

WHFoods: Turmeric

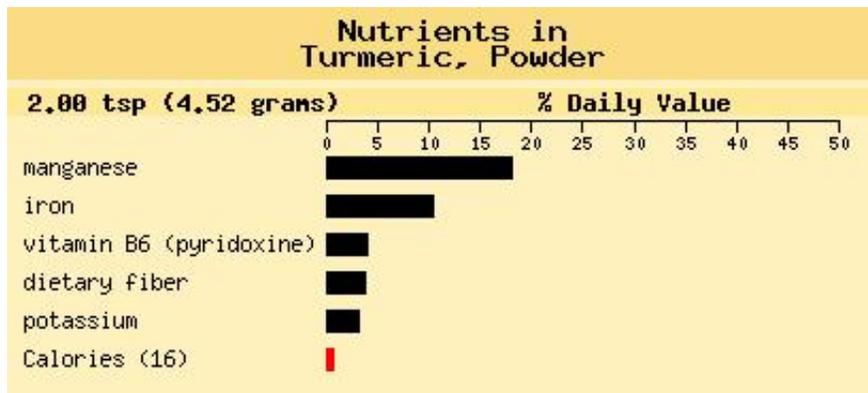
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Turmeric

Turmeric has a peppery, warm and bitter flavor and a mild fragrance slightly reminiscent of orange and ginger, and while it is best known as one of the ingredients used to make curry, it also gives ballpark mustard its bright yellow color.

Turmeric comes from the root of the *Curcuma longa* plant and has a tough brown skin and a deep orange flesh. Turmeric has long been used as a powerful anti-inflammatory in both the Chinese and Indian systems of medicine. Turmeric was traditionally called "Indian saffron" because of its deep yellow-orange color and has been used throughout history as a condiment, healing remedy and textile dye.



This chart graphically details the %DV that a serving of Turmeric provides for each of the nutrients of which it is a good, very good, or excellent source according to our Food Rating System. Additional information about the amount of these nutrients provided by Turmeric can be found in the Food Rating System Chart. A link that takes you to the In-Depth Nutritional Profile for Turmeric, featuring information over 80 nutrients, can be found under the Food Rating System Chart.

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Health Benefits

Turmeric (*Curcuma longa*), the bright yellow of the spice rainbow, is a powerful medicine that has long been used in the Chinese and Indian systems of medicine as an anti-inflammatory agent to treat a wide variety of conditions, including flatulence, jaundice, menstrual difficulties, bloody urine, hemorrhage, toothache, bruises, chest pain, and colic.

A Potent, Yet Safe Anti-Inflammatory

The volatile oil fraction of turmeric has demonstrated significant anti-inflammatory activity in a variety of experimental models. Even more potent than its volatile oil is the yellow or orange pigment of turmeric, which is called *curcumin*. Curcumin is thought to be the primary pharmacological agent in turmeric. In numerous studies, curcumin's anti-inflammatory effects have been shown to be comparable to the potent drugs hydrocortisone and phenylbutazone as well as over-the-counter anti-inflammatory agents such as Motrin. Unlike the drugs, which are associated with significant toxic effects (ulcer formation, decreased white blood cell count, intestinal bleeding), curcumin produces no toxicity.

An Effective Treatment for Inflammatory Bowel Disease

Curcumin may provide an inexpensive, well-tolerated, and effective treatment for inflammatory bowel disease (IBD) such as Crohn's and ulcerative colitis, recent research suggests. In this study, mice given an inflammatory agent that normally induces colitis were protected when curcumin was added to their diet five days beforehand. The mice receiving curcumin not only lost much less weight than the control animals, but when researchers checked their intestinal cell function, all the signs typical of colitis (mucosal ulceration, thickening of the intestinal wall, and the infiltration of inflammatory cells) were all much reduced. While the researchers are not yet sure exactly how curcumin achieves its protective effects, they think its benefits are the result of not only antioxidant activity, but also inhibition of a major cellular inflammatory agent called NF kappa-B. Plus, an important part of the good news reported in this study is the fact that although curcumin has been found to be safe at very large doses, this component of turmeric was effective at a concentration as low as 0.25 per cent-an amount easily

supplied by simply enjoying turmeric in flavorful curries.

Relief for Rheumatoid Arthritis

Clinical studies have substantiated that curcumin also exerts very powerful antioxidant effects. As an antioxidant, curcumin is able to neutralize free radicals, chemicals that can travel through the body and cause great amounts of damage to healthy cells and cell membranes. This is important in many diseases, such as arthritis, where free radicals are responsible for the painful joint inflammation and eventual damage to the joints. Turmeric's combination of antioxidant and anti-inflammatory effects explains why many people with joint disease find relief when they use the spice regularly. In a recent study of patients with rheumatoid arthritis, curcumin was compared to phenylbutazone and produced comparable improvements in shortened duration of morning stiffness, lengthened walking time, and reduced joint swelling.

