



Nature's Miracle Herb:

How to Use Turmeric
for Pain Management,
Brain & Digestive
Health, and Reduced
Inflammation

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What Is Turmeric: Introduction

Turmeric (known scientifically as *Curcuma longa*) is the rhizome – a stem that is found underground – of a perennial, roughly 3-foot tall plant of the ginger family. The rhizome looks similar to ginger and produces the well-known yellow turmeric spice. Although it is now found throughout the tropics, especially in southeast Asia, India is generally acknowledged to have been the largest producer of turmeric since ancient times.

The turmeric plant requires tropical temperatures and a lot of rainfall. The usual practice is to gather the plants annually and then propagate the next batch from some of those rhizomes the following growing season.

When not used fresh, the rhizomes are boiled in water for about 30-45 minutes and then dried in hot ovens, after which they are ground into a deep, orange-yellow powder, commonly used as a coloring and flavoring agent in many Asian cuisines. Due to its intense color, turmeric is also used for dyeing foods and fabrics. Turmeric powder has a warm, bitter, pepper-like flavor and an earthy, mustard-like aroma.



Turmeric: A Brief History

Marco Polo, the iconic Venetian merchant of land voyage fame, was referring to turmeric (*Curcuma longa*), a lustrous golden spice of Indian origin that's a key ingredient in curry and other traditional South Asian cuisine. Polo took a keen interest in this root spice after stumbling upon it during his famous 24-year expedition along the illustrious Silk Road trading route. He proclaimed its allure in his classic memoir *Travels of Marco Polo*.



“There is also a vegetable which has all the properties of the true saffron, as well the smell as the color, and yet it is not really saffron. It is held in great estimation, and being an ingredient in all their dishes, it bears, on that account, a high price.”

- Marco Polo, *Travels of Marco Polo*¹

Truth be told, it would have been difficult for Polo to miss turmeric. It was piled high in vibrant yellow mounds at India's many bustling spice bazaars. Its intense aroma and captivating flavor profile further lending to turmeric's irresistible appeal, both then and now.

It's no wonder that when Polo returned home to tell of his journey and his discovery of turmeric, that word quickly spread about what would eventually come to be known as “Indian saffron” – a much less expensive alternative to the costly red spice after which it was named.

Some would contend that we have Marco Polo to thank for making turmeric a household name far beyond the continent of Asia. But it was technically Arab traders who first brought it to Europe. The popularity of turmeric quickly spread like wildfire all throughout the continent and beyond.

Eventually, turmeric made its way across the Atlantic to North America. Some historical records also point to the Portuguese sailor Vasco de Gama as having been among the first to introduce turmeric and many other treasured spices to the Western world.

Regardless of who brought turmeric to the West, there's no denying that turmeric's reputation is timeless. Its origins span further back to a time long before these two men were even born.

In fact, the use of turmeric dates back nearly 4,000 years to the Vedic culture in India, where it was used as a culinary spice and also had religious significance. Experts now estimate that it probably reached China by 700 AD, East Africa by 800 AD, West Africa by 1200 AD, and Jamaica in the 18th century.²

The Role Of Turmeric In Ayurveda, India's Ancient Healing System

Turmeric has recently become very popular for its natural health properties, but it has actually been used medicinally for over 4,500 years. Apparently, analyses of pots discovered near New Delhi, India, showed residue from turmeric, ginger, and garlic from as far back as 2500 BC.

According to early Sanskrit medical treatises, turmeric has been an integral part of Ayurveda – India's ancient system of medicine – since around 500 BC. Similarly, Greco-Arab medicine, often referred to as Unani medicine, is another traditional medicine system that held turmeric in high regard, emphasizing it as a therapeutic phenomenon.



What Is Ayurveda?

Ayurveda directly translates from Sanskrit as “the science of life” – ayur meaning “life,” and veda meaning “science” or “knowledge.” In case you're not familiar with it, Ayurveda centers around nurturing the mind-body connection with herbs and functional foods.³

In contrast to conventional allopathic (Western) medicine, Ayurveda is not just another method of disease treatment. When properly understood, it is an intricately conceived system of inner science that involves positive health and natural living. The stated goal of Ayurveda is to show us how to harmonize ourselves with the greater Universe that exists within and around us.

Ayurveda sees the physical body not as a collective of independent systems, but rather as an inextricably linked and unified whole that includes both the mind and the soul. In other words, these three (body, mind, and soul) are inseparable when it comes to addressing a particular imbalance or ailment. This is why the Ayurvedic approach never really uses terms we hear in Western medicine such as “symptom management” to describe its holistic mechanisms of action and efficacy.

Ancient Vedic literature clearly explains how we can maintain our health and well-being through the judicious use of therapies, massages, herbal medicines, diet, and exercise. Specifically, Ayurveda places the highest value on nutrition in supporting the body’s innate ability to heal itself. A person’s diet should be fresh and “colorful,” with foods of many hues that include all six of the Ayurvedic tastes – sweet, salty, sour, pungent, bitter, and astringent.⁴

If the body is properly nourished, the mind and soul will be by extension. This seems to be the underlying theme of Ayurveda, illustrating why turmeric, the popularly termed “Golden Spice,” plays an exceptionally prominent role.



The Role of Turmeric in Ayurveda

According to Ayurvedic principles, foods with a “tikta rasa” or bitter taste tend to be dry, cooling, and light in their properties and cleanse our body when consumed in moderate amounts.⁵

They soothe itching and burning sensations, reduce water retention, detoxify blood, and support liver health. They also cleanse our taste buds and fight off parasites and other infections – which is why they are considered to be digestive tonics when taken in moderation. Bitter foods are also believed to relieve heaviness and dullness of body and mind.

Along with leafy green and yellow vegetables, turmeric is considered to be both bitter and astringent in the Ayurvedic system.

