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BENEFITS OF TURMERIC SUPPLEMENTATION FOR SKIN HEALTH

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ABSTRACT

Numerous studies have demonstrated the anti-inflammatory, antibacterial, antioxidant, and anti-neoplastic qualities of turmeric (Curcuma longa), a spice that is widely used worldwide. Curcumin, an active ingredient in turmeric, may be used medicinally to treat a number of dermatological conditions, according to mounting research. The purpose of this systematic review was to investigate the evidence supporting the use of turmeric/curcumin, both topically and internally, to modify the health and function of the skin. We conducted a comprehensive search of the PubMed and Embase databases for human clinical trials that looked at the connection between skin health and products that include turmeric or curcumin. Out of the 234 publications that were found, 18 research satisfied the requirements for inclusion. One study examined the effects of both topical and ingested turmeric/curcumin, nine studies examined the effects of ingestion, and eight studies examined the effects of topical application. Acne, alopecia, atopic dermatitis, face photoaging, oral lichen planus, pruritus, psoriasis, radiodermatitis, and vitiligo are among the skin diseases that are evaluated. When comparing the turmeric/curcumin treatment groups to the control groups, ten studies found a statistically significant improvement in the severity of skin diseases. Overall, there is preliminary evidence that oral and topical turmeric/curcumin supplements and products may have therapeutic effects for skin health. Nevertheless, there aren't many published studies at the moment, thus more research is necessary to fully assess effectiveness and the underlying mechanisms. Copyright © 2016 John Wiley & Sons, Ltd.

KEYWORD: Acne; atopic dermatitis; curcumin; eczema; pruritus; psoriasis; review; skin; turmeric; vitiligo.

Fig. No. 1: Turmeric Powder.

INTRODUCTION

Both the scientific and medical communities as well as the culinary community have shown a great deal of interest in turmeric. Turmeric belongs to the ginger family and is a rhizomatous herbaceous perennial plant (Curcuma longa).[1] Although turmeric, the plant that contains curcumin, has been used for thousands of years for its medical benefits, only recently have researchers looked into the precise mechanism or mechanisms of action and the bioactive components of turmeric.[2] Differentiuloylmethane, also known as curcumin (1,7-bis(4-hydroxy-3-methoxyphen yl)-1,6-heptadiene-3,5-dione), is the primary natural polyphenol present in the rhizome of Curcuma longa (turmeric) and other Curcuma species.[3] Asian nations have long utilised curcuma longa as a medicinal herb because of its anti-inflammatory[4], anti-mutagenic, anti-oxidant, antibacterial[5,6], and anticancer[7,8] qualities.

The numerous health benefits of curcumin, a polyphenol, have been supported by evidence that it targets several signalling molecules and exhibits cellular activity.[2] Inflammatory disorders[9], metabolic syndrome[10], pain[11], and degenerative and inflammatory eye conditions[12,13] have all been demonstrated to benefit from it. It has also been demonstrated to help the kidneys.[14] Although curcumin supplementation seems to have a myriad of therapeutic benefits, the majority of these benefits are attributable to its anti-inflammatory and antioxidant properties.[2,9] One of the main issues with taking curcumin by itself is its low bioavailability[15], which seems to be mostly caused by poor absorption, fast metabolism, and

quick elimination, despite its documented advantages through inflammatory and antioxidant pathways. By addressing these different routes, a number of compounds have been explored to increase curcumin's bioavailability. To improve curcumin's bioavailability, the majority of them were created to prevent its metabolic pathway. For instance, the main active ingredient in black pepper, piperine, is a known bioavailability enhancer[16] that has been linked to a 2000% increase in curcumin's bioavailability. Adding substances like piperine that increase bioavailability and form a curcumin complex seems to address abioavailability. 50.[17]

Around the world, curcumin is acknowledged and utilised in a variety of ways for a number of possible health advantages. In India, for instance, curcumin in turmeric is used in curries; in Japan, it is served in tea; in Thailand, it is used in cosmetics; in China, it is used as a colourant; in Korea, it is served in drinks; in Malaysia, it is used as an antiseptic; in Pakistan, it is used as an anti-inflammatory; and in the United States, it is used as a colouring agent and preservative in mustard sauce, cheese, butter, and chips, as well as in capsule and powder form. There are numerous forms of curcumin, such as pills, ointments, energy drinks, soaps, cosmetics, and capsules.

