

Benefits of Using Black Garlic and its Role In Treating Liver Diseases Along With Boosting Immunity

Prerna Navin Lade¹, Kavya Naidu², Sheerya Yenarkar³

¹⁻³Symbiosis Skills and Professional University (Kiwale), Pune.

Abstract: Black garlic is raw garlic that has been fermented by people under a controlled high-temperature, high-humidity condition of several weeks. Compared to fresh garlic, black garlic is mild in flavor and more delicate and stickier in consistency. An enzyme that is found in black garlic alliinase which further converts to allicin. Allicin is a compound that when pounded gives us a pungent odor, and it converts to alkaloids and flavonoid's compounds. Alkaloids and flavonoids are these compound's which are anti-inflammatory that are good for healing process. Alkaloids are amino acids found in plants, animals and fungi and contain nitrogen compounds. Whereas flavonoids are a natural compound found in plants that do not contain nitrogen. As both alkaloids and flavonoids are antioxidant both are good for liver health and for immunity. Black garlic contains vitamins which can be used to treat liver diseases. It also has some properties that can lower levels that can be harmful for the heart. As it has antioxidant properties, it can also be used for boosting immunity. It also has some side-effects if consumed in large amount that may irritate the gastrointestinal tract and cause some symptoms like nausea, gas, heartburn, bad body odor and diarrhea. Nowadays, in this pandemic we use so many supplements for boosting our immunity as well as for our deficiencies which are sometimes also chemically processed as well as expensive, so why not use a natural source to conquer good health that is "Black Garlic" which provides us with all the essential nutrients. In the future we can make a supplement out of black garlic itself by going for different supplements for different needs. We can use or take only one supplement.

Keywords: Black garlic, antioxidant, alkaloids, flavonoids, liver, heart, immunity, alliinase & allicin.

Introduction:

Garlic is obtained from *Allium Sativum L*, the native land of garlic is Middle Asia but the range of beliefs are that they originate from West China: But black garlic is obtained when garlic is fermented for a period of time at a controlled high temperature (60 to 90 degree celsius) under controlled high humidity (80 to 90%)

According to studies it is showed, that allicin is a natural anti-fungal agent, anti-microbial, anti-viral, anti-parasitic and antioxidant.

Black garlic contains twice of antioxidants, amino-acids (proteins) and vitamins compared to raw garlic.

You can consume 2 to 3 garlic cloves per day. The more aged the black garlic the more you get benefited. As you know it is loaded with the antioxidants it helps fighting the free radicals and prevent oxidative damage, which leads to several diseases.

Black Garlic can make to our "Superfood List" as it has all the essential nutrients that we need.

Even if black garlic contains smaller amount of allicin compared to regular garlic still it gives out a tremendous health benefits and its rich in amino acids, phytonutrients and antioxidants due to its fermentation process which brings all the magic and changes the concentrations of the garlic.

Increased amount of compound that is S-Allylcysteine (SAC) can be found in black garlic which helps our body to absorb allicin which can be effective at helping our body to get the best benefits that allicin provides.

Composition of 15grams of black garlic contains approximately:

- Energy: 40 kcal
- Carbohydrates: 8 grams
- Proteins: 2 grams
- Fats: 0 grams
- Dietary Fiber: 3 grams
- Sugar: 4 grams

Black garlic also contains noticeable amounts of:

- Vitamin C
- Manganese
- Calcium
- Zinc
- Iron
- Magnesium
- Phosphorus
- B vitamins (B1, B2, B3, B6)
- Folate

How Does Black Garlic Plays Role In Liver Diseases?

Liver diseases can be caused by many diseases and conditions that affect liver or it can be any disturbance of liver function that causes illness. As you known, liver diseases can be also caused by alcohol, exposure to chemicals, medications and germs; Black garlic may help us to protect the liver from damage that has been caused by this element.