Help for Cystic Fibrosis Sufferers

Curcumin, the major constituent of turmeric that gives the spice its yellow color, can correct the most common expression of the genetic defect that is responsible for cystic fibrosis, suggests an animal study published in the *Science* (April 2004). Cystic fibrosis, a fatal disease that attacks the lungs with a thick mucus, causing life-threatening infections, afflicts about 30,000 American children and young adults, who rarely survive beyond 30 years of age. The mucus also damages the pancreas, thus interfering with the body's ability to digest and absorb nutrients.

Researchers now know that cystic fibrosis is caused by mutations in the gene that encodes for a protein (the transmembrane conductance regulator or CFTR). The CFTR protein is responsible for traveling to the cell-surface and creating channels through which chloride ions can leave the cell. When the protein is abnormally shaped because of a faulty gene, this cannot happen, so chloride builds up in the cells, which in turn, leads to mucus production.

The most common mutation, which is called DeltaF508, results in the production of a misfolded protein. When mice with this DeltaF508 defect were given curcumin in doses that, on a weight-per-weight basis, would be well-tolerated by humans, curcumin corrected this defect, resulting in a DeltaF508 protein with normal appearance and function. In addition, the Yale scientists studying curcumin have shown that it can inhibit the release of calcium, thus allowing mutated CFTR to exit cells via the calcium

channels, which also helps stop the chloride-driven build up of mucus. Specialists in the treatment of cystic fibrosis caution, however, that patients should not self-medicate with dietary supplements containing curcumin, until the correct doses are known and any adverse interactions identified with the numerous prescription drugs taken by cystic fibrosis sufferers.

Cancer Prevention

Curcumin's antioxidant actions enable it to protect the colon cells from free radicals that can damage cellular DNA—a significant benefit particularly in the colon where cell turnover is quite rapid, occurring approximately every three days. Because of their frequent replication, mutations in the DNA of colon cells can result in the formation of cancerous cells much more quickly. Curcumin also helps the body to destroy mutated cancer cells, so they cannot spread through the body and cause more harm. A primary way in which curcumin does so is by enhancing liver function. Additionally, other suggested mechanisms by which it may protect against cancer development include inhibiting the synthesis of a protein thought to be instrumental in tumor formation and preventing the development of additional blood supply necessary for cancer cell growth.

Inhibits Cancer Cell Growth and Metastases

Epidemiological studies have linked the frequent use of turmeric to lower rates of breast, prostate, lung and colon cancer; laboratory experiments have shown curcumin can prevent tumors from forming; and research conducted at the University of Texas suggests that even when breast cancer is already present, curcumin can help slow the spread of breast cancer cells to the lungs in mice.

In this study, published in *Biochemical Pharmacology* (September 2005), human breast cancer cells were injected into mice, and the resulting tumors removed to simulate a mastectomy.

The mice were then divided into four groups. One group received no further treatment and served as a control. A second group was given the cancer drug paclitaxel (Taxol); the third got curcumin, and the fourth was given both Taxol and curcumin.

After five weeks, only half the mice in the curcumin-only group and just 22% of those in the curcumin plus Taxol group had evidence of breast cancer that had spread to the lungs.

But 75% of the mice that got Taxol alone and 95% of the control group developed lung tumours.

How did curcumin help? "Curcumin acts against transcription factors, which are like a master switch," said lead researcher, Bharat Aggarwal. "Transcription factors regulate all the genes needed for tumors to form. When we turn them off, we shut down some genes that are involved in the growth and invasion of cancer cells."

In another laboratory study of human non-Hodgkin's lymphoma cells published in *Biochemical Pharmacology* (September 2005), University of Texas researchers showed that curcumin inhibits the activation of NF-kappaB, a regulatory molecule that signals genes to produce a slew of inflammatory molecules (including TNF, COX-2 and IL-6) that promote cancer cell growth. In addition, curcumin was found to suppress cancer cell proliferation and to induce cell cycle arrest and apoptosis (cell suicide) in the lung cancer cells. Early phase I clinical trials at the University of Texas are now also looking into curcumin's chemopreventive and therapeutic properties against multiple myeloma and pancreatic cancer, and other research groups are investigating curcumin's ability to prevent oral cancer.

Turmeric and Onions May Help Prevent Colon Cancer

Curcumin, a phytonutrient found in the curry spice turmeric, and quercetin, an antioxidant in onions, reduce both the size and number of precancerous lesions in the human intestinal tract, shows research published in the August 2006 issue of *Clinical Gastroenterology and Hepatology*.

Five patients with an inherited form of precancerous polyps in the lower bowel known as familial adenomatous polyposis (FAP) were treated with regular doses of curcumin and quercetin over an average of six months. The average number of polyps dropped 60.4%, and the average size of the polyps that did develop dropped by 50.9%.

FAP runs in families and is characterized by the development of hundreds of polyps (colorectal adenomas) and, eventually, colon cancer. Recently, nonsteroidal anti-inflammatory drugs (NSAIDs such as aspirin, ibuprofen) have been used to treat some patients with this condition, but these drugs often produce significant side effects, including gastrointestinal ulcerations and bleeding, according to lead researcher Francis M. Giardiello, M.D., at the Division of Gastroenterology, Johns Hopkins University.

