

# Four foods that fight cancer

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## **Overview**

Cancer is a huge public health concern in South Africa and the rest of Africa. According to the Cancer Association of South Africa (CANSA), more than 100 000 South Africans are diagnosed with cancer every year. Among women, the leading cancers include breast, cervical, colorectal, and kaposi sarcoma while prostate, kaposi sarcoma, lung, and colorectal cancers top the list of cancers affecting men.

Even though cancer is becoming common, it is a highly preventable condition and can also be managed through lifestyle modification. Like is the case with other chronic illnesses, diet is a very powerful determinant of cancer risk. The Cancer Association of South Africa states that 90% of cancer cases are caused by environmental and lifestyle factors such as smoking, diet, and lack of exercise.

## **Cancer and diet**

Cancer risk and diet are strongly connected. The typical western diet with its high concentration in meat, processed foods, unhealthy fats, and other ingredients has been associated with a high incidence of cancer. The Westmead breast cancer institute explains that population studies indicate that western eating patterns such as eating a diet containing large amounts of fatty meat, processed foods, refined carbohydrates, and alcohol are associated with increased risk of breast cancer.

On the other hand, diets low in meat and rich in unprocessed plant foods appear to offer protection against cancer. In one study published by American Association for Cancer Research journal, the lower incidence of cancer in Mediterranean countries in comparison to Scandinavian countries, the United Kingdom, and the United States was attributed mainly to the traditional Mediterranean diet which happens to be rich in unprocessed plant foods and olive oil while very low in red meat. Like the Mediterranean diet, traditional African diets are low in meat and high in unprocessed plant foods and healthy fats. This is part of the explanation for the low incidence of cancer in rural Africa where many people still follow traditional African diet

Here are some of the foods in traditional African diets known to have powerful cancer fighting properties

### **1. Cabbage**

There has been a lot of research into the role of cabbage in cancer prevention and treatment and so far studies are showing that cabbage has very powerful anti cancer properties. With a multitude of high quality nutrients, cabbage is a powerful anti cancer food that ought to be part of a healthy diet. Cabbage is known locally as khavechi in South Africa.

## **Beta carotene**

Cabbage contains appreciable amounts of beta carotene, a powerful anticancer nutrient. Beta carotene is used for production of vitamin A, a verified cancer fighting nutrient based on various research findings. Foods rich in vitamin A are often mentioned for significantly lowering the risk of lung cancer. In addition to playing a role in the production of vitamin A, beta carotene functions as a powerful antioxidant and also acts as an effective immune booster. Studies have consistently linked foods rich in beta carotene and other antioxidants to a significant reduction in cancer incidence. A study published in Journal of the National Cancer Institute found that dietary beta carotene obtained from different fruits and vegetables was strongly linked to a significant reduction in cancer risk in non smokers.<sup>1</sup>

Evidently, eating cabbage is a dependable way of obtaining cancer fighting beta carotene. The U.S National Library of Medicine also states that eating various fruits and vegetables that contain beta carotene seems to decrease the risk of breast cancer in pre-menopausal women who are at high risk of getting breast cancer, including those with a family history and those who use alcohol excessively. In addition, following a diet rich in carotenoids, including beta-carotene, reduces the risk of ovarian cancer in women after menopause.

The immune system is affected by the amount of beta carotene in a diet. High intake of cabbage and other foods rich in beta-carotene such as cabbage tremendously strengthens the immune system. The University of Maryland Medical Center explains that vitamin A derived from eating beta-carotene keeps the immune system strong. This immune enhancing aspect of cabbage is a profoundly relevant tool for fighting cancer because a soundly functioning immune system is able to quickly recognize and destroy or inhibit cancer cells. A weak immune system makes it easy for cancer to form and grow out of control.