According to recent study it has shown that black garlic may also be helpful in more chronic diseases as it improves the liver function in the case of chronic alcohol induced liver damage likely through its anti- oxidant activity

Black Garlic may also lower markers of liver Injury following liver damage, it may rebalance size of liver cell and may decrease the fatty deposits in liver

In previous studies it has been shown that AST(Aspartate Transaminase) and ALT (Alkaline Phosphatase) Levels has decreased and liver histopathological analysis

The mineral "Selenium" that is present in black garlic can also cleanse the liver and may trigger the liver enzymes and naturally flush out the toxins from our body

Aged black garlic reduces the fact accumulation in liver and causes a significant decrease of the alcohol-induced increases in hepatic activity; Glutathione contained and the activities of antioxidant enzymes in liver were significantly enhanced were shown in some recent studies. Aged Black garlic has as strong antioxidative properties and may be a protecting and promising agent against chronic alcohol-induced liver damage. It also has properties which are in anti-inflammatory which may help in liver diseases.

Black garlic also contains some essential compounds that are magnesium, zinc, calcium and phosphorus which act as an electrolyte as we know that one of liver condition that is "cirrhosis" which is common disorder a fluid where there is a water retention and excess accumulation of body fluids with edema and ascites formation may be black garlic compounds can heal these conditions. Black garlic also contains important vitamin B (b1, b2, b3, b6) and folate which is also necessary for this condition and other liver condition.

Hepatitis is a disease of liver which causes inflammation of the liver and hepatitis may also be cause by virus, heavy alcohol use, toxins, some medications and some medical conditions may also be treated black garlic compounds that are alkaloid and flavonoids which are anti-inflammatory and can also be useful healing process.

Black Garlic may be a remedy that prevent effect on the liver or protect it from causing damage that can result in injury or chronic alcohol or medication or exposure to chemicals.

How Can Black Garlic Boost Your Immunity?

Immunity is the capability of our body to fight with foreign bodies (harmful microorganisms). In other words, we can say that immune system keeps the record of germs that has entered our body and it fought with so that when the same germ (microbe) enters our body it will recognize and destroy it.

We should build our immune system because a healthy immune system protects us by creating a barrier that stops the foreign bodies or germs or microbes from entering our body. If by chance one slips by the barrier, the immune system produces white blood cells and other components to attack and destroy these foreign substances.

Black garlic or aged black garlic (which have more antioxidant compared to the normal black garlic) have ample amount of antioxidant which is needed for the functioning of immune system or cell against homeostatic (maintenance of all organism, cells, tissues and regulation of the stability to function properly).

Immune system is an indicator for health, the shield of the inner system afforded by dietary antioxidant.

Antioxidant produces free radicals and chain reactions that may damage the cell of organisms. Free radicals are produced when our body breakdowns food or when we are exposed to tobacco smoke or radiations.

Antioxidants has its nutrients which are vitamin E, vitamin C, beta carotene, copper, zinc, iron and selenium which improves our different immune functions exhibit an important protective role in infections caused by bacteria, viruses or parasites. This major component that is antioxidant plays a major role in boosting our immunity.

this major component antioxidant is abundantly found in black garlic, aged black garlic contains the highest amount of phenolic, flavonoid and flavanol compounds, exhibited the greatest antioxidant activity which is greatest antioxidant activity which is great for our immune system.

As our immune system plays a crucial role in our overall health the antioxidant found in black garlic or aged black garlic enhance our immunity by fighting free radical, reducing inflammation and preventing oxidative damage to our cells.

Black garlic contains a concentrated dosage of antioxidant which can boost our immune system and benefit us with far-reaching effects on several health aspects of health and may aid in the treatment of covid-19 (corona virus), some allergies to autoimmune disorder and acute infections.

Black Garlic Impact on Heart Health:

Keeping our heart health good is most important and major role of our life knowing that it is a vital organ which is keeping us alive. So, it's important to treat this precious commodity like a king.

Nowadays, because of our lifestyle our heart is getting weak or in some other way we harm it which can further convert it into any heart disease. Keep your heart happy with diet, doing some lifestyle modifications, exercise etc.; But the most important thing is that you have to manage your levels that is cholesterol levels, good fat HDL (High Density Lipoprotein), bad fat LDL (Low Density Lipoprotein) levels and triglycerides levels.