Fig. No. 2: Curcuma Longa.

Botanical Name: Curcuma Longa

Family: Zingiberaceae

Common Name: Haldi

Geographical Source: South East, Asia, India

Chemical Constituents: Curcuminoids, Essential oil and othe aromatic compounds.

Parameter	Percentage
Moisture	13.1
Protein	6.3
Fat	5.1
Minerals	3.5
Carbohydrates	69.4

EXTRACTION METHOD

1. **Solvent extraction:** This technique includes extracting curcuminoids from turmeric using solvents such as acetone or ethanol.
2. **Supercritical Fluid Extraction:** This technique extracts curcuminoids from turmeric using high-pressure carbon dioxide.

ANALYTICAL METHOD

1. **High-Performance Liquid Chromatography (HPLC):** Turmeric's curcuminoid content is examined using this technique.
2. **Gas Chromatography-Mass Spectrometry (GC-GC-MS):** Turmeric's volatile oil content is examined using this technique.

CHEMICAL CONSTITUENTS

1. **Curcuminoids:** Curcumin, demethoxycurcumin, and bisdemethoxycurcumin are among the curcuminoids, a class of chemicals found in turmeric.
2. **Volatile Oils:** Turmeric contains Volatile oils, including turmerone, atlantone, and zingiberene.

CHEMICAL PROPERTIES

1. **Antioxidant Activity:** Turmeric's curcuminoids, which have antioxidant qualities, may help ward off oxidative damage.
2. **Anti-Inflammatory Activity:** Curcuminoids in turmeric have anti-inflammatory properties, which can help reduce inflammation.

Chemical Formula of Curcumin: C21H2006.

CHEMICAL REACTION

1. **Oxidation:** The stability and bioavailability of turmeric's curcumin may be impacted by oxidation processes.

2. **Hydrolysis:** Turmeric's curcuminoids can undergo hydrolysis reactions, which can break down the compounds into smaller molecules.
3. **Complexation:** The stability and bioavailability of curcumin, the compound found in turmeric, may be impacted by complexes it forms with metals.

CHEMICAL PROPERTIES

1. **pH-Dependent Stability:** The curcumin found in turmeric is less stable at alkaline pH values and more stable at acidic pH values.
2. **Light Sensitivity:** Because curcumin in turmeric is light-sensitive, it may degrade and lose its effectiveness.
3. **Thermal Stability:** High temperatures can cause curcumin in turmeric to break down, reducing its efficacy and bioavailability.

CHEMICAL INTERACTIONS

1. **Metal Interactions:** The bioavailability and stability of turmeric's curcumin may be impacted by interactions with metals like copper and iron.
2. **Polyphenol Interactions:** Interactions between curcumin and other polyphenols in turmeric may impact its stability and bioavailability.

ANALYTICAL TECHNIQUES

1. **Spectroscopy:** The chemical makeup and characteristics of turmeric's curcuminoids can be examined using methods such as NMR spectroscopy and UV-Vis spectroscopy.
2. **Chromatography:** Turmeric's chemical components can be separated and examined using methods like GC-MS and HPLC.

MECHANISM OF ACTION

1. Anti-inflammatory

Anti-inflammatory Oxidative stress has been implicated in a number of chronic diseases, and because inflammation may easily produce oxidative stress, the pathogenic mechanisms underlying both are closely related. The fact that inflammatory cells emit a range of reactive species at the site of inflammation, which leads to oxidative stress, is a clear indication of the relationship between oxidative stress and inflammation.[28] Additionally, some reactive oxygen/nitrogen species can initiate an intracellular signalling cascade that boosts the synthesis of genes that promote inflammation. Inflammation has been connected to a number of chronic diseases and conditions.[10,19,29,30] These illnesses include multiple sclerosis,