According to this ancient healing method, turmeric:

- ▶ Supports blood flow and purifies blood
- ▶ Is a powerful detoxifier
- ▶ Alleviates many skin conditions
- ▶ Keeps blood sugar within safe levels
- ▶ Manages inflammation and offers pain relief



In Ayurveda, turmeric is recognized as being a powerful “heating” spice, hence its classification as an herbal energetic. This means that turmeric possesses unique regenerative properties that can help to balance mind-body physiology, as well as promote strength and stamina within the human frame. The warming essence of turmeric is known to have a beneficial effect on the circulatory system, for instance, helping to support blood flow.

Turmeric is also recognized as having powerful detoxifying properties, which explains why many ancient cultures burned it in order to inhale its essence. This common ritual was believed to help cleanse the air passageways and deliver turmeric’s active constituents directly into the lungs. From here they could directly enter the bloodstream and begin their work of reparative “magic” throughout the body.

While some of turmeric’s historical uses have a strong spiritual component centered around Hinduism, its benefits truly are non-denominational. Any person can take advantage of turmeric’s benefits, regardless of one’s race, religion, or creed.



As far as its longstanding status in Ayurveda, many centuries of oral tradition suggest that turmeric was most commonly used to purify the blood and alleviate skin conditions. Beyond this, the ancient healers also took note of its specific interactions with three other organs: the heart, the liver, and the lungs. In each of these vital systems, turmeric was observed to help restore optimal balance and function.

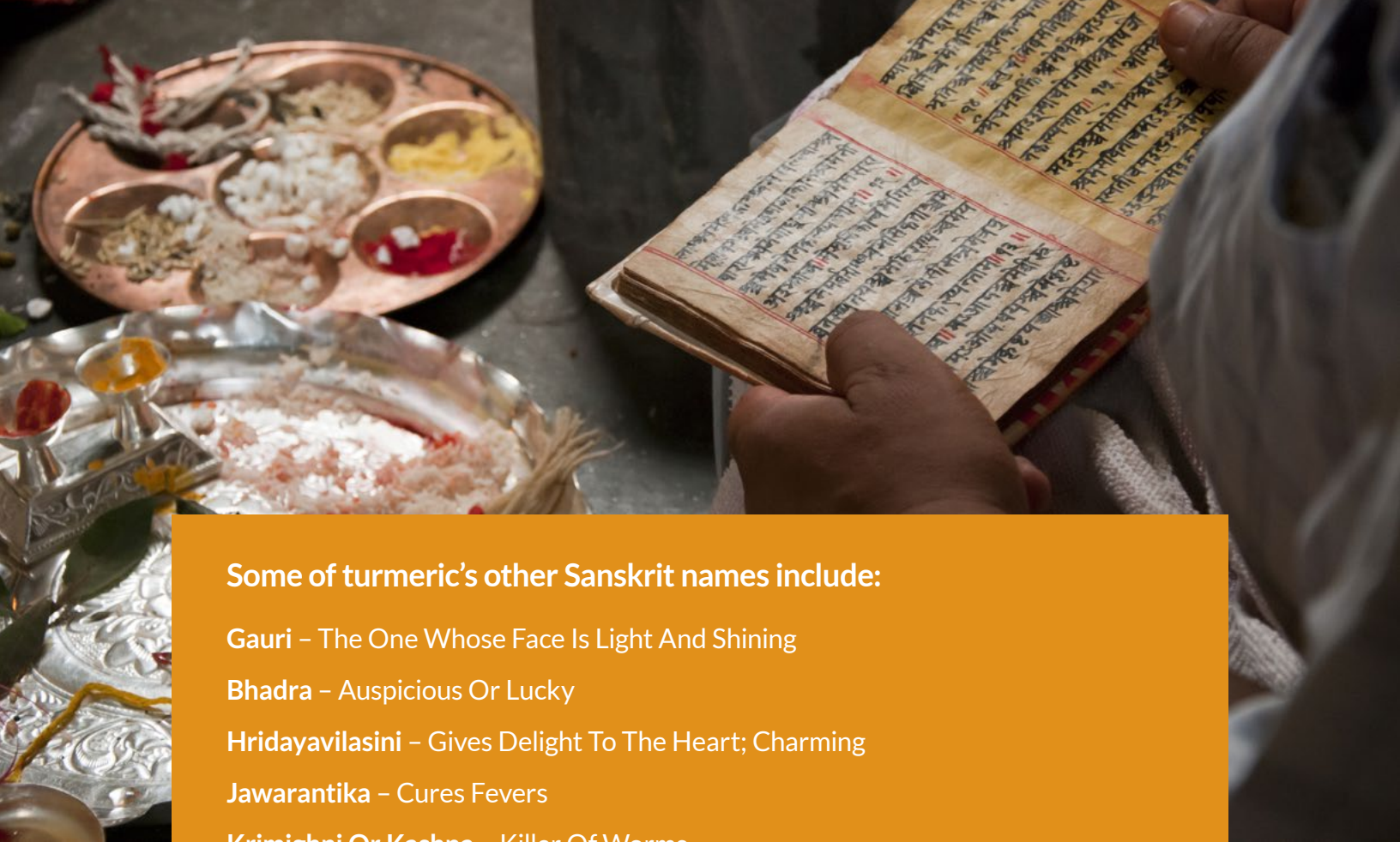
In the *Sushruta Samhita* (“Suśruta’s Compendium”) – the extensive Sanskrit compendium on medicine and surgery dating back to 250 BC – the traditional Indian physician Sushruta recommended using turmeric as an ointment to alleviate the damaging effects of food poisoning.

Similarly, other Ayurvedic healers also saw turmeric as beneficial in addressing conditions such as epilepsy and bleeding disorders, while also helping to purify the lungs and support detoxification of both the body and mind.

The Many Names of Turmeric

Ancient Ayurvedic experts knew full well that turmeric functioned in a profound way in the body, which is why it is referenced all throughout the Ayurvedic literature under more than 100 different descriptive names, depending on how it’s used.