Previous observational studies in populations that consume large amounts of curry, as well as animal research, have strongly suggested that curcumin, one of the main ingredients in Asian curries, might be effective in preventing and/or treating cancer in the lower intestine. Similarly, quercetin, an anti-oxidant flavonoid found in a variety of foods including onions, green tea and red wine, has been shown to inhibit growth of colon cancer cell lines in humans and abnormal colorectal cells in animals.

In this study, a decrease in polyp number was observed in four of five patients at three months and four of four patients at six months.

Each patient received curcumin (480 mg) and quercetin (20 mg) orally 3 times a day for 6 months. Although the amount of quercetin was similar to what many people consume daily, the curcumin consumed was more than would be provided in a typical diet because turmeric only contains on average 3-5 % curcumin by weight.

While simply consuming curry and onions may not have as dramatic an effect as was produced in this study, this research clearly demonstrates that liberal use of turmeric and onions can play a protective role against the development of colorectal cancer. And turmeric doesn't have to only be used in curries. This spice is delicious on healthy sautéed apples, and healthy steamed cauliflower and/or green beans and onions. Or, for a flavor-rich, low-calorie dip, try adding some turmeric and dried onion to creamy yogurt.

Turmeric Teams Up with Cauliflower to Halt Prostate Cancer

Prostate cancer-the second leading cause of cancer death in American men with 500,000 new cases appearing each year-is a rare occurrence among men in India, whose low risk is attributed to a diet rich in brassica family vegetables and the curry spice, turmeric.

Scientists tested turmeric, a concentrated source of the phytonutrient curcumin, along with phenethyl isothiocyanates, a phytochemical abundant in cruciferous vegetables including cauliflower, cabbage, broccoli, Brussels sprouts, kale, kohlrabi and turnips.

When tested singly, both phenethyl isothiocyanate and curcumin greatly retarded the growth of human prostate cancer cells implanted in immune-deficient mice. In mice with well-established prostate cancer tumors, neither phenethyl isothiocyanate nor curcumin by itself had a protective effect, but when combined, they significantly reduced

both tumor growth and the ability of the prostate cancer cells to spread (metastasize) in the test animals.

The researchers believe the combination of cruciferous vegetables and curcumin could be an effective therapy not only to prevent prostate cancer, but to inhibit the spread of established prostate cancers. Best of all, this combination-cauliflower spiced with turmeric-is absolutely delicious! For protection against prostate cancer, cut cauliflower florets in quarters and let sit for 5-10 minutes; this allows time for the production of phenethyl isothiocyanates, which form when cruciferous vegetables are cut, but stops when they are heated. Then sprinkle with turmeric, and [healthy sauté](#) on medium heat in a few tablespoons of vegetable or chicken broth for 5 minutes. Remove from the heat and top with olive oil, sea salt and pepper to taste.

Reduce Risk of Childhood Leukemia

Research presented at a recent conference on childhood leukemia, held in London, provides evidence that eating foods spiced with turmeric could reduce the risk of developing childhood leukemia. The incidence of this cancer has risen dramatically during the 20th century, mainly in children under age five, among whom the risk has increased by more than 50% cent since 1950 alone. Modern environmental and lifestyle factors are thought to play a major role in this increase.

Childhood leukemia is much lower in Asia than Western countries, which may be due to differences in diet, one of which, the frequent use of turmeric, has been investigated in a series of studies over the last 20 years by Prof. Moolky Nagabhushan from the Loyola University Medical Centre, Chicago, IL.

"Some of the known risk factors that contribute to the high incidence of childhood leukemia are the interaction of many lifestyle and environmental factors. These include prenatal or postnatal exposure to radiation, benzene, environmental pollutants and alkylating chemotherapeutic drugs. Our studies show that turmeric-and its colouring principle, curcumin-in the diet mitigate the effects of some of these risk factors."

Nagabhushan has shown that the curcumin in turmeric can:

- inhibit the mutagenicity of polycyclic aromatic hydrocarbons (PAHs) (carcinogenic chemicals created by the burning of carbon based fuels including cigarette smoke)
- inhibit radiation-induced chromosome damage

- prevent the formation of harmful heterocyclic amines and nitroso compounds, which may result in the body when certain processed foods, such as processed meat products that contain nitrosamines, are eaten
- irreversibly inhibit the multiplication of leukemia cells in a cell culture

Improved Liver Function

In a recent rat study conducted to evaluate the effects of turmeric on the liver's ability to detoxify xenobiotic (toxic) chemicals, levels of two very important liver detoxification enzymes (UDP glucuronyl transferase and glutathione-S-transferase) were significantly elevated in rats fed turmeric as compared to controls. The researchers commented, "The results suggest that turmeric may increase detoxification systems in addition to its anti-oxidant properties...Turmeric used widely as a spice would probably mitigate the effects of several dietary carcinogens."

