsaturated fatty Acid (g/100g)	0.05-0.07	0.24-0.25
Pyruvic acid (umole/ml)	6.5-14.9	22.21-29.46

Therapeutic and medicinal value

1.0Vitelizer

Onion helps in maintaining healthy bones. A new compound namely, 2- L-glutamyl-trans-s-1-propenyl -l- cysteine sulfoxide (GPCS) is identified in onion recently which inhibits the activity of osteoclasts. The osteoclast cells are responsible for break down bones. More intakes of GPCS through onion inhibit the action of osteroclasts. This compound of onion is more beneficial to women who are more prone to osteoporosis during menopause. Onion may found better substitute to the allopathic medicines such as Foramax, alendronate prescribed to prevent excessive bone loss during menopause. These medicines have several side effects such as, irritation of the upper gastrointestinal mucosa, esophageal ulcers etc while onion has no side effects. This character of onions also helps in strengthening the bones in aging peoples and ultimately restore the vigour of the body.

Garlic and garlic products offers beneficial ability to enhance the immune system . Never less, garlic offers many other beneficial aspects. It has been proven effective in cancer, cold and flu, heart diseases, allergies, bronchitis, arthritis, fungal , bacterial and yeast infections etc. The combined effect of all these helps in restoring the vigour year after year. The qualities of garlic are especially appealing to people with heart problems or anyone interested in cardiovascular health. Garlic is also known to have anti-tumor capabilities. It has been known for quite some time that garlic is a natural immune system enhancer. It helps the body fight off the infections and bacteria, which constantly threaten our health. Since traditional Western medicine has not been able to offer consumers any sort of protection against such ailments as the common cold and flu, people are turning to garlic to enhance their immunity.

2.0Hypoglycemic effect

The higher the intake of onion, the lower the level of glucose found during oral or intravenous glucose tolerance tests. The hypoglycemic properties of onion extract were identified as early as 1923. The experimental and clinical evidence suggests that allyl propyl disulfide, thiols, isomers of allyl propyl di sulphides and related compounds are responsible for this effect. These compounds lower blood sugar levels by increasing the availability of free insulin . The allyl propyl disulfide and its isomers compete with insulin to occupy insulin

inactivating sites in the liver . This results in an increase in the amount of insulin available to utilize glucose in cells resulting lower blood sugar. In addition, onions are a very good source of chromium. Chromium is mineral component molecule, which helps cells to respond appropriately to insulin. Clinical studies of diabetics have shown that chromium can decrease fasting blood glucose levels, improve glucose tolerance, lower insulin levels, and decrease total cholesterol and triglyceride levels, while increasing good HDL-cholesterol levels. Marginal chromium deficiency is common all over the world and chromium levels are depleting due consumption of refined sugars, white flour products and lack of exercise. One cup of raw onion can fulfill almost 20% of the daily requirement of chromium. Apart from hypoglycemic effect, few non-sulfur having hyperglycemic have been identified.

In many parts of the world, garlic is used as a remedy for diabetics in traditional medicine. In various studies, oral administration of garlic to human volunteers produced a significant hypoglycemic effect at the end of the fourth week. The hypoglycemic effect of garlic may be due to increase glycogenesis in the liver and better utilization of glucose in the peripheral tissues. The blood sugar lowering effect of garlic was ascribed to allicin and related disulfide-containing compounds. The SH-group compounds present in garlic are antagonistic to the action of insulin. This hypoglycemic activity of garlic juice is closely comparable to that of allopathic drugs tolbutamide, which is usually prescribed for diabetes.

3.0Hypocholesterolemic effect

The onions are rich in flavonoides. Among the flavonoides, the antocianos are responsible for the pink or violet color of certain varieties of onion, while the quercetin are colourless . The quercetins have antirust function. The quercetin contributes to the inhibition of the oxidation of lipo proteins of low density (LDL-Cholesterol) and minimize the risk of cardiovascular diseases. The other flavonoides presents in the onion have been found effective in reduction of arterial tension and blood clogging activity .The regular consumption of onions has been shown to reduce high cholesterol levels and high blood pressure which helps in prevention of atherosclerosis and diabetic heart diseases and reduce the risk of heart attack . These beneficial effects are attributed to sulfur compounds, chromium, flavonoides and vitamin B6 present in onions.

The effectiveness of garlic in the prevention and treatment of atherosclerosis and

vascular hypertension have been proved in both animal experiments and human clinical observations. The administration of garlic in both raw and boiled forms prevented the increase total cholesterol and tryglycerides in serum. A marked decrease in coagulability and increase in blood fibrinolytic activity were observed after the ingestion of garlic. The hypocholesterolemic action of garlic is ascribed to allicin present in garlic which can react with -SH group. In experiments human volunteers were who were given 10g of garlic daily showed significant decrease in blood cholesterol level within two months. It was cocluded that regular use of garlic reduce blood cholesterol and pressure and found beneficial in prevention of stroke.

The active ingredient allicin present in onion and garlic, is effective in helping to promote proper circulation throughout the body. When taken for a couple of months, garlic can drop the level of cholesterol in the blood by 15%. When garlic supplementation is combined with a positive diet change, blood cholesterol levels can drop enough to reduce heart attack risk by 30%.

