Medicinal Benefits of Curcumin, Specifically In Hepatic and Digestive Conditions

By

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5/1/2012

Abstract

Curcumin, the active compound of the spice, turmeric, has been used historically in food, pigments, and in ancient medicine. Complaints treated by this extract include several conditions throughout the body, especially those relating to liver health and digestive disorders. Modern Western science has been studying this compound and determined it has both antioxidant and anti-inflammatory properties, differentiating it from other antioxidants which do not possess anti-inflammatory qualities. These are suspected to be responsible in part for improving hepatic health by reducing inflammation in bile ducts which allows for improved bile flow, gallstone reduction, improved digestion, and lowering of free cholesterol and triglycerides. Also considered is curcumin's seeming ability to reduce the inflammation that leads to sclerosis of the bile ducts within the liver, leading to a possible treatment or preventative for diseases that lead to cirrhosis of the liver, a typically fatal condition. The majority of studies to this point have been animal studies, but one short-term human study showed significant reduction of free cholesterol and triglycerides after just one week of regular use. Since curcumin appears to be tolerable even at high pharmacological levels, it shows promise as a beneficial nutraceutical for

improved health in a society featuring diets rich in the fats and animal products requiring bile to be properly digested.

Introduction

Historically, turmeric, or *Curcuma longa*, has long been used as a spice, dye, and medically in the Asian continent. Its use in foods is also popular in the West and its medical value has become widely studied.

Grown as a rhizome, turmeric is harvested so the spice can be extracted from the roots and used in everything from curries to condiments, imparting a distinctive earthy, slightly peppery flavor and scent and color similar to mustard. Having strong colorant properties, it has also been used as a dye in Indian food and textiles, often referred to as the “Indian saffron” as it adds some similar notes to food as saffron without being as costly. (Aggarwal, 2007)

Since its initial medical use in Ayurveda to bring “heat” to the body’s hot/cold balance, many health conditions have been treated by turmeric. Its main bioactive compound, curcumin, is thought to be responsible for the many anti-inflammatory and antioxidant properties which benefit conditions as broad as healing wounds, (Aggarwal, 2007) cholesterol and triglyceride reduction, (Graham, 2009) reduction of sclerosing of bile ducts in the liver in cirrhosis, (Baghdsaryan, 2010) and improving many digestive conditions such as colic.

With its strong correlation to hepatic health, curcumin deserves a greater look as a healthful supplement in a society with ever-elevating circulating

cholesterol levels and other digestive concerns, often due to diets high in saturated fats and animal products.

Discussion

Since so many roles have been played by turmeric and its extract, researchers are looking at curcumin for many conditions previously considered and others to be studied. Historically, these include a cure for jaundice, suppression of appetite, and use as a digestive. Additionally, Both Indian and Chinese medicine have used it for its anti-inflammatory properties, as well as its ability to treat gas, colic, and chest pains. (Aggarwal, 2007) Stomach and liver problems have also been shown to improve by use of curcumin. Current thought is that curcurmin exhibits potent antioxidant as well as anti-inflammatory activity, unlike other antioxidants which typically don't also prove to be anti-inflammatory. Therefore, it's likely antioxidant properties are not chiefly responsible for curcumin's beneficial impact on hepatic health. As most chronic diseases are based on disregulated inflammation, curcumin has the possibility of being supportive or even curative by regulating and reducing the inflammation associated with these conditions.

According to Aggarwal, an interesting point is that high doses of curcumin per day can be taken and well tolerated, yet serum levels tend to remain low, which appears to be the reason it can be used so highly with pharmacological safety. To boost bioavailability, piperine, which is an extract of black pepper, is often used in curcumin preparations.

Though research has focused on animal studies for the most part (rats and mice), a small experiment with human subjects showed that curcumin extract administered in dosages of dosages of 500mg produced significant changes in serum cholesterol levels, resulting in lowered serum cholesterol and triglyceride levels in a one week study of humans fed diets high in fat. (Kim, 2010) This result likely comes from the decrease of inflammation in the bile ducts which would increase bile flow to the small intestine where it binds to chyme to form micelles which are either reabsorbed or excreted. Otherwise, unreleased bile is reabsorbed in the liver and circulated in the body as free cholesterol and triglycerides, and in extreme cases, as bile itself, causing the condition known as jaundice.