## **Indole 3 carbinol**

Cabbage has indole 3 carbinol, or simply I3C, too. Also found in other cruciferous vegetables, indole 3 carbinol has been linked by numerous studies to a substantially reduced risk of breast cancer. Indole 3 carbinol appears to work through multiple methods to combat breast cancer. One way indole 3 carbinol works is by disrupting breast cancer cell cycle. This is confirmed by a study in Journal of nutrition which found that the ability of indole 3 carbinol to disrupt cell cycle of breast cancer played a huge role in minimizing breast cancer risk.<sup>2</sup>

The anti cancer properties of indole 3 carbinol go far beyond breast cancer, this nutrient found abundantly in cabbage suppresses other forms of cancer as well. What's more, indole 3 carbinol is potent enough to kill cancer cells. Researchers explain that indole 3 carbinol induces mass deaths of prostate cancer cells and suppresses growth of colon and cervical cancer cells.<sup>3</sup>

Further, Indole 3 carbinol is known to be helpful for keeping hormones in a balanced state. Hormone sensitive cancers like breast and prostate tend to thrive where there is hormonal imbalance. By keeping hormones balanced, cabbage is able to fight off different forms of cancer. The hormonal balancing effect of cabbage also helps offset estrogen dominance, another serious risk factor for breast cancer.

### **Antioxidants**

Cabbage has a wide variety of powerful antioxidants that contribute to its cancer fighting abilities. Beta carotene and indole 3 carbinol act as potent antioxidants in addition to their various anti cancer roles. Another powerful antioxidant worth mentioning is vitamin C which has been found by several studies to reduce the risk of any disease including cancer. Diets filled with antioxidant rich foods such as cabbage have been linked to very low likelihood of cancer. Unprocessed plant foods like cabbage and different fruits and vegetables are the greatest food sources of antioxidants.

### **Omega 3 fatty acids**

Cabbage is not necessarily a rich source of omega 3 fatty acids but the fat composition of cabbage is highly concentrated in omega3 fatty acids. Omega3 fatty acids have been found to have powerful anti-inflammatory properties that make a major contribution to fighting off cancer. A shortage of omega 3 fatty acids in westernized diets is often mentioned by experts as a major reason for the rising incidence of cancer and other chronic illnesses. Even though cabbage is not very high in omega 3 fatty acids, including it in a diet contributes towards increasing the overall intake of the much needed omega 3 fatty acids.

### **Red cabbage**

Red or purple cabbage is particularly rich in anthocynins, plant pigments that produce the red/ purple hue. Anthocynins have powerful anticancer properties that play an important role in combating different types of cancer. Natural News states that red cabbage contains 36 different varieties of anthocyanins which have been linked to cancer protection by a number of studies.<sup>4</sup>

Clearly, the presence of anthocyanins in red cabbage is a massive addition to the cancer fighting abilities of cabbage. Anthocyanins act as antioxidants by preventing damage to cells. As a result of their antioxidant capabilities, anthocyanins are able to significantly lower systemic inflammation. Uncontrolled systemic inflammation is an underlying pro-cancer activity.

### **Fermented cabbage**

Fermented cabbage, also known as sauerkraut, adds to the already present cancer fighting properties in regular cabbage. This is because fermented cabbage contains friendly bacteria known as probiotics. Probiotics are widely synonymous with healthy digestion. But research shows that probiotics have a wide variety of health properties beyond promoting healthy digestion. These healthy bugs are endowed with immense cancer fighting properties especially with regards to cancers that affect the digestive tract. Such cancers include mouth, throat, stomach, and colorectal.

### **Preparation suggestions**

Cabbage has fat soluble nutrients like beta carotene and vitamin K1. Fat is needed for successful absorption of these nutrients. For this reason, it is recommended to add a healthy fat like olive oil during preparation or eating cabbage with a fat containing healthy food. Even though cabbage has omega 3 fatty acids, the amount that is available may not be adequate for proper absorption of nutrients. It is also wise to prepare cabbage in a manner that preserves nutrients such as making a salad, stir frying, or boiling for a short time. Cabbage and carrots go really well, you can grate some carrots and mix with cabbage during preparation. Over cooking cabbage should be avoided because it destroys vitamin C, a heat sensitive nutrient.

