

A COMPREHENSIVE REVIEW ON TURMERIC BENEFITS

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ABSTRACT

Turmeric, a spice with medicinal properties, has grabbed the interest of medical and scientific experts, as well as culinary fanatics, since it is the principal sources of the polyphenol curcumin. It assistances in the treatment of oxidative as well as inflammatory illnesses, as well as arthritis, anxiety, metabolic syndrome, as well as hyperlipidemia. It may also help cure exercise persuaded inflammations as well as muscle soreness, letting athletes to recover more quickly and perform better. Furthermore, even if a person does not have a known health problem, a small dose of the complex may be beneficial to their health. Its antioxidant and anti-inflammatory qualities account for the bulk of these benefits. Due to its low bioavailability, which appears to be due to poor absorption, fast metabolism, as well as rapid elimination, ingesting curcumin does not result in the associated health benefits. Bioavailability may be improved in a number of ways. Piperine, for example, is the main active ingredient in black pepper, and it has been proven to improve bioavailability by 2000% when mixed with curcumin in a complex. When mixed with other boosting agents, curcumin offers a wide range of health advantages. The goal of this study is to provide a concise review of the substantial research on the health benefits of curcumin.

KEYWORDS: *Anti-Inflammatory, Antioxidant, Curcumin, Polyphenol, Turmeric.*

1. INTRODUCTION

Turmeric is a interest that has captivated the attention of medical as well as scientific experts, and the culinary worlds. Turmeric (*Curcuma longa*) is a perennial rhizomatous herbaceous ginger plant[1]. Curcumin's medical qualities have been known for thousands of years, but determining the specific mechanism(s) of action and identifying the bioactive components has only lately been possible. Curcumin (one, seven-bis (four-hydroxy-three-methoxyphenyl)-one, six-heptadiene-three,five-dione) is a natural polyphenol found in the rhizomes of *Curcuma longa* (turmeric) as well as other *Curcuma* species, also known as diferuloylmethane. Because of its antioxidant, anti-inflammatory, antimutagenic, antibacterial, as well as anticancer characteristics, *Curcuma longa* has been utilized as a medicinal plant in Asian nations for millennia[2].

Curcumin, an poly phenol, has been found to target a range of signaling molecules as well as have cellular action, suggesting that it has many health effects. It has been shown to aid with inflammatory disorders, metabolic syndrome, and pain, as well as the treatment of both inflammatory and degenerative eye conditions. It has also been shown to be beneficial to the kidneys. Curcumin supplementation seems to provide a number of therapeutic effects, the majority of which are linked to its antioxidant and anti-inflammatory properties. Curcumin has a limited bioavailability, despite its anti-inflammatory and antioxidant properties, which seems to

be owing to insufficient absorption, fast metabolism, as well as excretion. Many substances have been explored to increase curcumin bioavailability by targeting these distinct routes. The majority were developed to increase curcumin bioavailability by inhibiting its metabolic pathway.

Curcumin will be well and used all over the world for its potential benefits of health in a numbers of conducts[3]. It includes curcumin, is utilized in curries in the India, tea in Japan, cosmetics in Thailand, beverages in Korea, colorants in China, antiseptics in Malaysia, anti-inflammatory agents in Pakistan, as well as cheese, mustard sauce, butter, and chips in the United States. Curcumin is accessible in a variety of forms, counting capsules, ointments, tablets, soaps, energy drinks, as well as cosmetics[4]. The goal of this study is to provides a quick summary of the multitude of research on curcumin's possible health benefits[5]. We chose to concentrate on the advantages linked with certain common health issues and benefits in healthy people rather than examining the massive research related to cancer and other sickness states due to the breadth of the material. The root of turmeric is seen in Figure 1[6].



Figure 1: The above diagram shows the root of turmeric[7].

1.1 Antioxidant:

Curcumin's anti-oxidant as well as anti-inflammatory characteristics account for the bulk of its impact on the many illnesses discussed in this study. Curcumin has been exposed to helps the body's oxidative stresses signs. It has been proven to boost the activities of antioxidants likes' superoxide dismutase in the bloodstreams (SOD). Curcuminoids supplementation had important consequence on all studied oxidative stress parameters, including plasma SOD and catalase activities, as well as serum glutathione peroxidase concentrations, according to a recent systematic review and meta-analysis of randomized control data on the effectiveness of purified curcuminoids supplementation on oxidative stress parameters. It's worth noting that every study in the meta-analysis used few kind of formulation to address bioavailability issues, with piperine showing in four of the six. The capacity of curcumin to neutralize free radicals is mediated in a variety of ways. It may scavenge multiple forms of allowed radicals, likes reactive oxygen as well as nitrogen species, controls the activity of free radical-neutralizing enzymes likes catalase, GSH, as well as SOD, and inhibit ROS-producing enzymes likes' lipoxygenase as well as xanthine hydrogenase. Curcumin is also a lipophilic molecules, making it a good peroxyradicals scavenger. As a consequences, curcumin is regarded as a chain-breaking antioxidant, similar to vitamin E.