Curcumin has been shown to prevent colon cancer in rodent studies. When researchers set up a study to analyze how curcumin works, they found that it inhibits free radical damage of fats (such as those found in cell membranes and cholesterol), prevents the formation of the inflammatory chemical cyclooxygenase-2 (COX-2), and induces the formation of a primary liver detoxification enzyme, glutathione S-transferase (GST) enzymes. When the rats were given curcumin for 14 days, their livers' production of GST increased by 16%, and a marker of free radical damage called malondialdehyde decreased by 36% when compared with controls. During this two week period, the researchers gave the rats a cancer-causing chemical called carbon tetrachloride. In the rats not fed curcumin, markers of free radical damage to colon cells went up, but in the rats given turmeric, this increase was prevented by dietary curcumin. Lastly, the researchers compared giving turmeric in the diet versus injecting curcumin into the rats' colons. They found injecting curcumin resulted in more curcumin in the blood, but much less in the colon mucosa. They concluded, "The results show that curcumin mixed with the diet achieves drug levels in the colon and liver sufficient to explain the pharmacological activities observed and suggest that this mode of administration may be preferable for the chemoprevention of colon cancer."

Cardiovascular Protection

Curcumin may be able to prevent the oxidation of cholesterol in the body. Since oxidized cholesterol is what damages blood vessels and builds up in the plaques that can lead to heart attack or stroke, preventing the oxidation of new cholesterol may help to reduce

the progression of atherosclerosis and diabetic heart disease. In addition, turmeric is a good source of vitamin B6, which is needed to keep homocysteine levels from getting too high. Homocysteine, an intermediate product of an important cellular process called methylation, is directly damaging to blood vessel walls. High levels of homocysteine are considered a significant risk factor for blood vessel damage, atherosclerotic plaque build-up, and heart disease; while a high intake of vitamin B6 is associated with a reduced risk of heart disease.

In research published in the *Indian Journal of Physiology and Pharmacology*, when 10 healthy volunteers consumed 500 mg of curcumin per day for 7 days, not only did their blood levels of oxidized cholesterol drop by 33%, but their total cholesterol dropped 11.63% , and their HDL (good cholesterol) increased by 29%! (Soni KB, Kuttan R).

How Turmeric Lowers Cholesterol

Tumeric's cholesterol-lowering effects are the result of the curry spice's active constituent, curcumin, which research reveals is a messaging molecule that communicates with genes in liver cells, directing them to increase the production of mRNA (messenger proteins) that direct the creation of receptors for LDL (bad) cholesterol. With more LDL-receptors, liver cells are able to clear more LDL-cholesterol from the body.

LDL-receptor mRNA increased sevenfold in liver cells treated with curcumin at a concentration of 10 microM, compared to untreated cells. (Liver cells were found to tolerate curcumin at levels of up to 12. microM for 24 hours). (Peschel D, Koerting R, et al. *J Nutr Biochem*)

Practical Tips:

Help increase your liver's ability to clear LDL-cholesterol by relying on turmeric, not just for delicious fish, meat or lentil curries, but to spice up healthy sautéed onions, potatoes and/or cauliflower; or as the key flavoring for a creamy vegetable dip. Just mix plain yogurt with a little omega-3-rich mayonnaise and turmeric, salt and pepper to taste. Serve with raw cauliflower, celery, sweet pepper, jicama and broccoli florets. Be sure to choose turmeric rather than prepared curry blends. Recent research indicates the amount of turmeric (and therefore curcumin) in curry blends is often minimal.(Tayyem RF et al.,*Nutr Cancer*)

For the most curcumin, be sure to use turmeric rather than curry powder—a study analyzing curcumin content in 28 spice products described as turmeric or curry powders found that pure turmeric powder had the highest concentration of curcumin, averaging 3.14% by weight. The curry powder samples, with one exception, contained very small amounts of curcumin. (Tayem RF, Heath DD, et al. *Nutr Cancer*)

Protection against Alzheimer's Disease

Growing evidence suggests that turmeric may afford protection against neurodegenerative diseases. Epidemiological studies show that in elderly Indian populations, among whose diet turmeric is a common spice, levels of neurological diseases such as Alzheimer's are very low. Concurrently, experimental research conducted recently found that curcumin does appear to slow the progression of Alzheimer's in mice. Preliminary studies in mice also suggest that curcumin may block the progression of multiple sclerosis. While it is still unclear how it may afford protection against this degenerative condition, one theory is that it may interrupt the production of IL-2, a protein that can play a key role in the destruction of myelin, the sheath that serves to protect most nerves in the body.

A number of studies have suggested that curcumin, the biologically active constituent in turmeric, protects against Alzheimer's disease by turning on a gene that codes for the production of antioxidant proteins. A study published in the *Italian Journal of Biochemistry* (December 2003) discussed curcumin's role in the induction of the heme oxygenase pathway, a protective system that, when triggered in brain tissue, causes the production of the potent antioxidant bilirubin, which protects the brain against oxidative (free radical) injury. Such oxidation is thought to be a major factor in aging and to be responsible for neurodegenerative disorders including dementias like Alzheimer's disease. Another study conducted jointly by an Italian and U.S. team and presented at the American Physiological Society's 2004 annual conference in Washington, DC, confirmed that curcumin strongly induces expression of the gene, called hemeoxygenase-1 (HO-1) in astrocytes from the hippocampal region of the brain.