Managing these levels maybe be difficult in our daily life as we don't have time to follow any diet regime or taking bunch of supplements so why not to try a natural remedy that is "Black Garlic". We can just pop 1 clove going itself or inculcating it in our daily meal.

Black garlic may provide some protective effects on our hearth health by reducing certain makers of heart disease.

In recent studies it has shown that black garlic helped reduce the total blood, fats, total cholesterol and triglycerides in rats fed a diet high I fat. It elevated levels of these usually indicate an increased risk of heart disease. Researchers also found that black garlic helped open up circulation to protect the heart from damage

Previous studies also compared the effects of raw and black garlic in rats recovering from heart damage due to ischemia-lack of blood flow to heart and found that black garlic was more beneficial. It has also been seen in previous studies that patients with coronary heart disease consumed 20g of black garlic extract daily for 6 months. Those who consumed it experienced increased antioxidant levels and improved indicators of heart health compared with those who took a placebo.

Black garlic can help in improving heart health and can also reduce risks of strokes and heart attacks. It works wonders in lowering done the levels to reduce our vulnerability towards heart diseases.

Potential Downside Of Black Garlic:

- As we know that nothing is purely perfect each thing has its two sides in the same way may black garlic has its own benefits and provide each component abundantly but it also comes with its own side effects.
- However, raw garlic has its own side effects and after all black garlic is its fermented end product if eaten in large amount it may increase the risk of bleeding for those who takes or are on blood thinning medications.
- You should avoid black garlic if you have an allergy to raw garlic.

- If consumed in excessive amount can also cause problems such as odor of the breath and skin, can origin symptoms like nausea, gas, heartburn and diarrhea as it irritates the gastrointestinal tract.
- It can also cause liver toxicity if consumed in excessive amount.
- Most commonly reported side effects include asthma, running nose, or skin problems like dermatitis.

Preparation to Formulate Black Garlic:

- Though black garlic is not common as raw garlic we can get it online stores also.
- But we can also prepare it at home using a slow cooker, rice cooker and dehydrator method, these techniques take few weeks, but all the techniques are worth efforts.

A. Slow Cooker:

1. Set the dial to warm (not cook).
2. Put whole heads of garlic inside the slow cooker.
3. Wait for two to three weeks for your black garlic to be ready.

B. Rice Cooker:

This is the first non- slow cooker option for making black garlic is a rice cooker.

1. For this method we should use the “keep warm” setting.
2. Keep the heads of garlic at the setting for a few weeks.

CAUTIONS: Slow cooker and rice cooker method can run for minimum 3 weeks but can anguish us for both expense and safety.

C. Dehydrator:

1. Wrap the garlic top in plastic and then cover it with several layers of tinfoil.
2. Cover the garlic to trap moisture and keep the cloves from drying out.
3. Set the packet in in the dehydrator.
4. Set the temperature to 130 degrees Fahrenheit.
5. Wait 3 weeks for black garlic to be ready.

Storage:

- Once aged keep the garlic wrapped up and placed in the fridge (3 to 6 months).
- Can also store in sealed container or if stored at room temperature, black garlic can be kept up for a month.

Inculcating Black Garlic In our Diet:

Compared to raw garlic black garlic can be a delicious that can satisfy you taste bud by adding it to your diet.

Black garlic has gelatinous consistency, a mild sweet flavor which can work with few dishes.

- We can use black garlic as a pizza topping.
- Blend them with olive oil to make a simple but a yum salad dressing.
- If the cloves thinly chopped it can be added to our past.
- Can be used as a seasoning for soups.
- Can make black garlic powder to marinate meats, fish and poultry.
- We can make carrot with herbs and black garlic yoghurt.
- We can make hummus out of black garlic.

Black Garlic Therapy:

- Eat 1 clove of black garlic in the morning can help you with detoxifying your body.

- If Insomniac try drinking milk which is made with black garlic int it.
RECEIPE: Add 1 crushed cloves in milk let it simmer around 2 to 3 minutes and then add honey to it and drink it half an hour before going to bed.
- Have garlic with water on empty stomach in morning to get benefits like removing harmful toxins from your body and prevent diseases like depression, diabetes, asthma etc.
- Drinking garlic water regularly can increase your eye health.

