

Alternative Nutrition Therapy
“Turmeric”
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Introduction:

Curcuma longa also known as turmeric is a plant of the ginger family. It is derived from an Arabic word, *Kurkum* which means yellow dye (DeJager, 2010). Turmeric contains curcumin—a phytochemical and antioxidant. This phytochemical is found in Southeastern Asian countries. It is considered part of the ginger family, and has white flowers that stick out above the soil. It has been used as a form of ayurvedic medicine in India, for its anti-inflammatory properties. Now multiple studies have proven the generous health benefits of using turmeric.

Alternative Therapy:

Alternative therapy is a form of healing practice that does not fit into the conventional forms of standard care and can come from cultural traditions. Forms of alternative therapy include aromatherapy, acupuncture, massage and using alternative nutrition therapy (Nelms, M., Long, S., Sucher, K, 2011). Alternative nutrition therapy is the use of various forms of food, in order to treat disease, prevent pain, and improve strength. Alternative nutrition therapy includes using spices like turmeric (Nelms et al., 2011).

History:

Turmeric is native to Southeast Asia grown in Western India. It was originally cultivated for use as a dye, and then later employed for culinary and cosmetic purposes. Turmeric is a domesticated plant not found in the wild (Michaels, 2008). It is sterile and does not produce seeds, so it can only be reproduced from rhizomes or pieces of the rhizomes of existing plants. Turmeric was introduced to China from India by 700 A.D. It was in use in eastern Africa by 800 A.D. and in western Africa by 1,200 AD (Smith, 2000). The root, also known as the rhizome, contains the active ingredient curcumin (Motterlini, 2000). The traditional method of curing is to boil or steam the fresh rhizome in lime or sodium carbonated water (Poth, 2000). This cleans the

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root, gelatinizes the starch and removes the earthy scent. After boiling, the rhizomes are dried and be stored whole or ground up into a powder.

The main health benefits from turmeric come from curcumin, or diferuloylmethane. The biosynthesis of curcumin is still unknown but there are two processes that have been experimented with. The first mechanism involves a “chain extension reaction by cinnamic acid and 5 malonyl-CoA molecules that eventually form a curcuminoid” (Motterlini, 2000). The second mechanism involves two cinnamate units coupled together by malonyl-CoA. Both mechanisms utilize cinnamic acid as their starting point, which is derived from the amino acid phenylalanine (Motterlini, 2000).

Usage:

Some of the medicinal uses, as discussed in research portion of this paper, include anti-inflammatory affects that can potentially reduce symptoms of rheumatoid arthritis, tenderness after surgery, and reduce cancer growth and metastasis. Turmeric is also involved in many cultural and beauty practices. In Indian weddings, turmeric signifies the last time when the couple is allowed to see each other before their wedding (Ramachandran, 2006). The ceremony takes place the day before the wedding and guests apply turmeric paste to the bride and grooms face as a form of a blessing (Ramachandran, 2006). The medicinal and cultural uses are the least well known uses of this spice, most individuals associate turmeric with cooking.

Turmeric is an essential spice in Indian cooking. The warm aromatic spice and its bitter undertones are commonly used in Southeast Asian and Middle Eastern Cousins (Smith, 2000). It adds a yellow/orange color to Indian foods whether in curries or with mixed vegetables. It is widely used in Moroccan cuisine to spice meat, particularly lamb. It is also used in spice blends

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in the Caribbean, North Africa, the Middle East, and Indonesia. Turmeric is also used to brighten the color of some prepared mustards (Smith, 2000). It is also used in canned chicken broth and other foods often as a much cheaper replacement for saffron. With the popularity of turmeric usage in foods, thorough studies have been done to highlight the spice's health benefits.

Review of Scientific Literature:

What curcumin is mostly known for is its anti-inflammatory effects. Curcumin does this by down-regulating the actions of cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS). These two enzymes are both part of creating the inflammatory response. The presence of nuclear factor-kappa B (NF- κ B) allows both COX-2 and iNOS to produce the inflammatory cascade. Curcumin halts the activation of NF- κ B, thus stopping the inflammatory process (Jurenka, 2009).

The anti-inflammatory properties have been put to the test in numerous clinical trials. To explore its benefits in post-surgical recovery, curcumin was administered in comparison to phenylbutazone (a leading non-steroidal anti-inflammatory drug) and a placebo. They received these solutions after surgery to correct an inguinal hernia—a painful condition with a painful recovery after surgery. At the end of the study, curcumin was most effective in reducing spermatic cord edema, spermatic cord tenderness, operative site pain, and operative site tenderness. In fact, phenylbutazone did not reduce tenderness at the operative site at all. Turmeric would be a significantly cheaper and potentially more effective option for reducing inflammation after surgery, leading to shorter recovery times and less discomfort (Jurenka, 2009).