Curcumin Crosses Blood-Brain Barrier, May Help Prevent Alzheimer's Disease

Research conducted at UCLA and published in the *Journal of Biological Chemistry* (December 2004), which has been confirmed by further research published in the *Journal of Agricultural and Food Chemistry* (April 2006), provides insight into the

mechanisms behind curcumin's protective effects against Alzheimer's disease.

Alzheimer's disease results when a protein fragment called amyloid β accumulates in brain cells, producing oxidative stress and inflammation, and forming plaques between nerve cells (neurons) in the brain that disrupt brain function.

Amyloid is a general term for protein fragments that the body produces normally. Amyloid β is a protein fragment snipped from another protein called amyloid precursor protein (APP). In a healthy brain, these protein fragments are broken down and eliminated. In Alzheimer's disease, the fragments accumulate, forming hard, insoluble plaques between brain cells.

The UCLA researchers first conducted test tube studies in which curcumin was shown to inhibit amyloid β aggregation and to dissolve amyloid fibrils more effectively than the anti-inflammatory drugs ibuprofen and naproxen. Then, using live mice, the researchers found that curcumin crosses the blood brain barrier and binds to small amyloid- β species. Once bound to curcumin, the amyloid- β protein fragments can no longer clump together to form plaques. Curcumin not only binds to amyloid- β , but also has anti-inflammatory and antioxidant properties, supplying additional protection to brain cells.

Turmeric Boosts Amyloid Plaque Clearance in Human Alzheimer's Patients

The most active ingredient in turmeric root, bisdemethoxycurcumin, boosts the activity of the immune system in Alzheimer's patients, helping them to clear the amyloid beta plaques characteristic of the disease.

In healthy patients, immune cells called macrophages, which engulf and destroy abnormal cells and suspected pathogens, efficiently clear amyloid beta, but macrophage activity is suppressed in Alzheimer's patients.

Using blood samples from Alzheimer's patients, Drs. Milan Fiala and John Cashman have shown that bisdemethoxycurcumin boosts macrophage activity to normal levels, helping to clear amyloid beta. Fiala and Cashman also observed that bisdemethoxycurcumin was more effective in promoting the clearance of amyloid beta in some patients' blood than others, hinting at a genetic element. Further study revealed the genes involved are MGAT III and Toll-like receptors, which are also responsible for a number of other key immune functions. Bisdemethoxycurcumin enhances the

transcription of these genes, correcting the immune defects seen in Alzheimer's patients. *Proc Natl Acad Sci U S A.* 2007 Jul 31;104(31):12849-54.

Description

Turmeric was traditionally called *Indian saffron* since its deep yellow-orange color is similar to that of the prized saffron. It has been used throughout history as a condiment, healing remedy and textile dye.

Turmeric comes from the root of the *Curcuma longa* plant and has a tough brown skin and a deep orange flesh. This herb has a very interesting taste and aroma. Its flavor is peppery, warm and bitter while its fragrance is mild yet slightly reminiscent of orange and ginger, to which it is related.

History

Turmeric is native to Indonesia and southern India, where it has been harvested for more than 5,000 years. It has served an important role in many traditional cultures throughout the East, including being a revered member of the Ayurvedic pharmacopeia. While Arab traders introduced it into Europe in the 13th century, it has only recently become popular in Western cultures. Much of its recent popularity is owed to the recent research that has highlighted its therapeutic properties. The leading commercial producers of turmeric include India, Indonesia, China, the Philippines, Taiwan, Haiti and Jamaica.

How to Select and Store

Even though dried herbs and spices are widely available in supermarkets, explore the local spice stores or ethnic markets in your area. Oftentimes, these stores feature an expansive selection of dried herbs and spices that are of superior quality and freshness than those offered in regular markets. Just like with other dried spices, try to select organically grown turmeric since this will give you more assurance that the herb has not been irradiated. Since the color of turmeric varies among varieties, it is not a criterion of quality.

For the most curcumin, be sure to use turmeric rather than curry powder—a study analyzing curcumin content in 28 spice products described as turmeric or curry powders found that pure turmeric powder had the highest concentration of curcumin, averaging 3.14% by weight. The curry powder samples, with one exception, contained very small amounts

of curcumin. (Tayyem RF, Heath DD, et al. *Nutr Cancer*)

Turmeric powder should be kept in a tightly sealed container in a cool, dark and dry place. Fresh turmeric rhizome should be kept in the refrigerator.

How to Enjoy

For some of our favorite recipes, click [Recipes](#).

Tips for Preparing Turmeric:

Be careful when using turmeric since its deep color can easily stain. To avoid a lasting stain, quickly wash any area with which it has made contact with soap and water. To prevent staining your hands, you might consider wearing kitchen gloves while handling turmeric.

If you are able to find turmeric rhizomes in the grocery store, you can make your own fresh turmeric powder by boiling, drying and then grinding it into a fine consistency.

A Few Quick Serving Ideas:

Add turmeric to egg salad to give it an even bolder yellow color.

Mix brown rice with raisins and cashews and season with turmeric, cumin and coriander.