4.0 **Anti carcinogenic effect**

Some studies indicate that the sulfur compounds of onion exert a protective effect in the beginning of the carcinogénesis by increasing process of enzymatic modulation in the metabolism of the cancerigenic substances. The studies conducted in humans have shown a protective effect of onion against esophagus cancer and stomach cancer. The use of onions regularly may significantly reduced risk of developing colon cancer. Onions contain a number of flavonoids, particularly quercitin, has been shown to check the growth of tumors in animals and to protect colon cells from the damaging effects of certain cancer-causing substances. Cooking meats with onions may help reduce the amount of carcinogens produced when meat is cooked.

Garlic was traditionally used for the treatment of cancer of the uterus. Numerous reports, including several important epidemiological studies, have asserted that it has a favorable effect on various forms of cancer. Cytologically, the effects of garlic were similar to those induced by colchicines. These produces blockage of the metaphase cells and scattering, as well as abnormal condensation of metaphase chromosomes. The inhibitory effect of garlic on nitrate reducing bacteria and their production in gastric juice indicates its use in the treatment of gastric cancer. Some studies indicate that the sulfur compounds of garlic provide

protective effect in the beginning of the carcinogénesis by interfering in the metabolism of the carcinogenic substances.

5.0Antiasthmatic and anti pulmonary disorders

The compounds derived from the onions have shown anti-asthmatic activity. The antiasthmatic and anti-inflammatory capacity of the onions is attributed to the presence of thio-sulfonates (sulfur compounds). The action mechanism seems to be related to an inhibition in the synthesis of ciclooxygenase and lipooxygenase, enzymes. These enzymes take part in the metabolism of the eicosanoides, which induce bronchial obstruction.

Inhalation of pulped and crushed garlic is traditionally used in the treatment of pulmonary disorders in various countries. Studies have confirmed that a concentration of 1:5000 of garlic juice completely inhibited the growth of bacteria causing tuberculosis i.e. M*ycobacterium tuberculosis*. This effect is not destroyed by boiling and prolonged storage .

6.0Anti-Inflammatory and Anti-Bacterial Activity

Several anti-inflammatory agents present in onions have been found helpful in reducing the severity of pain and swelling of joints and rheumatoid arthritis, sour throat, sinusitis, tonsillitis, allergic inflammatory and respiratory congestion during common cold. Onion contains compounds that inhibit lipoxygenase and cyclooxygenase resulting markedly reducing inflammation. Onions' anti-inflammatory effects are due not only to their vitamin C and quercitin, but to other active components called iso thiocyanates. These compounds work synergistically to provide relief from inflammation. In addition, quercitin and other flavonoids found in onions work with vitamin C to help kill harmful bacteria, making onions an especially good addition to soups and stews during cold and flu season.

Garlic has been found to have a very active antimicrobial effect, and many authors are of the opinion that there is abundant evidence that the antibiotic value of the plant is on a par with that of penicillin and other antibiotics. The extract of garlic has fungicidal action in high concentrations while low concentrations have fungistatic action. The antiviral activity was found to occur at concentrations below toxicity level to the tissue culture. These antiviral concentrations may be used in man or animals without any danger of significant toxicity . The antimicrobial principle of garlic is rapidly formed from a precursor which breaks down readily when the garlic is crushed. Hence, it is more effective when used crushed than segmented. Allicin, one of the active principles of freshly crushed onion and garlic products, has a variety

of antimicrobial activities. Allicin in its pure form was found to exhibit antibacterial activity against a wide range of Gram-negative and Gram-positive bacteria, including *Escherichia coli*; antifungal activity, particularly against *Candida albicans*; antiparasitic activity, including some major human intestinal protozoan parasites such as *Entamoeba histolytica* and *Giardia lamblia*; and antiviral activity. The main antimicrobial effect of allicin is due to its chemical reaction with thiol groups of various enzymes, e.g. alcohol dehydrogenase, thioredoxin reductase, and RNA polymerase.

7.0 Wormicidal properties

Garlic has wormicdal properties. It has been found that garlic is superior to piperazine citrate with respect to vermicidal potency. This confirms its traditional claim as antihelmintic for ascariasis and oxyuriasis . Garlic is also used to treat pinworms and other parasitic infections by many naturopaths. The volatile oil of garlic inhibits liver lesions and decreases infiltrated cells. The volatile oil elicits an intense inhibitory action on the formation of lipid peroxides and its potency is stronger than that of the reference substance, Vitamin .E . Investigations into the biologically active substances of garlic verified its medicinal value for gastric ulcers and pancreatitis.

Onion and garlic are used for healing wounds, burns, ear ache, yeast infection and many other diseases and disorders. The quantity of onion and garlic in diet is an important factor. It is advised that one medium size bulb of onion weighing 50 to 60g onion and two to four cloves of garlic weighing 5 to 8 gram garlic should be used in daily diet. By the virtue of these properties of onion and garlic, these plants are becoming the prime choice not only of naturopaths but also many trained allopathic practitioners. Many people are describing them as wonder drugs or the poor men’s antibiotics.