## **2. Black Jack**

Black jack, botanical name *bidens pilosa* is another indigenous African vegetable with powerful cancer fighting attributes. Muxiji and gewone knapseherel are two of the local names of black jack in South Africa. Black jack leaves are eaten as vegetables or used to prepare tea. Black jack is rich in several cancer fighting nutrients that counter different forms of cancer. One outstanding anticancer property of black jack is its ability to destroy cervical cancer cells.<sup>5</sup>

The action against cervical cancer is an important attribute considering that cervical cancer affects many women in South Africa and Africa in general. Black jack also has possible antitumor activities and may be capable of countering oral, liver, and breast cancer. Polyacetylenic compounds are believed to be among the leading compounds that give black jack its anti tumor powers.<sup>6</sup>

The impact of black jack on leukemia has also been probed. Leukemia is cancer of the blood and bone marrow. Research in this area shows that black jack maybe helpful for people suffering from leukemia. Going by the findings of a study published in American Journal of Chinese Medicine, black jack possesses anti cancer attributes that exhibit activity against leukemia by destruction of cancer cells.<sup>7</sup>

### **Phenolic compounds**

Black jack is rich in phenolic compounds and they largely contribute to the anticancer powers of the plant. There are various studies touting the anticancer activity of phenolic compounds from various plants. In one such study, it was established that besides preventing multiplication of cancer cells, phenolic compounds in black jack were effective for inducing mass deaths of multiple types of cancer cells including colon cancer. This is a very important finding because colon cancer is a top public health concern in South Africa and worldwide.<sup>8</sup>

Phenolic compounds in black jack have an antioxidant role as well. These plant compounds effectively scavenge harmful cancer causing radicals. Through this kind of action, phenolic compounds are also able to tame inflammation. What's more, phenolic compounds have another outstanding ability; they act as metal chelating agents. This means that phenolic compounds remove heavy metals like lead and mercury from the body. Phenolic compounds known as flavonoid compounds are able to prevent heavy metal poisoning by helping the body eliminate heavy metals.<sup>9</sup>

If left to linger in the body, heavy metals are potentially cancerous. The National Toxicology Program of the United States classifies lead and its compounds as 'reasonably anticipated to be human carcinogens. Besides eliminating heavy metals, phenolic compounds in black jack remove other potentially cancerous toxic substances from the body.

### **Beta carotene, vitamins C and E**

Black jack is a rich source of beta carotene as well which, as already indicated, is tied to a lower incidence of cancer. Also present are vitamins C and E. All these three nutrients possess powerful antioxidant properties and boost the immune system, improving the body's ability to combat cancer at different stages.

Vitamin C rich foods such as black jack are central to anti cancer nutrition. The American Journal of Nutrition recommends consumption of vitamin C rich foods for protection against different forms of cancer including esophageal, larynx, oral cavity, and pancreatic cancers as well as cancer relating to the stomach, rectum, breast, cervix, and lungs. This advice follows rigorous analysis of multiple studies indicating that diets rich in different fruits and vegetables high in vitamin C offer significant protection against cancer.

Vitamin E is another key anti cancer attribute of black jack. Researchers from Ohio State University looking into the anti cancer activity of vitamin E found that vitamin E suppresses an enzyme called AKT that is essential for survival of prostate cancer cells. It was observed during this study that loss of AKT led to tumor cell death.<sup>10</sup>

### **Phyto sterols**

Phyto sterols are another reason black jack is a powerful anti cancer food. There is growing evidence showing phyto sterols to suppress lung, stomach, ovarian, and breast cancer. Phyto sterols combat cancer by preventing cancer cell formation, suppressing multiplication of cancer cells, and destroying cancerous cells. Furthermore, eating phyto sterol-rich food like black jack enhances activity of antioxidant enzymes thereby reducing oxidative stress. And by promoting healthy cholesterol ratio, phyto sterols are able to induce destruction of cancer cells.<sup>11</sup>

Beta carotene, vitamin E, and other nutrients in black jack are fat soluble. This means that fat has to be present in order for these nutrients to be properly absorbed. As a result, it is advisable to add healthy fats to black jack during preparation. Alternatively, black jack can be eaten along with a fat containing healthy food like avocado or peanuts so as to boost absorption of fat soluble nutrients essential for fighting cancer and fulfilling other health promoting roles. Black jack can be eaten as a vegetable or used to make tea in its fresh or dried state.

### **3. Papaya (pawpaw)**

Papaya, also known as pawpaw and botanically referred to as carica papaya, has some incredible anti cancer attributes. The fruit and seeds are edible while leaves are used for making tea. A considerable body of research shows papaya to significantly lower cancer risk. Papaya is a unique collection of nutrients that work jointly to deliver different health benefits including anti cancer activities. One key reason papaya fights cancer effectively is because it greatly boosts the immune system, a major anti-cancer requirement.