Although turmeric is generally a staple ingredient in curry powder, some people like to add a little extra of this spice when preparing curries. And turmeric doesn't have to only be used in curries. This spice is delicious on healthy sautéed apples, and healthy steamed cauliflower and/or green beans and onions. Or, for a creamy, flavor-rich, low-calorie dip, try mixing some turmeric and dried onion with a little omega-3-rich mayonnaise, salt and pepper. Serve with raw cauliflower, celery, sweet pepper, jicama and broccoli florets.

Turmeric is a great spice to complement recipes that feature lentils.

Give salad dressings an orange-yellow hue by adding some turmeric powder to them.

For an especially delicious way to add more turmeric to your healthy way of eating, cut cauliflower florets in half and healthy sauté with a generous spoonful of turmeric for 5

minutes. Remove from the heat and toss with olive oil, salt and pepper to taste.

Be sure to choose turmeric rather than prepared curry blends. Recent research indicates the amount of turmeric (and therefore curcumin) in curry blends is often minimal.(Tayyem RF et al.,*Nutr Cancer*)

Individual Concerns

Turmeric is not a commonly allergenic food and is not known to contain measurable amounts of oxalates or purines.

Nutritional Profile

Turmeric is an excellent source of both iron and manganese. It is also a good source of vitamin B6, dietary fiber and potassium.

For an in-depth nutritional profile click here: [Turmeric](#).

In-Depth Nutritional Profile

In addition to the nutrients highlighted in our ratings chart, an in-depth nutritional profile for [Turmeric](#) is also available. This profile includes information on a full array of nutrients, including carbohydrates, sugar, soluble and insoluble fiber, sodium, vitamins, minerals, fatty acids, amino acids and more.

Introduction to Food Rating System Chart

In order to better help you identify foods that feature a high concentration of nutrients for the calories they contain, we created a Food Rating System. This system allows us to highlight the foods that are especially rich in particular nutrients. The following chart shows the nutrients for which this food is either an excellent, very good, or good source (below the chart you will find a table that explains these qualifications). If a nutrient is not listed in the chart, it does not necessarily mean that the food doesn't contain it. It simply means that the nutrient is not provided in a sufficient amount or concentration to meet our rating criteria. (To view this food's in-depth nutritional profile that includes values for dozens of nutrients - not just the ones rated as excellent, very good, or good - please use the link below the chart.) To read this chart accurately, you'll need to glance up in the top left corner where you will find the name of the food and the serving size we used to calculate the food's nutrient composition. This serving size will tell you how

much of the food you need to eat to obtain the amount of nutrients found in the chart. Now, returning to the chart itself, you can look next to the nutrient name in order to find the nutrient amount it offers, the percent Daily Value (DV%) that this amount represents, the nutrient density that we calculated for this food and nutrient, and the rating we established in our rating system. For most of our nutrient ratings, we adopted the government standards for food labeling that are found in the U.S. Food and Drug Administration's "Reference Values for Nutrition Labeling." [Read more background information and details of our rating system.](#)

Turmeric, powder					
2.00 tsp					
4.52 grams					
16.04 calories					
Nutrient	Amount	DV (%)	Nutrient Density	World's Healthiest Foods Rating	
manganese	0.36 mg	18.0	20.2	excellent	
iron	1.88 mg	10.4	11.7	excellent	
vitamin B6 (pyridoxine)	0.08 mg	4.0	4.5	good	
dietary fiber	0.96 g	3.8	4.3	good	
potassium	114.48 mg	3.3	3.7	good	
World's Healthiest Foods Rating	Rule				
excellent	DV>=75%	OR	Density>=7.6	AND	DV>=10%
very good	DV>=50%	OR	Density>=3.4	AND	DV>=5%
good	DV>=25%	OR	Density>=1.5	AND	DV>=2.5%

In-Depth Nutritional Profile for [Turmeric](#)

References

- Abbey M, Noakes M, Belling GB, Nestel PJ. Partial replacement of saturated fatty acids with almonds or walnuts lowers total plasma cholesterol and low-density-lipoprotein cholesterol. Am J Clin Nutr 1994 May;59(5):995-9 1994. PMID:16240.
- Aggarwal B. Paper presented at the U.S. Defense Department's 'Era of Hope' Breast Cancer Research Program meeting in Philadelphia, PA, October 5, 2005,. reported in NUTRAingredients.com/Europe "Turmeric slows breast cancer spread in mice."
- Ahsan H, Parveen N, Khan NU, Hadi SM. Pro-oxidant, anti-oxidant and cleavage activities on DNA of curcumin and its derivatives demethoxycurcumin and

bisdemethoxycurcumin. *Chem Biol Interact* 1999 Jul 1;121(2):161-75 1999. PMID:7690.