One such moniker is *jayanti*, which means “one who is victorious over diseases.” Another is *matri-manika*, which means “as beautiful as moonlight.”⁶



Some of turmeric's other Sanskrit names include:

Gauri – The One Whose Face Is Light And Shining

Bhadra – Auspicious Or Lucky

Hridayavilasini – Gives Delight To The Heart; Charming

Jawarantika – Cures Fevers

Krimighni Or Kashpa – Killer Of Worms

Laxmi – Prosperity

Mehagni – Killer Of Fat

Nishawa – Clears Darkness And Imparts Color

Pavitra – Holy

Ratrimanika – As Beautiful As Moonlight

Shiva – Gracious

Soubhagaya – Lucky

Tamasini – Beautiful As Night

Varna Datri – Enhancer Of Body Complexion

Vishagni – Killer Of Poison

You can be sure that these glowing descriptors wouldn't exist (nor would they have stood the test of time!) were they not relevant to turmeric's vast therapeutic potential.

Its practical uses – everything from brightening up clothing to zesting up food – are impressive enough on their own. However, the many other ways in which turmeric has (and still can be) used functionally to support our health and well-being elevate this spice to even greater heights in the modern age.

The Role of Turmeric in Traditional Chinese Medicine (TCM)



Traditional Chinese medicine (TCM) views turmeric in similar high regard as Ayurveda. For thousands of years, TCM practitioners have prescribed it – under the name “Yu Jin” – as a supercharged herbal tonic for balancing the spleen and stomach.

The spicy, yet cooling, properties of turmeric are recognized in TCM as having the ability to cleanse the blood and clear up stagnation throughout the body. It is thus used by these practitioners to help keep inflammation levels in check while relieving pain. The fundamental basis behind the TCM approach is both similar and contrasting to Ayurveda.

TCM surmises that the body functions as a product of “qi,” also known as one’s circulating life force. Ancient Chinese philosophy was very focused on qi, perceiving any impediment of its flow inside the body as a root cause of illness. It is thus the goal of TCM to clear up any lingering qi stagnation, which is where turmeric comes into play.

In TCM, the vital organs of the body are said to be aligned along specific energy pathways known as meridians. The active constituents of turmeric are recognized as having the ability to enter at least four of these meridians – those of the heart, lungs, liver, and gallbladder. These compounds found in turmeric are believed to create an improved travel route for qi that is said to help invigorate the body.⁷

Similar to how it functions in Ayurveda, turmeric is often used in TCM as a means by which to jumpstart the circulatory system. It’s a lot like a turbo boost on a sports car that gives it that little extra kick for weaving through slow traffic. The herbal purification properties of turmeric help to really get the blood “vehicle” moving so that its liquid life force is better able to reach every area of the body for systemic healing support.

Turmeric in Ayurveda:

- ▶ Is considered to be both bitter and astringent
- ▶ Is a powerful “heating” spice that supports blood flow and purifies blood
- ▶ Has powerful detoxifying properties
- ▶ Alleviates many skin conditions
- ▶ Interacts with the heart, liver, and lungs, purifying them and restoring optimal balance and function
- ▶ Keeps blood sugar within safe levels
- ▶ Manages inflammation levels and offers pain relief

Turmeric holds similar potential for balancing brain chemistry in the TCM paradigm. Recognizing the functionality of the heart as being inextricably linked to that of the brain, TCM's uses for turmeric secondarily extend to the cognitive, helping to improve memory and thought.

In this same vein, TCM sees turmeric as helping to balance brain chemistry by addressing disturbances of the heart that it sees as being intrinsically linked. Turmeric's "cooling" properties further lend to its abilities to target both heat and dampness, which are considered by TCM to be two of the six detrimental states that contribute to disease.

Turmeric In Traditional Chinese Medicine (TCM):

- ▶ Is spicy yet cooling, cleanses blood and clears up stagnation throughout the body
- ▶ Helps to keep inflammation levels in check and relieve pain
- ▶ Is able to penetrate four meridians – those of the heart, lungs, liver, and gallbladder – and improve the flow of qi (one's circulating life force), helping to invigorate the body
- ▶ Boosts the circulatory system
- ▶ Balances brain chemistry, improving memory and thought, by addressing "disturbances of the heart"
- ▶ Targets heat and dampness, two of six detrimental states that contribute to disease according to TCM
- ▶ Helps to balance temperature and moisture in the body



Heat is considered to be a harmful influence of the "yang" variety in TCM, meaning it can affect mood, inflammation levels, bodily organs, and of course body temperature. Individuals suffering from heat-related yang conditions may experience symptoms such as body fluid imbalances, constipation, and dark urine. In the organs, heat can manifest as emotional problems, mouth ulcers, and excess mucus.

Dampness often goes right along with heat, creating "swamp-like" conditions in the body that are ripe for disease formation. The cooling-plus-drying properties of turmeric are believed to help overcome all of this. Turmeric is considered to bring about a natural balance of both temperature and moisture in the body, keeping everything flowing smoothly. Movement, after all, is an underlying theme of turmeric's important functionality in TCM.

What Science Is Discovering About The Wonders Of Turmeric

It's not just the traditionalists who are excited about turmeric's many health-giving properties. According to relatively recent scientific research, the more than 300 potent components in turmeric exert multiple beneficial actions in our body.

Indeed, many scientific studies are now being routinely carried out on a group of compounds known as curcuminoids – including curcumin – and a volatile oil derived from the turmeric root that contains an intriguing class of phytochemicals known as turmerones.



Let's take a look at some of these compounds and their properties.

Role in Food and Nutrient Preservation

The traditional methods by which turmeric spice is produced from the plant's rhizomatous root masses are a cultural wonder all on their own. What you may not know is that in addition to its impressive therapeutic profile and robust flavor and color, turmeric also possesses preservation properties that help to keep food fresh.

This means not only keeping foods from spoiling, but also protecting the nutrient content of food, which can degrade over time the longer it's exposed to oxygen. Almost immediately after a fruit or vegetable is picked, for instance, its nutrient density starts to decline. But something about that bright, yellow-orange pigment in turmeric helps to keep these nutrients intact so as to maximize the nutritional value of food.

Research out of Egypt that was published in the journal *Science and Education Publishing* looked at how turmeric compares to synthetic chemical preservatives in preventing oxidation and bacterial overgrowth in cooking oil and chicken breasts. In both cases, very small amounts of the water-soluble yellow pigment in turmeric were enough to keep the oil from going rancid, and the chicken breasts from developing harmful bacteria, molds, and yeasts, thereby increasing their shelf life.