Health Benefits of Black Garlic:

There are few more benefits of black garlic those are:

1. Blood Sugar Level:

Black garlic may help to regulate blood sugar levels by reducing the high blood sugar and can help preventing chronic health issues like diabetes symptoms, dysfunction of kidney etc.
Higher concentration of antioxidant may help to prevent complications related to diabetes.

2. Brain Health:

Black garlic can help down the inflammation and prevent cognitive conditions such as Parkinson's Disease and Alzheimer's Disease by improving memory and other parts of cognitive conditions because of its antioxidant properties.

So, while black garlic has less of the active enzyme that is allicin compared to fresh raw garlic, it boasts higher concentrations of antioxidants, other beneficial compounds and many nutrients.

The higher concentration of all compounds may be partly responsible for all the health benefits that we get from black garlic.

Conclusions:

The black garlic has several benefits due to its nutrients content which is abundantly filled with antioxidants that help reducing inflammation, decrease oxidative stress by nullifying the free radicals and give a kick to our immune system.

Black garlic is fermented product of raw garlic.

Black garlic has significantly increased antioxidants activities. In fact, antioxidants in black garlic are likely the reason for its potential benefits for the liver, blood sugar, heart, boosting immunity and brain as well as its potential anticancer properties.

Every coin has two sides and does the black garlic has adverse effects when consumed in large amounts if under the blood thinning medications. Also need to be careful about allergies.

Everything in moderation is good for health, so a moderate dosage of black garlic is important.

Future Aspects:

There are numerous benefits of black garlic on our health. Hence, capsule or powder for therapeutic treatments can be accepted.

Acknowledgements:

Heartfelt and sincere gratitude to Meesha Deshpande ma'am, Ruchu Kuthiala ma'am, Archana Ainpure ma'am from Symbiosis Skills And Professional University (Kiwale, Pune) for their constant support, keen interest, valuable guidance, suggestions as well as encouragement in the completion of this endeavor. We would like to thank our friend Prashant Singh Parihar and Gunjan Bhosale for his constant support, guidance, suggestion and for his valuable time he has given to this.

We would like to thanks our parents for being our pillars of strength. We are highly obligated for their love and encouragement at every point of time.

References.

Sources from google and some related articles.

1. Amagase, H. and Milner, J.A. (1993) Impact of various sources of garlic and their constituents on 7,12-dimethylbenz[a]anthracene binding to mammary cell DNA. *Carcinogenesis*, 14, 1627-1631.
2. Block, E. (1985) The chemistry of garlic and onions. *Sci. Am.*, 252, 114-119.
3. Isensee, H., Rietz, B. and Jacob, R. (1993) Cardioprotective actions of garlic (*Allium sativum*). *Arzneimittelforschung*, 43, 94-98.
4. Hoshino, T., Kashimoto, N. and Kasuga, S. (2001) Effects of garlic preparations on the gastrointestinal mucosa. *J. Nutr.*, 131, 1109S-1113S.
5. Oboh, G. (2004) Prevention of garlic-induced hemolytic anemia using some tropical green leafy vegetables. *J. Med. Food*, 7, 498-501
6. McRae, M.P. (2005) A review of studies of garlic (*Allium sativum*) on serum lipids and blood pressure before and after 1994: does the amount of allicin released from garlic powder tablets play a role? *J. Chiropr. Med.*, 4, 182-190.
7. Ishikawa, H., Saeki, T., Otani, T., Suzuki, T., Shimozuma, K., Nishino, H., Fukuda, S. and Morimoto, K. (2006) Aged garlic extract prevents a decline of NK cell number and activity in patients with advanced cancer. *J. Nutr.*, 136, 816S-820S.
8. Borek, C. (2001) Antioxidant health effects of aged garlic extract. *J. Nutr.*, 131, 1010S-1015S.

Biographies



Author: Prerna Navin Lade.



Co.Author: Kavya Naidu.



Co.author. Sheerya Yenarkar.