epilepsy, Alzheimer's disease (AD), Parkinson's disease, cerebral injury, cardiovascular disease, metabolic syndrome, cancer, allergies, bronchitis, asthma, colitis, arthritis, renal ischaemia, psoriasis, diabetes, obesity, depression, exhaustion, and acquired immune deficiency syndrome. AIDS.[10] Nuclear factor (NF)-κB, a transcription factor, controls the activation of tumour necrosis factor a (TNF-a), a key mediator of inflammation in the majority of illnesses. Although TNF-a is thought to be the most powerful NF-KB activator, NF-κ́ also controls TNF-a expression. The majority of inflammatory cytokines, gram-negative bacteria, different disease-causing viruses, environmental pollutants, chemical, physical, mechanical, and psychological stress, high glucose, fatty acids, UV light, cigarette smoke, and other disease-causing factors all activate NF-kB in addition to TNF-α. Agents that inhibit NF-kB and NF-KB-regulated gene products may therefore be effective in treating a number of these illnesses. It has been demonstrated that curcumin inhibits NF-κB activation that is triggered by a variety of inflammatory triggers.[10] Curcumin's mechanism of action as a possible anti-inflammatory medication is supported by the several ways it has been demonstrated to decrease inflammation, many of which are outside the purview of this review.[10]

2. Antioxidant

Most of the benefits of curcumin on the many disorders covered in this study can be explained by its antioxidant and anti-inflammatory characteristics.[21,22] Systemic indicators of oxidative stress have been demonstrated to improve with curcumin.[23] It has been shown to raise the levels of antioxidants such superoxide dismutase (SOD) in the blood.[24,25,26] Curcuminoids supplementation had a significant impact on all examined oxidative stress parameters, including serum concentrations of Polipid peroxides and plasma activities of SOD and catalase, according to a recent systematic review and meta-analysis of randomised control data on the effectiveness of supplementing with purified curcuminoids on oxidative stress parameters.[23] It is important to note that four of the six studies in the meta-analysis used piperine, and all of the studies used some form of formulation to get around bioavailability issues. Curcumin works against free radicals through a number of distinct routes. It can scavenge various types of free radicals, including reactive oxygen and nitrogen species (ROS and RNS, respectively)[25], modulate the activity of GSH, catalase, and SOD enzymes that are involved in free radical neutralisation[21,22], and inhibit enzymes that produce ROS, such as xanthine hydrogenase/oxidase and lipoxygenase/cyclooxygenase.[21]

Curcumin is also regarded as an Achain-breaking antioxidant, similar to vitamin E, because it is a lipophilic molecule that effectively scavenges peroxyl radicals.[27]

3. Healthy people

Most human studies on curcumin have so far focused on groups that already have health issues. This could be because research on healthy individuals can be difficult because advantages might not be as obvious and quantifiable if baseline biomarkers are normal. Therefore, even though these studies can be expensive and time-consuming, tracking subjects over time may offer the most insight into any potential health advantages in healthy individuals. Because the few studies that have been conducted have utilised different dosages, frequently as high as 1 g, it can be challenging to make cross-comparisons between them.[57,58] Note that the only reason this would be regarded as a large dose is that it is higher than what the majority of people could get from eating the spice itself.[49] An 80 mg daily dose of a lipidated version of curcumin was utilised in one investigation on healthy adults between the ages of 40 and 60. For four weeks, the subjects received either curcumin (N = 19) or a placebo (N = 19). 400 mg of powder containing 980 mg of curcumin per day was the treatment. For four weeks, the subjects received either curcumin (N = 19) or a placebo (N = 19). The regimen consisted of 400 mg of powdered curcumin daily. Before and after the four weeks, samples of blood and saliva were collected. Triglyceride levels were considerably reduced by curcumin, but not total cholesterol, LDL, or HDL levels. Nitrous oxide (NO) and soluble intercellular adhesion molecule 1 (sICAM), a molecule associated with atherosclerosis, were both markedly elevated. Myeloperoxidase levels indicated an increase in inflammation-related neutrophil function, while ceruloplasmin and c-reactive protein did not. Salivary radical scavenging abilities and the plasma antioxidant enzyme catalase increased, but not superoxide dismutase or glutathione peroxidase. Salivary amylase activity, which can be a sign of stress, decreased. Furthermore, there was a decline in plasma alanine amino transferase activity, a sign of liver damage, and beta amyloid plaque, a sign of brain ageing. This suggests that individuals without recognised medical issues may benefit from a comparatively low dosage of curcumin.[51]