The results of this particular study were so pronounced that the researchers recommended that turmeric be used as a natural preservative to help suppress lipid oxidation and keep microbial contamination at bay, without the need for synthetic chemicals.⁸

These protective properties may also have relevance in terms of human health. Specifically, turmeric's ability to prevent nutrients from breaking down and food from spoiling may similarly help to protect living tissue inside the body from undergoing oxidative damage and degeneration.

This is the very same anti-aging effect associated with turmeric that's often described in the scientific literature as helping to "stabilize and protect biomolecules in the body at the molecular level."

Support for Healthy Levels of Inflammation

With each new scientific discovery, mankind is gaining a better understanding as to why the body becomes diseased in the first place. And it's becoming clearer than ever that there's one thing in particular that seems to be at the root of nearly every major disease: persistent or chronic inflammation.

Chronic inflammation is tenacious and long-lasting and is not to be confused with acute inflammation, which is the body's natural and normal response to an injury. The former results from a failure of the immune system to effectively repair bodily damage, in turn becoming a type of autoimmune disease in which healthy tissue ends up being attacked as if it was a harmful pathogen.

Chronic inflammation can be either low-grade or high-grade. The former may not necessarily be noticeable, which in a way makes it worse than the latter, which typically manifests in more obvious ways – think rapid aging, extreme susceptibility to infections, chronic pain, and arthritis, for starters.

But it's that prolonged, slow-moving, low-grade inflammation that's the real killer because it's a silent killer. It does its damage under the radar, so to speak, which is why many health experts recommend embracing an anti-inflammatory diet and lifestyle to help offset its harmful effects.





That's where turmeric comes into play. Numerous studies suggest that turmeric and curcumin (an active compound found in turmeric) offer supportive benefits with regards to both the oxidative stress that can lead to chronic inflammation, as well as inflammation itself.⁹

Both animal models and controlled human trials suggest that turmeric offers a wealth of support in maintaining healthy inflammation levels. For instance, a placebo-controlled trial involving 40 men who had recently had surgery for persistent hernias found that oral consumption of curcumin was highly effective at reducing post-surgical markers of inflammation.¹⁰

Similar outcomes were observed in people with joint problems – many of whom saw significant improvements in morning stiffness, walking time, and joint swelling after just two weeks of supplementation with curcumin.¹¹

A randomized, double-blind, placebo-controlled study published in 2008 strongly suggests that enemas containing curcumin may help to manage gastrointestinal conditions associated with chronic inflammation.¹²

In the book *Herbal Medicine: Biomolecular and Clinical Aspects, Second Edition*, researchers Sahdeo Prasad and Bharat B. Aggarwal flesh out many other inflammatory conditions which turmeric has been shown to help manage.

So, what exactly is it in turmeric that lends to the spice's vast and varied potential in supporting human health? There are several hundred answers to this question, each of them being unique molecular compounds that each have their own special biological effects. These effects also number in the hundreds as well – upwards of 326 to be more precise.

What are these molecules and what are their effects in our body? Let's start with the most abundant component of turmeric: the volatile oil derived from its underground roots that contains the unique, health-giving turmerones.

The Rich Essential Oil of Turmeric: A Closer Look at Turmerones

Turmerones are recognized as giving turmeric its distinct aroma. Although as emerging science continues to show, they do a whole lot more than that! In a nutshell, turmerones offer a high degree of neurological support that, up until recently, has gone largely unnoticed. That's because curcuminoids, another class of compounds in turmeric, has dominated the spotlight with regards to turmeric's active constituents.

But turmerones are equally important, and in their own unique way. Consider a 2014 study out of the Institute of Neuroscience and Medicine in Jülich, Germany, that reported more precisely how turmerones impact neural stem cells. [Note: neural stem cells (NSCs) are self-renewing, "multipotent" cells that develop into brain cells – known as neurons – during embryonic development. Some NSCs persist in our brains into adulthood and continue to produce neurons throughout our lifetime.]

Both in the petri dish and in animal subjects, injections of ar-turmerone (one of at least three primary turmerone compounds in turmeric) into cerebral fluid caused NSCs to grow as much as 80% faster than normal. In rats, these injections not only boosted NSC growth, but also neurogenesis – which is when NSCs actually develop into fully matured neurons. [Note: cerebral fluid, also known as cerebrospinal fluid, is a clear, colorless body fluid that acts as a cushion, providing mechanical and immunological protection to the brain inside the skull.]



Beyond this, the presence of ar-turmerone was shown to facilitate greater movement of stem cells from an area of the brain known as the subventricular zone – where they tend to congregate and hide out – to many other parts of the brain. This allows turmerones to offer full-spectrum support for optimal brain health, which some researchers believe has profound implications with regards to recovery of brain and neuronal health after damage.¹³

Based on what's already been uncovered about turmerones, these special compounds appear to have vast supportive potential in helping to maintain and repair our neurons. Not to mention their studied impact on neural inflammation, whereby evidence suggests that turmerones may offer additional mitigatory benefits.

That's what researchers from South Korea discovered, anyway. After testing the effects of ar-turmerone on multiple signaling pathways of inflammation, they found that ar-turmerone expressed marked suppressive activity, leading them to declare that this powerful substance can help to manage neuronal inflammation within safe levels and protect against neuronal toxicity.¹⁴

Furthermore, turmerones show incredible promise in supporting the healthy function of myelin sheaths. These are the protective layers that surround neurons and are essential for their ability to communicate with one another. Learning and memory formation are a product of healthy myelination, which suggests that turmerones may play a role in supporting these functions as well.¹⁵



The Many Health Benefits of Curcumin

In addition to its essential oil, turmeric is chock-full of another group of compounds known as curcuminoids that lend their bright orange and yellow color to the spice. Many of these, including demethoxycurcumin, 5'-methoxycurcumin, and dihydrocurcumin, are recognized as being natural antioxidants and help the body neutralize oxidative stress and fight free radical damage.