1.2 *Anti-Inflammatory:*

Oxidative stress has been connected to a numbers of chronic illnesses, as well as its pathological processes are similar to those of inflammations in that one may readily be caused by the others. In actuality, at the site of inflammations, inflammatory cells are known to generate a range of reactive species, subsequent in oxidative stress, establishing the relationship among oxidative stress as well as inflammation. A numbers of reactive oxygen species may also activates an intracellular signaling cascade that increases the productions of pro-inflammatory genes. A vast spectrum of chronic diseases as well as syndromes have been associated to inflammation. Parkinson's disease, Alzheimer's disease, , cerebral injury, arthritis, renal ischemia, multiple sclerosis, cardiovascular disease, epilepsy metabolic syndrome, obesity, depression, cancer, colitis, allergy, asthma, bronchitis, psoriasis, diabetes, fatigue, as well as acquired immune deficiency syndrome are just a fewer of the conditions that can affects people. AIDS is only one of the illnesses that have been discussed.

1.3 *Arthritis:*

Osteoarthritis (OA), a chronic joint ailment, is one such illness linked to inflammation, both chronic and acute. It affects approximately 250 million individuals globally, resulting in higher healthcare expenditures, impairment in daily activities (ADL), and, as a result, a worse excellence of life. Though OA was previously thought to be mainly a degenerative as well as non-inflammatory disease, it is now known to include inflammatory features, such as increased cytokine levels, and to be linked to systemically inflammations. While there is no cure, there are a number of pharmacological alternatives for therapy; unfortunately, many are expensive and come with unwanted side effects. As a result, alternative therapies such as nutritional supplements and herbal medicines are becoming more popular.

1.4 *Metabolic Syndrome:*

Because systemic inflammation has been related to a range of disorders affecting multiple organ systems, curcumin's ability to lower it has implications beyonds arthritis. Metabolic syndrome is characterized by hyperglycemia, hypertension, insulin resistance, lower higher density lipo proteins cholesterol; raised lower-density lipoprotein cholesterol raised triglyceride levels, as well as obesity, especially visceral obesity. Curcumin has been shown to improve insulin sensitivity, reduce adipogenesis, and reduce blood pressure, inflammation, and oxidative stress, all of which are MetS symptoms. Curcuminoids seem to impact gene expression as well as the activity of enzymes involved in lipoprotein metabolism, resulting in lower plasma triglyceride and cholesterol levels and higher HDL-C levels. Obesity and overweight are linked to chronic low-grade inflammation; although the exact mechanisms are unknown, pro-inflammatory cytokines are known to be produced. Because these cytokines are regarded to be at the root of diabetes and cardiovascular disease, it's critical to manage inflammation.

1.5 *Healthy Peoples:*

The mainstream of curcumin research in persons has so far been done on patients who already have health problems. This might be because studies on healthy persons are harder to do since the advantages may not be as quick and quantifiable if biomarkers are normal from the outset. As a consequences, longitudinal studies may give the most vision into any possible health's advantages in healthy individuals, however these studies may be time over whelming as well asexpensive. Cross evaluations across the fewer studies that have been complete may be problematic due to the uses of various dosages, characteristically as higher as one g. It's worth

noting that this is only considered a higher dosages since it's more than most people could get from eating the spice alone. An eighty mg/day dosage of a lipidated version of curcumin was utilized in one investigations on healthy people aged forty to sixty years. For four weeks, subjects were administered either curcumins (N = nineteen) as well as placebo (N = nineteen).

The treatment consisted of 400.00 mg of powder each and every days, comprising eighty mg of curcumin. Blood as well as saliva samples were taken before as well as after the 4 weeks. Curcumin reduced triglyceride levels considerably, but not total cholesterol, HDL levels. Both nitrous oxides as well as soluble intercellular adhesion molecule one, an atherosclerosis-related molecule. Myeloperoxidase levels rose as a result of inflammation-related neutrophil action, but not c-reactive proteins. There were decreases in salivary amylase activity, a stress signal, as well as increases in salivary radical scavenging capacities and plasma antioxidant enzyme catalase, but no alterations in superoxide dismutase or glutathione peroxidase. Both beta amyloid plaque, a measure of aging in the brain, and plasma alanine amino transferase activity, a sign of liver damage, were decreased. This implies that a little dosage of curcumin may help those who don't have any ailments.

1.6 Side Impacts:

Curcumin has a lengthy track record of being a safe supplement. According to JECFA as well as EFSA findings, the Allowable Daily Intake (ADI) for curcumin is zero to three mg/kg body weight. Curcumin's safety and effectiveness have been shown in a variety of healthy person's trials. Despite the fact that the drug's safety has been verified, there have been occasional reports of undesirable side effects. Seven participants who took 500.00–12,000.00 mg as well as were observed for seventy two hours had headache, diarrhea, rash, as well as yellow stool in a dosage response trial. In another trial, participants who took 0.45.00 to 3.6.00 g of curcumin per day for four to one months had nausea as well as diarrhea, as well as higher levels of blood alkaline phosphatase and lactate dehydrogenase.