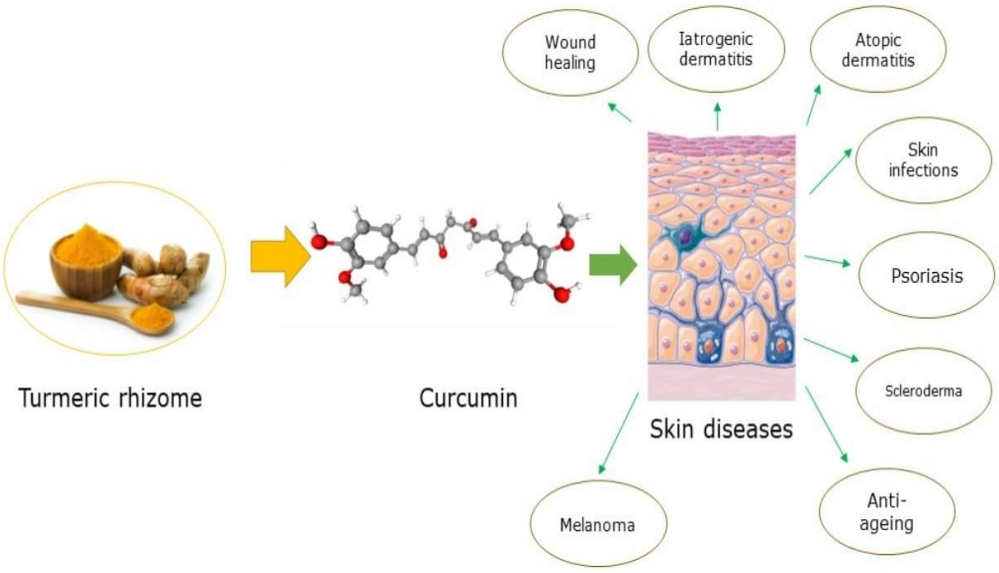

Fig. No. 3: Curcumin In Management of Skin Diseases.

COMMON SIDE EFFECTS

1. **Indigestion:** Excessive intake of turmeric may result in diarrhoea, nausea, and upset stomach.
2. **Allergic Reactions:** Turmeric allergies can produce symptoms like hives, itching, and trouble breathing in certain people.
3. **Skin Staining:** When applied in high doses, turmeric can leave stains on skin and clothing.

LESS COMMON SIDE EFFECT

1. **Bleeding Risk:** Especially when combined with blood thinners, turmeric may make bleeding more likely.
2. **Kidney Stone Formation:** For certain people, turmeric may raise their risk of kidney stones.
3. **Interactions with Medications:** Certain drugs, including blood thinners, diabetes treatments, and blood pressure medications, may interact with turmeric.

RARE SIDE EFFECT

1. **Liver Damage:** Some people may get liver damage from high dosages of turmeric.
2. **Respiratory Problems:** In certain people, turmeric may make respiratory conditions like asthma worse.

MEDICINAl USE OF TURMERIC INCLUDE

Anti-inflammatory: Curcumin, the main ingredient in turmeric, has strong anti-inflammatory properties and may be able to help with inflammatory bowel disease, arthritis, and muscle stiffness.

Antioxidant: As an antioxidant, curcumin aids in the body's defence against dangerous free radicals and may lower the chance of major illnesses.

Antimicrobial: Turmeric exhibits antimicrobial properties, which can help fight against certain bacteria and fungi.

Skin conditions: It has long been used to treat wounds, infections, and to speed up the healing process.

Digestive issues: Turmeric is traditionally used to aid Adigestion, relieve indigestion, and address issues like irritable bowel syndrome.

Respiratory ailments: Often used in hot water extracts, it may aid with coughs, asthma, and other respiratory issues.

CONCLUSION

Traditionally, turmeric's health benefits have been obtained through long-term dietary use, even at low levels. The sensible application of turmeric in the treatment of human ailments necessitates a thorough comprehension of the drug's mechanism of action, safety, and effective dosage. If turmeric is to be used to meet human requirements and improve human welfare, more clinical research is necessary. Antibacterial, antiviral, anti-inflammatory, anticancer, antioxidant, antiseptic, cardioprotective, hepatoprotective, nephroprotective, radioprotective, and digestive properties are among turmeric's many advantages. Numerous components, including curcumin, volatile oil, and curcuminoids, have been identified by phytochemical research of turmeric and have been shown to possess strong pharmacological effects.

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