#### **Lycopene**

Papaya contains lycopene, especially the deep orange variety. Lycopene, has been widely studied for its health benefits including its impact on cancer. A study published in Pubmed states that lycopene has the ability to prevent the formation and development of different types of cancers including prostate, breast, and lung cancer. There are various ways lycopene acts to counter cancer. First of all, lycopene is a powerful antioxidant that scavenges harmful cancer causing radicals. Lycopene also disrupts cancer cell cycle, induces mass deaths of cancer cells, and promotes anti inflammatory activity which works to suppress formation and progression of cancer.<sup>12</sup>

And lycopene's anti cancer potency tends to get stronger when a lycopene containing food like papaya is taken in combination with green tea. An interesting study done on Chinese men established that habitually drinking tea combined with eating fruits and vegetables rich in lycopene could lead to a reduced risk of cancer in Chinese men. It is believed that lycopene and green tea act jointly to deliver the anti cancer effect. Lycopene is concentrated in the fruit part of the papaya plant.<sup>13</sup>

#### **Folate, beta carotene, and Vitamin C**

Another anticancer nutrient found in papaya is folate or vitamin B9. Even though studies looking into the connection between folate and cancer risk produce mixed results, there is still considerable evidence indicating that eating folate-rich foods like papaya substantially reduces the risk of different cancers including breast and cervical. According to the University of Maryland Medical Center, folate in diet seems to protect against the development of some forms of cancer including colon, breast, cervical, pancreatic, and stomach cancer. Furthermore, a study appearing in Gastroenterology found that taking high levels of folate may reduce colorectal cancer risk.<sup>14</sup>

Papaya also happens to be rich in beta carotene and vitamin C, two nutrients with immense antioxidant powers that produce anti cancer effects. Other than their antioxidant capacities, beta carotene and folate work through other means to counter cancer, one such method is strengthening the immune system. Beta carotene and vitamin C are found in the fruit and leaves of the papaya plant.

## **Papain**

Papaya contains papain, an enzyme which possesses an impressive set of cancer fighting qualities. Papain promotes digestive health, an effect that can possibly cut the risk of cancers related to the digestive system like mouth, esophageal, stomach, and colorectal cancer. Additionally, papain functions as an antioxidant, reduces inflammation, and provides immune support, factors known to reduce cancer risk.

## **Papaya leaves**

Papaya leaves are being studied for their anti cancer benefits and so far there is evidence showing papaya leaves to be potent against cancer. In a study published in Journal of Ethnopharmacology, researchers at the University of Florida and in Japan found papaya leaves to have powerful anti cancer properties against cervical, breast, liver, lung, and pancreatic cancers. One way papaya leaves were noted to combat cancer was by inducing death of cancer cells. The study also found papaya leaves to offer immune support, a valuable tool for fighting cancer.<sup>15</sup>

Papaya leaves, fresh or dried, are used for making tea. Tea from fresh papaya leaves tends to be bitter while tea from dry leaves does not have the bitter taste. There are also reports of people taking papaya leaves as vegetables.

## **Seeds**

Papaya seeds serve as an important anti cancer agent too. Based on research findings, papaya seeds contain phenolic compounds which are known to possess antioxidant powers. Papaya seeds also contain compounds that boost the immune system, subsequently slowing down tumor growth. However, there is also a word of caution regarding consumption of papaya seeds. The extract from papaya seed contains a compound that may be toxic if taken at high doses. Nevertheless, the amount of this compound in a normal serving of papaya seeds is too low to be harmful.<sup>16</sup>

Livestrong.com provides some ideas on how to eat papaya seeds. Fresh papaya seeds can be added to a salad or eaten as is. Wikihow suggests adding honey to fresh papaya seeds to offset the bitter taste. Dried and crushed papaya seeds also make a good substitute for black pepper and the taste is like a combination of black pepper and mustard.

## **4. Baobab**

Baobab, known scientifically as *adansonia digitata*, is well known in African folk medicine for prevention and treatment of various illnesses including cancer. Local names of baobab include kremetartboom, isimuku, umshimulu, isimuhu, ximuwu, mowana, and muvhuyu. A growing body of scientific evidence is validating the role of baobab as a powerful medicinal food for cancer and many other diseases. Studies are finding baobab to be a very potent anti cancer agent. The fruit pulp, seeds, and leaves of the baobab plant are edible.