2. LITERATURE REVIEW

Betül Kocaadam et al. discussed a review on Curcumin[8]. Turmeric is a ginger family herb that is widely grown in tropical Asia's southern and western areas. Turmeric is commonly used as a spice in Malesia, Iran, China, India's, Polynesia, as well as Thailand, as well as has an influences on the nature, colors, and flavor of the foods. Turmeric has been used for millennia in India as well as China to treat a variety of maladies, infection, counting dermatologic disorders, as well as depression. Curcumin, a lipophilic polyphenol molecule produced from the herb's rhizomes as well as orange and yellow in color, is largely responsible for turmeric's health's benefits. Curcumin has recently been revealed to have anti-inflammatory, antioxidant, as well as anticancer qualities, as well as to play a key roles in the preventions as well as treatments of a wide ranges of diseases, counting cancer, cardiovascular, autoimmune, neurological, as well as diabetic problems. It is also envisaged that producing curcumin analogues would improve the biological activity as well as physiological effects of curcumin on the body. This page discusses the history of curcumin, its chemical as well as physical characteristics, physiological activity mechanisms, analogues, metabolites, as well as health repercussions.

Vahid Soleimani et al. discussed a review on Turmeric and its major components[9]. Turmeric's main ingredient is curcumin. Turmeric has long been used as a culinary spice and for medicinal purposes, having anti-inflammatory, anti-hyperlipidemic, and antibacterial properties. Turmeric and curcumin have no mutagenic or genotoxic properties. At some levels, oral turmeric and curcumin did not cause reproductive harm in mice. Curcumin was shown to be safe when taken

orally for four to seven weeks at a dosage of six grams per day. However, certain side effects, such as gastrointestinal issues, are possible. Furthermore, at dosages of 500.00 mg twice daily for 30 days, oral bioavailable formulations of curcumin were shown to be safe for humans, but further research is needed, especially on nanoformulations, which should be addressed in a separate publication. Curcumin is also regarded as a drug that is usually considered to be safe. The safety and toxicity of turmeric and curcumin in medicine are discussed in this review. People may safely ingest turmeric and curcumin, particularly when administered orally. Animals are also safe when it comes to turmeric and curcumin. In animals, they are nonmutagenic and safe during pregnancy, although further research in humans is required.

Si Qin et al. discussed about Efficacy and safety of turmeric[10]. In the general population, dyslipidemia is a significant and prevalent cardiovascular risk factor. Turmeric and curcumin have yet to be shown to have lipid-lowering effects. The effectiveness and safety of turmeric and curcumin in decreasing blood lipids in people at risk of cardiovascular disease were investigated in a meta-analysis. Methods: A comprehensive literature search was conducted on PubMed, Embase, Medline, Ovid, as well as the Cochrane Library databases to find randomized controlled trials that looked at the effects of turmeric and curcumin on blood lipid levels such as total cholesterol, high-density lipoprotein cholesterol, lower-density lipoprotein cholesterol, and triglycerides. The effect was measured using a pooled standardized mean difference with a 95% confidence range. The research had seven publications that were appropriate for inclusion in the analysis (649 patients). Turmeric and curcumin were shown to be fully safe in all investigations, with no major side effects identified. Conclusions: Turmeric and curcumin may help patients who are at risk of cardiovascular disease by lowering blood cholesterol levels. Curcumin is a safe and effective dietary supplement that may be used in combination with other therapies. Curcumin dosage form as well as prescription frequency are all unknowns that need to be investigated further.

3. DISCUSSION

Curcumin, a yellow polyphenolic pigment derived from the rhizome of *Curcuma longa* L., has been utilized in Ayurveda and Chinese medicine for millennia as a culinary and food coloring agent, as well as a component in a variety of medicinal formulations. Their biological functions have been intensively explored in recent decades. It helps with metabolic syndrome, arthritis, anxiety, and hyperlipidemia, as well as oxidative and inflammatory diseases. It may also help athletes recover faster and perform better by reducing exercise-induced inflammation as well as muscle discomfort. Linked to its low bioavailability, which seems to be due to poor absorption, quick metabolism, and rapid elimination, ingesting curcumin does not result in the associated medical benefits. Bioavailability may be boosted by a number of factors.

4. CONCLUSION

Curcumin, a yellow-colored compound found in turmeric, is the plant's primary coloring agent. Curry powder, turmeric, as well as, to a lesser degree, ginger all contain curcumin, a yellow pigment. Curcumin has received a great deal of attention owing to its many health benefits, which seem to be mostly due to its anti-oxidant and anti-inflammatory properties. These advantages are particularly noticeable when curcumin is taken with drugs like piperine, which dramatically boost its bioavailability. Curcumin may aid in the treatment of oxidative as well as inflammatory illnesses, metabolic syndrome, anxiety, and hyperlipidemia, according to research. It may also help athletes recover faster and perform better by reducing exercise-induced

inflammatory and muscle discomfort. Furthermore, even if a person does not have a recognized health problem, a little amount may be beneficial to their health.

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