



GARLIC AND YOUR HEALTH

Garlic is a member of the lily family (Liliaceae). It is also closely related to the onion, shallot, leek and chive. There are many varieties of garlic but the most widely used variety is *Allium sativum*, which is the garlic used as a spice.

The majority of the plant is considered edible including the leaves, stems and flowers. These are usually consumed while immature. The most commonly used part is the underground bulb, which is comprised of several cloves joined together and encased in a papery covering.

Those familiar with garlic know the pungent, unmistakable smell it bears. This distinctive smell is courtesy of a sulphur compound called *allicin* (diallyl thiosulphinate).

Allicin

Allicin does not occur naturally in garlic. When fully intact, the

amino acid alliin (S-allylcysteine sulphoxide), is the major sulphurous compound in garlic. When damaged by cutting, crushing, etc., the enzyme allinase comes into contact with the alliin, converting it to allicin.



Allicin is not very stable and breaks down easily, especially when heated. Conversely, breakdown can be slowed by refrigeration. Allicin breaks down into compounds known as diallyl sulphides, the most common of which is diallyl disulphide. Diallyl sulphides are also thought to have medicinal properties, although

their antimicrobial and antifungal properties are not as strong as that of allicin.

Garlic and Cancer

An analysis of 19 research papers written between 1955 and 2007 found no link between garlic consumption and reduced incidence of gastric, breast, lung, or endometrial cancer. There was, however, limited evidence to support a link between garlic intake and a reduced risk of colon, prostate, esophageal, larynx, oral, ovarian, and renal cell cancers.

While these findings are intriguing it should be borne in mind that there are several factors which influence the risk of cancer. Smoking tobacco, poor diet and genetics are a few of the risk factors identified in cancer formation. To focus on a single behaviour or a single food as a suitable intervention would not be wise. Instead try to maintain an

overall healthy lifestyle in conjunction with following doctor's advice on screening procedures and checkups.

Garlic as an Antimicrobial and Antibiotic Agent

Research suggests that the diallyl sulphides discussed earlier interact with the cell membranes of many microorganisms, altering their structure and inhibiting their function and ultimately, survival. The sulphur derivatives are also thought to be able to cross the cell membranes and interact with other sulphur containing amino acids and proteins in the cell, inhibiting reproduction and general cell metabolism. The presence of glutathione, a sulphur containing amino acid, in human cells is thought to protect them against damage by allicin and its derivatives. Glutathione reacts with allicin derivatives and removes the potential for cell damage.

Garlic compounds have shown tremendous success against many diarrhoeal pathogens, especially gram negative bacteria. It is also exciting that bacterial resistance against garlic derivatives has not yet been seen, as frequently occurs with traditional antibiotic agents. This suggests that garlic can be a very useful partner in normal antibiotic treatment.

Garlic has been found to be effective against many pathogens which are sometimes found in the human respiratory tract. Some of these organisms may cause pneumonia in individuals who have weakened immune systems.

These pathogens include *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. *Escherichia coli* (*E. Coli*), which cause food poisoning, is particularly susceptible to garlic. Other susceptible pathogens are *Candida albicans* (yeast infection), *Shigella dysenteriae* (dysentery) and *Salmonella spp.*

Garlic for Colds

Because of the antimicrobial effect of garlic derivatives, it is postulated that garlic may also be suitable for warding off a cold, or preventing infection in the first place.

There are very few scientific studies which were properly designed so that conclusions can be drawn. The few thorough studies suggest that there is a protective effect. It was found that supplementation with allicin preparations may reduce your risk of contracting a cold and/or shorten the duration of symptoms if one does catch a cold when compared to individuals who did not receive supplementation.

Garlic and Cholesterol

There have been many studies on garlic and its effects on serum cholesterol with varying results. This variation may be due to using different forms of garlic or perhaps groups of persons with varying degrees of hypercholesterolemia.

Two experiments showed no effect for at least three (3) months of supplementation with garlic tablet or thai garlic on total

cholesterol, triglycerides, Low Density Lipoproteins (LDLs) or High Density Lipoproteins (HDLs) when compared to placebo.

However, other studies have showed that time release garlic powder capsules may be effective at lowering serum cholesterol; when taken by people with mild hypercholesterolemia for at least 8 weeks; a prolonged biological effect was seen. There was a significant reduction in total serum cholesterol and a significant increase in HDLs, which are the good cholesterol responsible for removing excess cholesterol from the cells.

Similar positive results were obtained when 5 g of raw garlic was administered twice per day for 42 days. However, when this treatment was discontinued for another 42 days, effects moved in the opposite direction suggesting that garlic supplementation may not be suitable as the only treatment for hyperlipidemia, and also may be more effective in people with mild hyperlipidemia.

Another study showed that four months of garlic consumption provided additional benefits of decreasing both the systolic and diastolic blood pressure in people who had high blood pressure. The blood pressure of people with usually normal blood pressures was not affected.

Garlic for Mosquitos?

If you believe in vampires then you would know that cloves of garlic are supposed to provide excellent protection from vampires. It is thought that bit of lore

was responsible for the notion that garlic would also repel mosquitoes.

Some reports suggest that the sulphur compounds in garlic are responsible for blocking the sensory organs of mosquitoes such that they are not able to detect the person from whom the smell emanates.

There are many natural repellents on the market consisting of garlic derivatives. It is even suggested that frequent consumption of enough garlic will cause the smell to pass through the pores, providing protection.

A few studies have been done, some using the pesticide N, N-diethyl-meta-toluamide (DEET) as the gold standard for comparing efficacy. These studies have not found substantial evidence to support garlic as an effective mosquito repellent. Some, however, were limited by a short duration of garlic consumption.