Rheumatoid arthritis is an auto-immune disease characterized by chronic painful inflammation of the joints. In one study, the researchers examined the specific extracts used as dietary supplements and their effects on decreasing inflammation of rheumatoid arthritis. The

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researchers used a clinical measurement called Arthritic Index, to determine the amount of joint swelling. They did a random testing of numerous over-the-counter turmeric dietary supplements and found that the majority of them did not contain essential oils and had less than 50% curcuminoids. They thus created an essential oil-depleted extract that contained less than 40% curcumin (fractured) and compared its effectiveness to that of an extract containing 93% curcumin (purified). The study found that curcumin was only successful in reducing inflammation as a preventative measure, if given to the subject before the inflammation had started. They also found that a high dose of the fractured curcumin showed similar results to that of the low dose purified curcumin (Chen, et al., 2006). More research is needed in respect to dosages and their effectiveness.

Pro-inflammatory states are well understood to be linked to cancer growth, therefore there is much anticipation that anti-inflammatory actions will also be linked to chemopreventative activity. In pre-clinical cancer research, there has been strong evidence to support that curcumin has anti-carcinogenesis effects on such cancer types as colorectal, pancreatic, gastric, prostate, hepatic, breast, and oral cancers, and leukemia, and at various stages. This implies that the inhibition of iNOS and COX-2 can be potentially anticarcinogenic (Jurenka, 2009).

One group of researchers believed in not only curcumin's anti-carcinogenic ability but also its ability to stop cancer cells from metastasizing—more specifically with breast cancer. Breast cancer is still the 2nd leading cause of cancer related death for women; it is also the most common type of malignant tumor. The entire study was done *in vitro*, using live human mammary epithelial carcinoma cells and curcumin purified to roughly 98%. The result of this study was that with increased concentration of curcumin, there was decreased proliferation of the

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cancer cells (Fan, Q., Wang, F., Wang, L., & Zong, H., 2011). Another study examined that anti-invasion and anti-metastasizing abilities of curcumin and discovered the same results. Instead of breast cancer, however, the researchers examined lung cancer cells. In both *in vitro* and *in vivo*, an injection of curcumin was able to produce apoptosis in rapidly proliferating cancer cells. At a lower concentration, curcumin stopped the cancer cells from migrating and invading other cells (Chen, et al., 2008). These trials combined make a solid case that curcumin can stop cancer metastasis. Cancer cell metastasis is the leading cause of mortality in cancer patients; therefore the ability to stop this action is significant.

Curcumin has been found in multiple studies to have a very low bioavailability. When given to subjects both intravenously and orally, the compound was metabolized and excreted within 24 hours. Therefore supplementation of curcumin alone is limited. There has thus been a push toward the benefits of combining curcumin with other substances to increase bioavailability. A study found that combining piperine (a component of black pepper and long pepper) helps increase the bioavailability of curcumin. Increasing bioavailability would increase the effectiveness of curcumin and therefore allow the body to utilize the health benefits (Srinivasan, K. & Suresh, D, 2007).

Results & Discussion:

Curcumin's anti-inflammatory ability is the staple of its health benefits, blockage of the NF- κ B pathway has been proven to help treat chronic pain and slow cancer growth. More *in vivo* research is needed to confirm these claims as well as to define a consistent dosage because clearly different concentrations have different effects. In addition to dosages, drug interactions also need to be taken into consideration because of the wide variety of turmeric available for consumption.

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Common Forms/Dosages:

The most common form of turmeric is in the powder form. This bright yellow powder is used in soups, salads, milk and many other foods. The recommended dosage of turmeric extract is 500 mg two to four times daily (WebMD, 2009). Curcumin being both fat-soluble, unstable in the intestine, and quick to break down by enzymes contribute negatively to its bioavailability (WebMD, 2009). It is best to take in turmeric with meals containing fat in order to add in absorption. Researchers have concluded that mega doses, as much as 10 grams or 10,000 mg, do not significantly increase the amount of curcumin in the bloodstream (WebMD, 2009). High doses are accompanied by unwanted side effects, including nausea and upset stomach.

Side Effects, Contraindications, Drug Interactions:

As of today there are 68 known drug interactions associated with turmeric. Included is that turmeric increases the effects of anticoagulant drugs (WebMD, 2009). Taking medication like Aspirin, Warfarin, and Plavix along with turmeric could be potentially beneficial. Anticoagulants are used in some surgeries to prevent blood clots from forming. However, excessive use or a combination of an anticoagulant with turmeric may cause excessive bleeding. Also during some surgeries, clotting may be desired (Nelms, M. et al., 2011). Therefore patients in both pre and post-operative period should consult their doctor before consuming an unusual of turmeric. High dosages of turmeric have also been linked to diarrhea and gallbladder contraction. A common concern for pregnant women taking high dosages of turmeric through pills is uterine stimulation. Uterine stimulation can initiate menstrual flow, which is unwanted during pregnancy (WebMD, 2009).