- Arbiser JL, Klauber N, Rohan R, et al. Curcumin is an in vivo inhibitor of angiogenesis. *Mol Med* 1998 Jun;4(6):376-83 1998. PMID:7540.
- Asai A, Nakagawa K, Miyazawa T. Antioxidative effects of turmeric, rosemary and capsicum extracts on membrane phospholipid peroxidation and liver lipid metabolism in mice. *Biosci Biotechnol Biochem* 1999 Dec;63(12):2118-22 1999. PMID:7550.
- Balasubramanian K. Molecular Orbital Basis for Yellow Curry Spice Curcumin's Prevention of Alzheimer's Disease. *J. Agric. Food Chem.*, 54 (10), 3512 -3520, 2006. 10.1021/jfo603533 S0021-8561(06)00353-0, Web Release Date: April 20, 2006. 2006.
- Calabrese V, Butterfield DA, Stella AM. Nutritional antioxidants and the heme oxygenase pathway of stress tolerance: novel targets for neuroprotection in Alzheimer's disease. *Ital J Biochem.* 2003 Dec;52(4):177-81. 2003.
- Calabrese V, et. al. Paper on curcumin's induction of hemeoxygenase-1. Presented at the annual conference of the American Physiological Society, held April 17-21, 2004, Washington, D.C. 2004.
- Cruz-Correa M, Shoskes DA, Sanchez P, Zhao R, Hyland LM, Wexner SD, Giardiello FM. Combination treatment with curcumin and quercetin of adenomas in familial adenomatous polyposis. *Clin Gastroenterol Hepatol.* 2006 Aug;4(8):1035-8. Epub 2006 Jun 6. 2006. PMID:16757216.
- Deshpande UR, Gadre SG, Raste AS, et al. Protective effect of turmeric (*Curcuma longa* L.) extract on carbon tetrachloride-induced liver damage in rats. *Indian J Exp Biol* 1998 Jun;36(6):573-7 1998. PMID:7740.
- Dorai T, Cao YC, Dorai B, et al. Therapeutic potential of curcumin in human prostate cancer. III. Curcumin inhibits proliferation, induces apoptosis, and inhibits angiogenesis of LNCaP prostate cancer cells in vivo. *Prostate* 2001 Jun 1;47(4):293-303 2001. PMID:16280.
- Egan ME, Pearson M, Weiner SA, Rajendran V, Rubin D, Glockner-Pagel J, Canny S, Du K, Lukacs GL, Caplan MJ. Curcumin, a major constituent of turmeric, corrects cystic fibrosis defects. *Science.* 2004 Apr 23;304(5670):600-2. 2004. PMID:15105504.
- Ensminger AH, Ensminger M. K. J. e. al. *Food for Health: A Nutrition Encyclopedia.* Clovis, California: Pegus Press; 1986 1986. PMID:15210.
- Fiala M, Lin J, Ringman J, Kermani-Arab V, Tsao G, Patel A, Lossinsky AS, Graves

- MC, Gustavson A, Sayre J, Sofroni E, Suarez T, Chiappelli F, Bernard G. Ineffective phagocytosis of amyloid-beta by macrophages of Alzheimer's disease patients. *J Alzheimers Dis.* 2005 Jun;7(3):221-32; discussion 255-62. 2005. PMID:16006665.
- Fiala M, Liu PT, Espinosa-Jeffrey A, Rosenthal MJ, Bernard G, Ringman JM, Sayre J, Zhang L, Zaghi J, Dejbakhsh S, Chiang B, Hui J, Mahanian M, Baghaee A, Hong P, Cashman J. Innate immunity and transcription of MGAT-III and Toll-like receptors in Alzheimer's disease patients are improved by bisdemethoxycurcumin. *Proc Natl Acad Sci U S A.* 2007 Jul 31;104(31):12849-54. 2007. PMID:17652175.
 - Fortin, Francois, Editorial Director. *The Visual Foods Encyclopedia.* Macmillan, New York 1996.
 - Grieve M. *A Modern Herbal.* Dover Publications, New York 1971.
 - Gururaj A, Kelakavadi M, Venkatesh D et al. Molecular mechanisms of anti-angiogenic effect of curcumin. *Biochem Biophys Res Commun* 2002 Oct 4;297(4):934 2002.
 - Hidaka H, Ishiko T, Furunashi T et al. Curcumin inhibits interleukin 8 production and enhances interleukin 8 receptor expression on the cell surface: impact on human pancreatic carcinoma cell growth by autocrine regulation. *Cancer* 2002 Sep 15;96(6):1206-14 2002.
 - Kang BY, Chung SW, Chung W et al. Inhibition of interleukin-12 production in lipopolysaccharide-activated macrophage by curcumin. *Eur J Pharmacol* 1999 Nov;384(2-3):191-5 1999.
 - Kang BY, Song YJ, Kim KM et al. Curcumin inhibits Th1 cytokine profile in CD4+ T cells by suppressing interleukin-12 production in macrophages. *Br J Pharmacol* 1999 Sep;128(2):380-4 1999.
 - Khor TO, Keum YS, Lin W, Kim JH, Hu1 R, Shen G, Xu1 C, Gopalakrishnan A, Reddy B, Zheng X, Conney AH, Kong AN. Combined Inhibitory Effects of Curcumin and Phenethyl Isothiocyanate on the Growth of Human PC-3 Prostate Xenografts in Immunodeficient Mice. *Cancer Research.* 2006 Jan; 66(2): 613-621. 2006. PMID:16423986.
 - Lim GP, Chu T, Yang F, et al. The curry spice curcumin reduces oxidative damage and amyloid pathology in an Alzheimer transgenic mouse. *J Neurosci* 2001 Nov 1;21(21):8370-7 2001. PMID:16240.
 - Nagabhushan M, Amonkar AJ, Bhide SV. *In vitro* antimutagenicity of curcumin against environmental mutagens. *Food Chem Toxicol.* 1987 Jul;25(7):545-7. 1987. PMID:3623345.
 - Nagabhushan M, Bhide SV. Curcumin as an inhibitor of cancer. *J Am Coll Nutr.*