It has not yet been determined if there are other components than curcumin in turmeric which exert a beneficial effect, or if other spices work with or against curcumin to increase its functionality in the system. One way of approaching this would be to select structural analogues of curcumin with more bioavailability and efficaciousness to test, though this could potentially compromise the safety of curcumin. (Aggarwal, 2007) More well-controlled large clinical trials are needed to determine the potential of curcumin in both the prevention and therapy of diseases.

Studies show that curcumin inhibits factors modulating pro-inflammatory and profibrotic cytokines in addition to antioxidant properties, and these factors provide a rational molecular basis for its use in hepatic disorders. (Rivera-Espinoza, 2009) It also attenuates liver injury induced by several types of

intoxication, including cholestasis, which is the condition where bile cannot flow from the liver to the duodenum to promote emulsification required in lipid digestion. This can occur in the case of gallstones blocking the bile duct or when there is actual cirrhosis of the bile ducts. Research on curcumin and specific diseases is still in its nascent stages and more must be encouraged to understand why curcumin may be helpful in these conditions. One function is that curcumin is an antioxidant and oxidative stress plays a role in some of these hepatic conditions.

One research team, (Baghdsaryan, 2010) looked to study if curcumin could delay the damage caused by progressive inflammatory conditions of the liver, specifically primary sclerosing cholangitis and primary biliary cirrhosis. Both of these conditions, which can be sparked by genetics or autoimmune disease as well as environmental factors, cause the liver's plumbing system of bile ducts to become inflamed, scarred, and blocked. This leads to extensive tissue damage which is likely irreversible and ultimately leads to fatal liver cirrhosis.

Baghdsaryan’s research team analyzed tissue and blood samples from mice with chronic liver inflammation before and after adding curcumin to their diet for a period of four and a period of eight weeks. The findings showed that the curcumin diet significantly reduced bile duct blockage and curbed liver cell (hepatocyte) damage and scarring (fibrosis) by interfering with several chemical signaling pathways involved in the inflammatory process. These effects were clear at both four and eight weeks. No such effects were seen in mice fed a normal diet.

Conclusions

Turmeric holds much promise medically as an anti-inflammatory beneficial in the prevention or reduction of symptoms in several health conditions, especially those involving liver health and bile flow. Reductions in these conditions would be responsible for many common diseases, such as elevated cholesterol and subsequent heart disease; digestive disorders such as gallbladder disease and lipid malabsorption; and conditions of cirrhosis, which can be fatal. Antioxidant properties of curcumin may play a role in the beneficial nature of this compound, yet there appears to be something different about its process as unlike other antioxidants, turmeric is anti-inflammatory as well, making it likely another aspect of curcumin responsible for its beneficial effects on health. Certainly, further study is warranted as diseases resulting from some type of disrupted bile flow affect great numbers of our population.

Works Cited

Aggarwal, B. S. (2007). *Curcumin: the Indian solid gold.* (Vol. 595). Advanced Experimental Medical Biology.

Baghdsaryan, A. C. (2010). *Curcumin improves sclerosin choalangitis in Mdr2-/-mice by inhibition of cholanglocyte inflammatory response and portal myofibroblast proliferation.* (Vol. 59). Gut.

Graham, A. (2009). *Curcumin adds spice to the debate: lipid metabolism in liver disease.* (Vol. 157). British Journal of Pharmacology.

Kim, M. &. (2010). *Hypocholesterolemic effects of curcumin via up-regulation of cholesterol 7a-hydroxylasein rats fed a high fat diet.* (Vol. 4(3).). Nutrition Research and Practice.

Rivera-Espinoza, Y. &. (2009). *Pharmacological actions of curcumin in liver diseases or damage.* (Vol. 29). Liver International.