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Conclusion:

Turmeric as an alternative nutrition therapy has been shown to have a wide variety of uses both symbolical and practical. However, without pairing with the right foods, consumers can waste their money on a useless bio-unavailable product. Or worse yet, an over dose or mixing turmeric with the wrong medication or medical procedure can cause major complications and in some cases can threaten the patient's life. But with every risk, comes potential. Turmeric can be part of the distinctive color and flavor of a delicious curry dish, it can be a blessing to a soon to be married couple, it can relieve chronic pain from a suffering patient, and maybe one day it can stop a dangerous cancer from spreading. If used carefully and thoughtfully, turmeric can be part of a healthy lifestyle and can improve the well-being of a consumer in need.

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References

- Chen, G., Frye, J., Funk, J., Jolad, S., Lantz, C., Oyarzo, J., Solyom, A., & Timmerman, B. (2006). Turmeric extracts containing curcuminoids experimental rheumatoid arthritis. *National Institute of Health*. Retrieved 13 Oct 2011 from <http://www.ncbi.nlm.gov/pmc/articles/PMC2533857/?tool=pubmed>
- Chen, HW., Chen, JJ., Chen, WJ., Ho, CC., Huang, JY., Su, SF., Huang, CW., Lee, JY., Tsai, MF., Wang, CC., Yu, SL., Yang, PC., (2008). Curcumin inhibits lung cancer cell invasion and metastasis through the tumor suppressor HLJ1. *Cancer Research*. Retrieved 13 Oct 2011 from <http://cancerres.aacrjournals.org/content/68/18/7428.long>
- DeJager, P. (2010). *Turmeric: The Ayurvedic Spice of Life*. New York City : Pioneer Imprints.
- Fan, Q., Wang, F., Wang, L., & Zong, H. (2011). Curcumin inhibits metastatic progression of breast cancer cell through suppression of urokinase-type plasminogen activator by NF-Kappa B signaling pathways. *Springer Link*. Retrieved 13 Oct. 2011 from: <http://0-www.springerlink.com.opac.sfsu.edu/content/56h0686232j80327/fulltext.pdf>
- Jurenka, Julie. (2009) "Anti-Inflammatory properties of curcumin, a major constituent of *cucuma longa*: A review of preclinical and clinical research." *Alternative Medicine Review*. Retrieved 13 Oct. 2011 from: <http://www.altmedrev.com/publications/14/2/141.pdf>

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Motterlini, R. (2000). Curcumin and anti-oxidant and anti-inflammatory. *Free Radical Biology*

and Medicine, 28(8), 1-7. Retrieved 11 Oct. 2011, from

http://www.sciencedirect.com/science?_ob=ImageURL&_cid=271331&_user=521824&_pii=S089158490000294X&_check=y&_origin=&_coverDate=15-Apr-2000&_view=c&_wchp=dGLbVIV-zSkzV&_md5=fef8d23a515b1634b8073279214d9ef3/1-s2.0-S089158490000294X-main.pdf

Michaels, F. (2008). Turmeric growing information. *Green Harvest Organic Gardening Supplies*.

Retrieved 11 Oct. 2011, from

http://www.greenharvest.com.au/Plants/turmeric_info.html

Nelms, M., Long, S., Sucher, K (2011). Pharmacology. *Nutrition Therapy and Pathophysiology*

(pp. 210-211). Belmont, California : Wadsworth Cengage Learning .

Poth, S. (2000). *The Spice Lilies: Eastern Secrets to Healing with Ginger, Turmeric, Cardamom, and Galangal*. New York: Healing Arts Press.

Ramachandran, A. (2006). Turmeric. *Sally's Place: Food, Wine, Travel, Ethnic Cuisines,*

Recipes. Retrieved 11 Oct. 2011, from

<http://www.sallybernstein.com/food/columns/ramachandran/turmeric.htm>

Srinivasan, K. & Suresh, D. (2007). Studies on the in vitro absorption of spice principles—

curcumin, capsaicin and piperine in rat intestines. *Food and Chemistry Toxicity*,

Received From <http://www.sciencedirect.com/science/article/pii/S0278691507000610>

Smith, E. (2000). *The Quick & Easy Ayurvedic Cookbook*. Clarendon, Vermont: Journey

Editions.

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WebMD. (2009) Turmeric. Retrieved 13 Oct. 2011, from <<http://www.webmd.com/vitamins-supplements/ingredientmono-662-TURMERIC.aspx?activeIngredientId=662&activeIngredientName=TURMERIC>>.