1992 Apr;11(2):192-8. 1992. PMID:1578097.

- Nagabhushan M, Nair UJ, Amonkar AJ, D'Souza AV, Bhide SV. Curcumins as inhibitors of nitrosation *in vitro*. *Mutat Res*. 1988 Nov;202(1):163-9. 1988. PMID:3054526.
- Nagabhushan M. Research presented at the Children with Leukaemia Conference, www.leukaemia.org, September 2004 2004.
- Nakamura K, Yasunaga Y, Segawa T et al. Curcumin down-regulates AR gene expression and activation in prostate cancer cell lines. *Int J Oncol* 2002 Oct;21(4):825-30 2002.
- Natarajan C, Bright JJ. Peroxisome proliferator-activated receptor-gamma agonists inhibit experimental allergic encephalomyelitis by blocking IL-2 production, IL-12 signaling and Th1 differentiation. *Genes Immun* 2002 Apr;3(2):59-70 2002.
- Olszewska M, Glowacki R, Wolbis M, Bald E. Quantitative determination of flavonoids in the flowers and leaves of *Prunus spinosa* L. *Acta Pol Pharm* 2001 May-2001 Jun 30;58(3):199-203 2001. PMID:16270.
- Parfk SY, Kim DS. Discovery of natural products from *Curcuma longa* that protects cells from beta-amyloid insult: a drug discovery effort against Alzheimer's disease. *J Nat Prod* 2002 Sep;65(9):1227-31 2002.
- Peschel D, Koerting R, Nass N. Curcumin induces changes in expression of genes involved in cholesterol homeostasis. *J Nutr Biochem*. 2007 Feb;18(2):113-9. Epub 2006 May 18. 2007. PMID:16713233.
- Salh B, Assi K, Templeman V, Parhar K, Owen D, Gomez-Munoz A, Jacobson K. Curcumin attenuates DNB-induced murine colitis. *Am J Physiol Gastrointest Liver Physiol*. Jul;285(1):G235-43. Epub 2003 Mar 13 2003. PMID:12637253.
- Shah BH, Nawaz Z, Pertani SA, et al. Inhibitory effect of curcumin, a food spice from turmeric, on platelet-activating factor- and arachidonic acid-mediated platelet aggregation through inhibition of thromboxane formation and Ca²⁺ signal. *Biochem Pharmacol* 1999 Oct 1;58(7):1167-72 1999. PMID:7670.
- Shishodia S, Amin HM, Lai R, Aggarwal BB. Curcumin (diferuloylmethane) inhibits constitutive NF-kappaB activation, induces G1/S arrest, suppresses proliferation, and induces apoptosis in mantle cell lymphoma. *Biochem Pharmacol*. 2005 Sep 1;70(5):700-13. 2005. PMID:16023083.
- Soni KB, Kuttan R. Effect of oral curcumin administration on serum peroxides and cholesterol levels in human volunteers. *Indian J Physiol Pharmacol*. 1992 Oct;36(4):273-5. 1992. PMID:1291482.

- Tayyem RF, Heath DD, Al-Delaimy WK, Rock CL. Curcumin content of turmeric and curry powders. *Nutr Cancer*. 2006;55(2):126-31. 2006. PMID:17044766.
- Wills RB, Scriven FM, Greenfield H. Nutrient composition of stone fruit (*Prunus* spp.) cultivars: apricot, cherry, nectarine, peach and plum. *J Sci Food Agric* 1983 Dec;34(12):1383-9 1983. PMID:16280.
- Wood, Rebecca. *The Whole Foods Encyclopedia*. New York, NY: Prentice-Hall Press; 1988 1988. PMID:15220.
- Wuthi-udomler M, Grisanapan W, Luanratana O, Caichompoo W. Antifungal activity of *Curcuma longa* grown in Thailand. *Southeast Asian J Trop Med Public Health* 2000;31 Suppl 1:178-82 2000. PMID:16270.
- Yang F, Lim GP, Begum AN, Ubeda OJ, Simmons MR, Ambegaokar SS, Chen PP, Kaye R, Glabe CG, Frautschy SA, Cole GM. Curcumin inhibits formation of Aβ oligomers and fibrils and binds plaques and reduces amyloid *in vivo*. *J Biol Chem*. 2004 Dec 7; [Epub ahead of print] 2004. PMID:15590663.
- Zhang L, Fiala M, Cashman J, Sayre J, Espinosa A, Mahanian M, Zaghi J, Badmaev V, Graves MC, Bernard G, Rosenthal M. Curcuminoids enhance amyloid-beta uptake by macrophages of Alzheimer's disease patients. *J Alzheimers Dis*. 2006 Sep;10(1):1-7. 2006. PMID:16988474.

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