There's one curcuminoid in particular that really stands out in this regard: curcumin. However, despite being considered one of the primary active constituents in turmeric, curcumin actually only makes up between two to five percent of the raw plant material. But because curcumin is a very powerful molecule, this is often just enough to provide the supportive benefits desired. When it's not, standardized extracts of highly concentrated curcumin can provide an added therapeutic boost.

Let's take a closer look next at what scientists are reporting that curcumin can do.

Curcumin and Metabolic Syndrome

The modern world is facing an epidemic of insulin resistance that now affects tens of millions of people. There are a variety of different health complications that can arise from this abnormal blood sugar state, the collective of which falls under the banner of "metabolic syndrome."

Symptoms of metabolic syndrome include everything from high blood pressure and excess circulating blood sugar to obesity and chronic inflammation. If left unchecked, all of these issues can lead to even worse problems such as stroke, heart disease, and type 2 diabetes.

Researchers have been investigating solutions to this widespread crisis – the most promising being major dietary changes and herbal therapeutics. Curcumin in particular has been the focus of multiple avenues of research on this front.

For instance, scientists in Iran have found that it can help to support heart health in people with metabolic syndrome as reported in the journal *Nutrition* in 2016.¹⁶

In a human eight-week trial, this group of researchers "aimed to investigate the effect of curcumin on circulating adiponectin and leptin concentrations in patients with metabolic syndrome."

Their research method was what's often considered the "gold standard" of research – a double-blind, placebo-controlled study. As stated in their report: "In this pilot, randomized, double-blind, placebo-controlled trial, subjects who met the criteria of metabolic syndrome according to the National Cholesterol Education Program Adult Treatment Panel III criteria were randomly assigned to curcumin (n = 59; 1000 mg/d) or a placebo (n = 58) for 8 wk.

Serum adiponectin and leptin concentrations were determined before and after intervention. The pooled effect size for the impact of curcumin supplementation on serum adiponectin and leptin levels was also estimated using random-effects meta-analysis."

According to a Reuters news article about the study, the researchers measured starting and ending levels of three blood markers of inflammation, including C-reactive protein (CRP), which even on its own has been linked with heart disease risk.



"They [researchers] found that the people who took curcumin had improved blood levels of all three biomarkers as well as reduced fasting blood sugar and hemoglobin A1c, a measure of long-term blood sugar levels. The comparison group had higher glucose and levels of one of the inflammation markers, and no changes in the other markers."¹⁷

This research team also looked at data from eight earlier studies on curcumin, all of which demonstrated similar drastic reductions in CRP levels resulting from its intake.

"Two key effects of curcumin that account for most of the therapeutic effects of this compound are its strong antioxidant and anti-inflammatory properties," stated Amirhossein Sahebkar from the Mashhad University of Medical Sciences in Iran, the study's senior author. "The findings of our studies, along with clinical findings reported by other groups, indicate the usefulness of daily use of curcumin supplement for the prevention and treatment of several diseases."¹⁸





Curcumin and Skin Health

As mentioned earlier, turmeric has long been used by Ayurvedic healers to treat skin conditions. For instance, the juice of the root has been – and still is – used to help treat cuts, wounds, bruises, and leech bites.

Similarly, a paste made of turmeric alone or in combination with leaves from the neem tree is recommended for treating ringworm, itching, eczema, and many other parasitic skin conditions. Pastes of turmeric are also still used to relieve skin itching and ulcers during infections of smallpox, chickenpox, and shingles, and to treat various skin blemishes.

Preventing Photoaging

Modern-day scientific and clinical evidence shows that curcumin is indeed effective for the management of a variety of skin diseases.¹⁹ For instance, recent scientific research shows that curcumin blocks an enzyme known as phosphorylase kinase, with beneficial effects for many skin conditions including burns and photoaging.²⁰ Specifically, a 2013 study showed that a gel containing curcumin helped to heal burns rapidly, with little or no residual scarring.

Additionally, this gel also helped to reverse many of the adverse changes seen in photo-damaged skin – suggesting that curcumin could be used as a natural, non-toxic ingredient in sunscreen creams and lotions. [Note: Photoaging is a term used to describe premature aging of the skin caused by repeated exposure to ultraviolet radiation (UV) – mainly from the sun, but also from artificial UV sources. Photoaged skin typically shows areas of greater pigmentation and becomes thin and easily damaged.]

Minimizing the Side Effects of Radiation Therapy

Radiation therapy commonly used in cancer treatments causes severe side effects and reduces both quality of life and long-term survival. One very common side effect of radiation therapy is dermatitis, typically characterized by itchiness, red skin, and a rash, usually on very specific areas of the skin and sometimes over the entire body.

Up to 85% of all patients undergoing radiation therapy are likely to experience skin reactions, which continue to build up as radiation therapy goes on. Management of radiation dermatitis is therefore crucial, as it can improve the benefits of radiation therapy, prevent infections, and reduce skin injury and scarring.

Promisingly, turmeric has been shown to help manage this condition, likely thanks to its ability to manage inflammation levels. In a randomized, double-blind, placebo-controlled clinical study conducted in 2013, 30 patients were given either two (2) grams of curcumin or control orally in capsule form three times daily – in other words, a total of six (6) grams every day – throughout the course of their radiation therapy sessions.²¹

At the end of the study, the researchers concluded that orally given curcumin significantly reduced severity of radiation dermatitis and a condition known as moist desquamation after radiation therapy. [Note: Moist desquamation is a skin condition that happens as a consequence of radiation exposure in which the skin thins and begins to weep, or ooze liquid, because of a weakening of skin structure.]

In 2014, another study was undertaken to assess the effectiveness of a popular, commercially available herbal-based skin cream for preventing severe dermatitis in patients requiring radiation therapy.²² This cream contains turmeric and sandalwood oil and has been used in India for over 40 years to enhance the complexion and rejuvenate the skin. Study results showed that patients using the turmeric and sandalwood cream had a significantly delayed appearance and reduced levels of dermatitis at all time points during their radiation therapy.