If you are looking for a natural repellent, so far, products containing *Eucalyptus citriodora* extract (Eucalyptus Oil) have been shown to be most effective of plant extracts against mosquitoes.

An interesting experiment showed a positive effect when allicin was used on Plasmodium, the infectious agent of malaria. Allicin was found to be able to work on 2 stages of the Plasmodium life cycle in the vertebrate host. Mice given allicin injections showed significantly lower incidence of infection than control mice. A four day course of intravenous or oral allicin increased the survival rate of infected mice.

Garlic Use During Pregnancy

Because of the antihypertensive properties of garlic, it is theorised that it may help to prevent pre-eclampsia in pregnant women. The studies are so far inconclusive.

Research has been documented which shows that garlic derivatives from the mother's usual diet is able to cross the placenta into the amniotic fluid altering its smell. There have not been any reports of risks to the embryo or fetus.

The effect of therapeutic amounts of garlic is not known, however, one source has suggested that there may be an increased risk of menstrual bleeding because of garlic supplementation during pregnancy. It was also suggested that therapeutic levels of garlic may cause uterine contractions and possibly abortions.

Since the actual effect is uncertain, garlic supplementation may be better avoided during pregnancy.

Garlic Use During Breastfeeding

The mother's diet affects the breastmilk she produces. Garlic consumption may change the smell or taste of breastmilk. In some cases, this changes the feeding pattern of the baby, resulting in reduced suckling in some cases and prolonged feeding times in others.

Otherwise, adverse reactions have not been reported for normal dietary amounts of garlic. The safety of garlic supplementation during breastfeeding is not known.

Side Effects of Garlic Use

The most common side effect of garlic consumption is the familiar garlic breath. Far from being life threatening, it is easily detectable by others and found to be offensive by many. A few people have reported sensitivity to garlic, resulting in contact dermatitis, allergic rhinitis and even hives. Standard allergy treatment should remedy any garlic allergic reaction.

Body odour, heartburn and upset stomach have also been reported. These are usually associated with raw garlic. There are, however, many preparations available which are marketed as being odour free.

Contraindications of Garlic Supplementation

Herbal supplements, including garlic supplements, are very common. Many people take them and do not indicate to their physicians that they are on herbal supplements. It is important to let your doctor know what you are taking, since many of these herbs will interact with some medications.

Aspirin is a blood thinner and pain reliever. It reduces the clotting ability of the blood and is recommended to suitable patients as prophylactic treatment for heart attack. Garlic shares the blood thinning property of aspirin. If you are on a regular course of aspirin, it is not recommended that you also



take garlic supplements. This may lead to excessive blood thinning and bleeding. Similar results can occur if garlic supplements are taken while on

Heparin and Warfarin, which are also anti-coagulants.

Many reports of bleeding have also been recorded when garlic was consistently taken with the herb *Ginko biloba*. Also because of its anti-coagulant effect, it is recommended that you should stop taking garlic supplements at least seven days before any kind of surgery or dental work. This will drastically reduce the risk of excessive bleeding during and after the procedure.

Anyone with any kind of bleeding disorder should avoid garlic supplementation.

The drug Saquinavir, used in the treatment of HIV, shows reduced effectiveness in the presence of garlic derivatives. People on Saquinavir or other protease inhibitors should avoid garlic supplementation.

If you are interested in taking a course of garlic supplementation, please discuss it with your doctor to ensure that your risk of negative effects is low. Also, choose the supplement wisely. Check the ingredients to avoid taking a combination of herbs which would be detrimental to your health.

Purchasing Garlic

Now that you have all this additional information about garlic, how can you go about enjoying it to its fullest potential?

Well, if you would like to use raw garlic, you should select bulbs that are not too old or too young, as these will not give you maximum benefits or flavour. To pick a bulb that is just right, look for one that is tightly closed, with many layers of dry papery covering. The cloves must be firm under slight pressure and should not crumble or fall apart easily.

If the bulb is beginning to sprout, it is too old.

Also, even though large elephant garlic may look attractive, they are usually not the tastiest.

Storing Garlic

So now you've purchased a few healthy bulbs of garlic. How do you preserve their quality for as long as possible?

Garlic lasts longest when stored in a cool place, away from direct sunlight. If there is fresh air circulating in the storage area, this will also help to keep the garlic in good condition.

Avoid refrigerating garlic. It may become soft and mouldy. Storing in a closed plastic container will also produce similar results. Freezing is not a very good idea, as this also ruins the texture.

If the garlic begins to sprout, it is time to throw it out or plant it!

Please note carefully that it is not advised that garlic be stored in oil or stored for too long in the refrigerator. The sulphurous compounds in garlic make it a good breeding place for the bacterium *Clostridium botulinum*. If the bacterium is in an environment that is not properly acidified, it may thrive and produce a toxin, which when ingested, results in Botulism. This toxin is the same toxin used to produce the pharmaceutical Botox, used in cosmetic treatments.

Symptoms of botulism include fatigue, weakness, and vertigo, usually followed by blurred vision, dry mouth, and difficulty in swallowing and speaking and sometimes vomiting, diarrhoea, constipation and abdominal swelling. If there is no treatment, the condition will progress, causing weakness in the neck, arms and lower body and eventually paralysis of the respiratory muscles. Most people will recover once an early diagnosis is made and the anti-toxin is administered in time.

If you notice that your garlic bulbs go bad very soon after purchasing, try a different supplier. How the garlic is handled after reaping greatly influences its shelf life.

Now enjoy using your garlic and experimenting with different foods, while gaining numerous health benefits.

For further information contact:

Caribbean Food and Nutrition Institute
UWI Campus, P.O. Box 140, Kingston 7
Jamaica, W.I.

Caribbean Food and Nutrition Institute
UWI Campus, St. Augustine
Trinidad, W.I.

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