### **High antioxidant content**

Baobab is very high in a wide variety of antioxidant nutrients and this feature is a key factor of baobab's anti cancer activity. A study looking into the antioxidant activity of fourteen wild edible fruits from Burkina Faso found baobab to have the second highest level of phenolic compounds. The antioxidant activity of baobab fruit was also determined to be on the higher side.<sup>17</sup>

In addition to phenolic compounds, baobab has a wide selection of several other antioxidant nutrients including vitamin C. Baobab fruit pulp is particularly rich in vitamin C, boasting up to six times as much

vitamin C as the amount in oranges. Some estimates put the vitamin C content at an amount much higher than this. All antioxidants in baobab work together to produce a powerful anti cancer force. This just goes to show what a fundamental role diet plays in determining cancer risk. A 2013 study concluded that antioxidants in baobab fruit pulp have antitumor properties.<sup>18</sup>

### **Seeds, leaves**

Baobab seeds and leaves are edible too and they are high in cancer fighting nutrients. The seeds are particularly rich in omega 3 fatty acids which have been found to exhibit immense cancer fighting properties. Numerous studies tout omega 3 fatty acids for their anti inflammatory powers which are extremely instrumental for fighting cancer. Uncontrolled systemic inflammation is an underlying pro-cancer activity. A study in the American Journal of Nutrition affirms that omega 3 fatty acids work through various mechanisms to control inflammation.<sup>19</sup>

Furthermore, omega 3 fatty acids prevent proliferation of cancer cells in the breast, prostate, and colon. Omega 3 fatty acids also prevent insulin resistance. Level of insulin sensitivity is another important factor that affects cancer risk. Insulin that is insensitive or resistance increases cancer likelihood while sensitive insulin is associated with low risk of cancer. By improving insulin function, omega 3 fatty acids improve the body's capability to fight cancer

Baobab leaves have beta carotene, vitamin C, and multiple antioxidants that make a massive contribution towards fighting cancer. Leaves are eaten as vegetables or used to make tea. Baobab leaves are also made into powder and used in various ways including thickening stew. Seeds are eaten raw, roasted, or grounded into a paste that can be added to stew.

Baobab fruit pulp can be eaten just the way it is or dissolved in water to make a nice, tasty drink. Another common suggestion is to add baobab fruit pulp to smoothies.

### ***The common features***

Cabbage, black jack, papaya, and baobab each have their own unique cancer fighting characteristics. The same foods also share some common cancer fighting attributes that are worth mentioning.

#### **Prevention of acidity**

Cabbage, black jack, papaya, and baobab are unprocessed plant foods that prevent acidity in the body. This effect is even greater when these foods are part of a diet with mostly unprocessed plant foods, like is the case with traditional African diets. Such diets are known to be very effective at offsetting acidity. Cancer and other diseases tend to favor acidity and cannot thrive in a normal or alkaline setting.

#### **Hormonal balance**

Cabbage, black jack, papaya, and baobab contribute significantly towards hormonal balance. This is especially vital for tackling hormone sensitive cancers such as breast and prostate. Unbalanced hormones are known to fuel cancer activity and part of the solution for stopping cancer lies in eating foods that balance hormones. Diet plays a tremendous role in achieving hormonal balance. Western diets are known to disrupt hormonal activity, thereby raising the risk for cancer.

## **Fiber**

All the foods profiled contain fiber which happens to be a potent tool for fighting different forms of cancer. The risk of colon cancer is markedly lowered by diets rich in high fiber food. This happens because fiber suppresses colon polyps, abnormal growths on the inside of the colon. Colon polyps can turn cancerous if allowed to continue growing. There is another common explanation advanced for the strong association between fiber rich diets and low prevalence of colon cancer. Fiber cuts the transit time of food through the digestive tract, reducing the amount of time the colon is exposed to potentially cancerous toxins in the gastro intestinal contents. Moreover, fiber acts as a prebiotic and this means that fiber promotes probiotic activity. Probiotics are healthy bacteria that have numerous health benefits including lowering the risk of colon cancer and other cancers affecting the digestive tract. Among their many anticancer properties, probiotics produce vitamin K which slows tumor growths of different cancers. Probiotics also help eliminate carcinogenic material from the body.