Psoriasis Support

Psoriasis is a persistent skin disorder in which skin cells grow up to 10 times faster than normal, leading to raised, red plaques covered with white scales – typically seen on the knees, elbows, and scalp.

In various laboratory studies, turmeric has been shown to block many of the inflammatory enzymes involved in triggering psoriasis. For instance, in a 2015 clinical trial, the clinical and quality of life parameters in patients treated with a turmeric microemulgel (micro-emulsion based gel) were seen to be significantly better relative to patients with untreated lesions.²³ Observed side effects of this treatment were trivial.



Curcumin and Gut Health

Turmeric has been known since ancient times to stimulate the digestive process. Additionally, recent research unequivocally shows that this root spice and its many potent ingredients actively support gut health.

For instance, in a 2004 study, 207 volunteers with a bowel condition were randomly assigned to daily receive either one or two tablets of a standardized turmeric extract for eight (8) weeks. Prevalence of the bowel condition was significantly reduced in both the one- and two-tablet groups. Further, abdominal pain and discomfort was also reduced significantly in both groups. Up to two-thirds of the study volunteers reported an improvement in their symptoms. Overall, there was a favorable shift in self-reported bowel patterns.²⁴

Further, results from multiple studies show that treatment with curcumin helps to manage inflammation of the colon. Indeed, curcumin has been shown to change the profiles of signaling immune system-related compounds in the body known as cytokines, from pro-inflammatory to anti-inflammatory.²⁵

Researchers have stated that curcumin's inhibitory effects on various major inflammatory mechanisms indicate that it – along with the closely related compound demethoxycurcumin – is a very promising candidate for treating various gut-related health conditions resulting from underlying chronic inflammation.²⁶

Curcumin and Brain Health

Research out of UCLA that was published in the online edition of the *Journal of Biological Chemistry* found that curcumin directly prevents the accumulation of destructive beta amyloid proteins. These are known to be the main component in brain plaques that a large scientific consensus agrees directly contribute to the development of various forms of degenerative brain disorders.

Further, in 2008, researchers from India embarked on an in-depth investigation looking at how curcumin might help to support cognition and manage brain degeneration. Their own research – combined with a cohort of existing research studies – led them to state that: “Due to various effects of curcumin, such as decreased Beta-amyloid plaques, delayed degradation of neurons, metal-chelation, anti-inflammatory, antioxidant and decreased microglia formation, the overall memory in patients with AD (Alzheimer’s disease) has improved.”²⁷

Because of its reported ability to cross the blood-brain barrier, curcumin is especially promising for healthy brain support. In 2015, Vanderbilt University researchers administered a curcumin derivative to mice in a novel way to help it cross the blood-brain barrier – by aerosolizing it and having the mice inhale it. The researchers stated in their report that: “Curcumin is a promising compound that can be used as a theranostic agent.”²⁸ [Note: The term “theranostic” refers to ongoing efforts to combine diagnostic and therapeutic agents.]

Further, “Curcumin has a demonstrated ability to enter the brain, bind, and destroy the beta-amyloid plaques present in Alzheimer’s with reduced toxicity,” declared Dr. Wellington Pham, an assistant professor of Radiology and Radiological Sciences and Biomedical Engineering at Vanderbilt, and one of the senior authors of the study.²⁹

Where this all comes full circle is in the comparative data. Consider the fact that the prevalence of dementia in the U.S. is reported to be about 4.4 times higher than it is in India where turmeric (rich in curcumin) just so happens to be a staple part of many people’s everyday diet. This is just more empirical evidence to suggest that the curcumin in turmeric plays a major role in helping to support a healthy, well-functioning brain.





Curcumin and Detoxification

Turmeric further helps to stimulate the body's natural detoxification systems, as evidenced by the following studies. In a rat study published back in 1993 in the journal *Plant Foods for Human Nutrition*, several of the active constituents in turmeric, including curcumin, exhibited properties that led the researchers to state in their conclusion that:

“The results suggest that turmeric may increase detoxification systems in addition to its anti-oxidant properties. Curcumin perhaps is the active principle in turmeric. Turmeric used widely as a spice would probably mitigate the effects of several dietary carcinogens.”³⁰

More recent research published in *Pharmacognosy Magazine* in 2014 found that curcumin has additional neuroprotective benefits that extend to poisonous fluoride. As you may know, fluoride is a synthetic byproduct of aluminum and fertilizer production. Unfortunately, it is commonly added to many municipal water supplies, particularly in the U.S. and Canada, with the stated goal of reducing tooth decay.

In a mouse study, researchers concluded that: “Supplementation with curcumin significantly reduce the toxic effect of F [fluoride] to near normal level by augmenting the antioxidant defense through its scavenging property and provide an evidence of having therapeutic role against oxidative stress mediated neurodegeneration.”³¹

A study published in the *Journal of Nutrition and Metabolism* in 2015 looked at the metabolic detoxification potential of a variety of foods and food-derived nutrients, including curcumin. It found that curcumin is specifically beneficial for:³²

- ▶ Enhancing the activity of UDP-glucuronosyltransferases (UGTs), a class of enzymes that enhances elimination of bio-transformed toxins in urine and feces. UGTs are also responsible for metabolizing steroid hormones and bilirubin, the waste product of the liver's breakdown of old red blood cells.
- ▶ Upregulating and restoring glutathione s-transferases (GSTs), a family of detoxification enzymes responsible for maintaining many of the body's essential life-giving systems.

Curcumin: Action Against Parasites

In multiple studies, turmeric and many of its ingredients have shown potent activity against many tropical parasites including Plasmodium, Leishmania, Trypanosoma, and Schistosoma as well as against nematodes, Babesia, Candida, Giardia, Coccidia, and Sarcoptes.³³

Specifically, curcumin has been shown to induce apoptosis (programmed cell death) and eventually cause the death of Schistosoma mansoni worms.³⁴ These worms are a significant parasite in humans and one of the major agents of intestinal schistosomiasis.

Chagas disease, which is prevalent mainly in Central and South America, is caused by the protozoan parasite Trypanosoma cruzi. The most common complications of chronic Chagas disease are heart problems including congestive heart failure and sudden cardiac death.