Further, fiber minimizes excess fat. Carrying excess body fat causes hormonal imbalance, a serious risk factor for hormone sensitive cancers. What's more, fiber combats cancer by improving insulin sensitivity. Insulin that is insensitive or resistant is a major stepping stone towards cancer.

## **Antioxidants**

Cabbage, black jack, papaya, and baobab are all rich in various antioxidants that work through various mechanisms to combat cancer at different levels. Anti oxidants are instrumental for preventing the formation of cancer in the first place. And if cancer is already present, antioxidants have the ability to fundamentally disrupt cancer progression, an action that may get rid of cancer altogether or slow down its growth. There are a number of known mechanisms through which antioxidants combat cancer. One is by inducing apoptosis in cancer cells. This is where antioxidants program cancer cells to commit mass suicides. Antioxidants also starve cancer cells by cutting off blood supply to the cells. Furthermore, antioxidants inhibit the multiplication of cancer cells. This effect is usually referred to as anti-proliferative activity. Also, antioxidants have a toxic effect on cancer cells or cytotoxicity. The underlying action of antioxidants that makes all these processes possible is the ability to scavenge cancer causing radicals. If left unabated, these harmful radicals inflict damage on healthy body cells and allow cancer to form and thrive.

Antioxidants in various unprocessed plant foods are also known for their role in preventing oxidative stress. Oxidative stress happens when the body does not have enough antioxidants to neutralize existing harmful radicals or repair the damage caused by harmful radicals. As a result of the shortfall in the amount of antioxidants, body cells undergo a lot of damage, usually referred to as oxidative damage. This can easily lead to the formation and progression of cancer. A diet filled with antioxidant-rich foods such as cabbage, black jack, papaya, and baobab is able to offset oxidative stress and subsequently fight off cancer.

And by neutralizing harmful radicals, antioxidants are able to tame low grade systemic inflammation. Systemic inflammation is when the body experiences swelling, redness, and heat in different spots throughout the body due to cell damage by harmful radicals in those areas. Researchers say chronic low grade systemic inflammation is also a root cause of cancer. As part of a sustainable anticancer diet, cabbage, black jack, papaya, baobab, and other antioxidant-rich foods are highly recommended because of their anti-inflammatory properties.

## ***Availability***

Cabbage and papaya are usually sold at mainstream food stores and market places. When black jack is in season, it is sold mostly at markets. Baobab is sold at some market places and health food stores. With the realization of health benefits of indigenous foods, a number of health food stores are starting to stock some indigenous foods like baobab.

## ***Part of a healthy diet***

The anti-cancer properties of the above mentioned foods work best when these foods are eaten as part of a healthy diet that is nutritionally balanced and has a wide variety of foods. Each food has its own unique nutritional profile and it makes an important contribution to the cancer fighting abilities of a healthy diet. Nutrients in the mentioned foods also enhance the cancer fighting activities of other foods found in a healthy diet. So what makes the discussed foods powerful anti cancer weapons is that they are part of healthy traditional African diets that are nutritionally balanced and contain a wide variety of foods.

## ***Integrative medicine***

With such powerful anti-cancer properties it is clear that cabbage, black jack, papaya, baobab, and other healthy foods can make a valuable contribution towards fighting cancer using integrative medicine, a treatment approach that cherry picks options from conventional and lifestyle medicine. Integrative medicine combines these options to arrive at a treatment method that gives the best outcome possible for a given situation. With the growing realization that conventional medicine is not fully equipped to successfully handle cancer and other chronic illnesses, integrative medicine is a concept that is gaining popularity and it is turning out to have a much higher success rate than simply using conventional medicine. Some of the leading integrative medicine centers in the United States are Arizona Center for Integrative Medicine and Cleveland Clinic.

## ***Conclusion***

The four foods profiled give a glimpse into the anticancer features of traditional African foods and diets. There are so many more foods in traditional African diets that possess powerful cancer fighting properties. The low rates of cancer in rural Africa can be largely attributed to the presence of a large collection of cancer fighting foods in people's diets. Traditional African diets tend to be rich in unprocessed plant foods and these are the foods rich in cancer fighting nutrients.

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