Promisingly, according to the results of a 2016 study, curcumin appears to interfere with this parasite's ability to function, leading the study researchers to state that it “represents a promising approach for the treatment of Chagas heart disease.”³⁵



Making the Case for Whole Turmeric

While many would contend that curcumin (and to a lesser extent turmerones) are responsible for most if not all of turmeric's therapeutic value, the truth is that there are many other curcuminoids in turmeric that offer added synergistic benefits. These include demethoxycurcumin (DMC) and bisdemethoxycurcumin (BDMC), both of which are highlighted in the scientific literature as possessing incredible therapeutic potential on their own.

Curcumin comprises the bulk of turmeric's active curcuminoid content, topping out at around 77% of its overall makeup – which is probably why it's remained the center of attention in the scientific world. Then comes DMC at 17%, followed by BDMC at a mere 3%. These numbers might sound small, but don't let them fool you – all three of these curcuminoids play an important role in supporting bodily health and homeostasis, research suggests.



A study published in 2017 in the *Journal of Cellular Physiology*, for instance, found that BDMC possesses unique properties that enhance turmeric's therapeutic efficacy. BDMC was found in this particular study to be more stable than either curcumin or DMC, suggesting a special resiliency that allows it to work its magic in ways unique from its curcuminoid counterparts.³⁶

A 2010 study published in the journal *Biochemical Pharmacology* further supports this hypothesis, revealing that BDMC is also more potent than curcumin and DMC in terms of its ability to manage inflammation within safe levels.³⁷

And remember those turmerones that we discussed earlier? It turns out that they work as transporters to deliver the entire family of curcuminoids all throughout the body. Turmerones act as cultivators, in essence, to enhance the reach and bioavailability of turmeric and its many healing constituents.

Recognizing that each individual component of turmeric serves a unique purpose, it only stands to reason that consuming the entire spice as opposed to just its isolated constituents will deliver the most comprehensive benefits. This isn't to say that consuming high-dose curcumin doesn't have its rightful place, but rather that it would be a mistake to favor curcumin at the expense of the rest of turmeric's many health-giving components.

Whether you're trying get healthy or just stay healthy, consuming whole turmeric is the easiest and most natural way to obtain full-spectrum support.

Maximizing Turmeric's Bioavailability

For everything that turmeric is known to be good for, one thing to keep in mind is that it isn't necessarily as bioavailable as it could be. Research shows that curcumin, in particular, isn't very easily absorbed by the body.

Even when a person takes high amounts of it in isolation, very little of it ends up in blood plasma, peripheral tissues, or urine – indicating that the body isn't getting very much of it.³⁸

The good news is that there are ways to increase turmeric's bioavailability. As we discussed earlier, consuming whole turmeric is a great place to start, as combining all of turmeric's active ingredients together elicits what's known as an "entourage effect," or what some refer to as therapeutic synergy.

Therapeutic synergy is basically the idea that the sum of a food or spice's individual parts is never as good as the entirety of that food or spice – a philosophy that's traditionally more grounded in Eastern medicine as compared to here in the West.

This is slowly changing, however, as more people gain a better understanding of the holistic nature of our natural world, and the importance of consuming whole, natural foods.

Other strategies for maximizing the bioavailability of turmeric include:

Always consume turmeric with fat

Turmeric is fat-soluble, it is best absorbed into our body when consumed alongside healthy fats. This allows it to provide the greatest benefits to the body. Healthy fats include things like clean, grass-fed butter or ghee, pure coconut oil, extra virgin olive oil that's been certified for sustainable sourcing and purity, sustainably produced palm oil, and avocado oil.



Black pepper increases turmeric absorption by 2000 percent

Black pepper is a potent turmeric adjuvant. Combining it with turmeric or using curcumin supplements that contain added black pepper or piperine (one of black pepper's active constituents) can help to maximize its potency.³⁹ **Warning: Long-term use of black pepper can wreak havoc in your gut. Read about the downfall of combining black pepper and turmeric below.**

"If people are given a bunch of turmeric curcumin, within an hour there's (only) a little bump in the level in their blood stream," says Dr. Michael Greger, MD, FACLM. "We don't see a large increase because our liver is actively trying to get rid of it. But what if the process is suppressed by taking just a quarter teaspoon's worth of black pepper? Then you see curcumin levels skyrocket."

"Even just a little pinch of pepper – 1/20th of a teaspoon – can significantly boost levels. And guess what a common ingredient in curry powder is besides turmeric? Black pepper."

Why Long-Term Use of Black Pepper With Turmeric Isn't the Answer

It's important to understand that while black pepper does increase the bioavailability of curcumin, it also has its downfalls. Black pepper tends to be toxic in higher quantities – particularly in folks with compromised digestive systems. Consuming black pepper in excess, research has shown, can damage the mucosal lining of the small intestine, potentially causing bleeding or other injuries.⁴⁰

If you're at all familiar with the harmful effects of aspirin on gut health,⁴¹ black pepper, believe it or not, is similarly threatening. Studies show that too much black pepper can cause erosions and ulcers throughout the digestive tract, just like aspirin.

While piperine all by itself is said to be better than full-spectrum black pepper, as it's been scientifically shown to be generally safe while causing "no adverse effects" in most people,⁴² it, too, remains a potential risk for some. Because of this, you may want to consider only using supplements that contain piperine or black pepper for short periods of time. For longer term use there are other safer options that increase bioavailability.



Fermentation Increases the Power of Turmeric Better Than Black Pepper

By fermenting turmeric, its active constituents can be drawn out and made more potent in multiple ways that provide substantive health benefits.

In an animal study published in the *International Journal of Food Science & Technology* in 2012, researchers found that fermented turmeric contains the most antioxidant power. Compared to ground turmeric in powder and probiotic forms, fermented turmeric led to substantially higher plasma antioxidant concentrations in test subjects.⁴³

In terms of how it affects the liver, fermented turmeric was shown in 2013 research out of South Korea to be powerfully hepatoprotective, meaning it shields the liver from damage. Not only that, but fermented turmeric was also shown to help improve the liver's functional detoxification potential.⁴⁴

According to 2017 research published in *Planta Medica*, turmeric fermented with *Lactobacillus plantarum* contained more curcumin than unfermented turmeric, by volume. In addition to improving both its antioxidant and antimicrobial capacity, fermenting turmeric drew out an impressive 11% more curcumin. Fermentation also made turmeric 3.1 times more effective at scavenging oxidizing free radicals from the body compared with non-fermented turmeric.⁴⁵

Another area where fermented turmeric has a leg up on both unfermented turmeric and turmeric combined with black pepper is in the area of inflammation. Research published by The Korean Society for Applied Microbiology and Biotechnology in 2011 found that fermented turmeric is a powerful anti-inflammatory, possessing the ability to inhibit pro-inflammatory cytokines much more effectively than any other known form of turmeric. Fermented turmeric was further shown in this same study to protect against acute anaphylactic, or allergic, reactions.⁴⁶



From an antimicrobial perspective, fermented turmeric shows incredible potential against a wide variety of pathogenic bacteria, including drug-resistant “superbugs.” Research out of the Middle East in 2016 found that fermented turmeric provides broad-spectrum protection against harmful bacteria such as *Escherichia coli* (*E. coli*), *Streptococcus agalactiae*, *Staphylococcus aureus* (Staph), *Enterococcus faecalis*, Methicillin-Resistant *Staphylococcus aureus* (MRSA), *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*.⁴⁷

Various animal studies point to other benefits of fermented turmeric including reduced serum lipid levels,⁴⁸ weight loss,^{49,50} and improved learning and memory ability.⁵¹

Cook Your Turmeric

There are many foods and nutrients out there that are damaged by high levels of heat, but turmeric isn't one of them. Thousands of years of traditional use combined with modern-day research has shown that heating turmeric with oil and fat is one of the best ways to unlock its optimal bioavailability.

“I use it (turmeric) in every sauté, just a quarter teaspoon, a half teaspoon is enough,” says Dr. Saraswati Sukumar, a medical oncologist at Johns Hopkins who's been actively researching turmeric for many years.⁵² “But you don't have to use it sparingly – use it lavishly,” he says. “If you have any sauté, just sprinkle it in. The moment you heat oil and add turmeric to it, it now becomes completely bioavailable to you.”





Using Turmeric Spice in Your Cooking

Both fresh or dried turmeric can be consumed. Fresh turmeric can be used in sautés and smoothies, while ground turmeric can be conveniently added to any foods, including roasted vegetables, stews, and curries. With either form, be sure to look for a quality organic source.

Fresh turmeric roots can usually be found in Asian and Indian grocery stores. Fresh roots should be firm to the touch while their bright orange flesh – after peeling – is typically earthy, peppery, and slightly bitter in taste.

Like ginger, fresh turmeric can be cut and chopped into any shape, grated, or juiced. It can be stored in the refrigerator in a plastic bag or airtight container for a couple of weeks, or frozen for several months at a time.

Dried turmeric loses some of its essential oils and pungency. However, it can still provide plenty of warmth and color to food. Again, Asian stores and specialty spice shops will typically have fresher and better quality stocks. Dried turmeric can be stored in an airtight container in a cool, dark place for up to a year.

As a general rule of thumb, one inch of fresh turmeric is equivalent to a tablespoon of freshly grated turmeric or a teaspoon of ground turmeric.



Is it Possible to Take Too Much Turmeric?

Turmeric is considered extremely safe – especially when used whole – since nearly all Indians and other South Asians use significant amounts of fresh turmeric in their daily cooking for their entire lives without any reported adverse effects.

However, one needs to use caution when consuming fresh turmeric juice, turmeric oil, tinctures, and other therapeutic formulations containing turmeric, as well as turmeric supplements, because the dose of turmeric – and its various powerful active ingredients, including curcumin – can vary significantly.

Because of its incredible potency, there are rare instances when consuming too much turmeric may create imbalances in a sensitive body.

The bitterness of turmeric is so intense, for instance, that taking large amounts of it for an extended period of time could create too much “drying” in the blood (or “yin” according to TCM). Symptoms of such over-consumption include dizziness, blurred vision, insomnia, a burning feeling in the hands and feet, dry eyes, night sweats, and even an extreme manifestation of hot flashes known as “steaming bone disorder” in which pain penetrates deep within the bones.

While it may seem as though there's no harm to be had from taking turmeric indefinitely, the fact of the matter is that too much of it over time can (again, in rare instances) deplete a person's blood and yin, potentially damaging the kidneys and vital fluids.

Taking turmeric for chronic pain is one thing, as the benefits generally outweigh any perceived risks in the vast majority of cases. But because this isn't always the case, it is recommended that folks first consult with a qualified professional or herbalist before undertaking any high-dose turmeric regimen to avoid potentially putting themselves in harm's way.⁵³

Individuals with so-called "yin deficiencies" are said to be most at-risk for experiencing contraindications from long-term intake of very high doses of turmeric. But again, the health benefits offered by this herb far outweighs the risks in most cases.

Simply put, one would have to consume almost unrealistically large amounts of turmeric in order for any of these contraindications or side effects to occur. At least that's the educated opinion of Dr. James Duke, author of the book *Dr. Duke's Essential Herbs*, who believes that the risk of turmeric causing any type of serious harm is next to nil.

"There are some suggestions in medical literature that people with gastrointestinal problems such as gallstones, stomach ulcers, hyperacidity, or bile duct obstructions shouldn't eat large amounts of turmeric, although I suspect these cautions may have been overstated," Dr. Duke says.⁵⁴

He goes on to say that "Eating very large amounts of turmeric could potentially damage white and red blood cells. As a practical matter, however, there is little likelihood that anyone would ever ingest enough to make this happen."

In conclusion, while most of the currently available evidence indicates that turmeric and its many active ingredients are extremely safe, it's recommended that you take fresh turmeric juice, turmeric oil, tinctures, and other therapeutic formulations containing turmeric, as well as turmeric supplements, under the supervision of a qualified healthcare provider.



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