REFERENCE SHEET:

Curcumin

Pronunciation

Curcumin (Ker-cue-min)

Summary

Curcumin is a plant chemical found in turmeric root (Curcuma longa). It can be used to make curries, teas, and other drinks, mustard sauces, cheese, butter, and chips. It is also used as a colorant and as a preservative.

Main Medical Uses

Curcumin is commonly used in the treatment of inflammation, in the treatment of metabolic syndrome, and as an antioxidant in the protection against cardiac diseases. Research also demonstrates its potential use in treating type II diabetes.

Dosing and Administration

Condition	Dosing & Administration	Outcome	Class of Evidence
Arthritis	Curcumin: 1000 mg per day	↓ joint pain	A
Type II Diabetes	Nano-micelle curcumin: 80 mg per day for 3 months	↓ HBA1C, FBG, TG, BMI	B
	Turmeric: 2 g per day for 1 month w/ metformin	↓ HBA1C, FBG, LDL-C, non-HDL-C and LDL/HDL ratio, hsCRP, lipid peroxidation, MDA ↑ total antioxidant status	B
	Curcumin: 150 mg, 2x per day for 8 weeks	↑ endothelial function ↓ malondialdehyde, ET-1, IL-6 and TNFalpha	B
Metabolic Syndrome	Curcumin extract: 630 mg 3x daily for 12 weeks	↑ HDL-C ↓ LDL-C, TG	B
	Turmeric: 2.4 g per day for 4 weeks	↓ BMI, WC, BF%	B
Non-Alcoholic Fatty Liver Disease	Curcumin formulation: 500 mg per day	↓ Liver fat content, BMI, TC, LDL-C, TG, aspartate aminotransferase, alanine aminotransferase, glucose, and HBA1C	B
Osteoarthritis	Curcumin: 180 mg per day	↓ knee pain	B
Rheumatoid Arthritis	Curcumin: 500 mg per day	↓ tenderness and swelling	C
Peptic Ulcer	Turmeric: 600 mg 5x per day for 4 weeks	↓ ulcer prevalence, abdominal pain and discomfort	C

For an explanation of the classes of evidence, please see the Rating Scales for Evidence-Based Decision Support.

Adverse Effects

Curcumin is considered safe and non-toxic with good tolerability. Diarrhea, headaches, rash, or yellow stool may occur. However, the prevalence of these adverse effects was not dose-dependent between doses of 1,000-12,000 mg. Curcumin use has also been associated with nausea.

Licensed Ingredients

Standard unformulated curcumin has low bioavailability. Licensed ingredients may improve bioavailability compared with unformulated curcumin as summarized in the following table.

Licensed Ingredient	Formulation	Bioavailability & Safety	Indication & Outcome	Class of Evidence
Unformulated	No formulation.	2 g produced no change to bioavailability in humans	**MetSyn:** ↓ LDL, TG	A
			↓ BMI, WC, BF%	B
			↑ HDL, ↓ LDL	B
BCM-95®	Micronized curcumin in turmeric essential oils	↑ 7x bioavailability	**Depression**: ↓ symptoms	A
Curcumin-Bioperine®	Combined with piperine	↑ 21x bioavailability	**Oxidative Stress:** ↓ malondialdehyde	A
			MetSyn: ↑ HDL, ↓ LDL, non-HDL, Total-C, TG, lipoprotein(a)	B
C3 Complex®	95% concentration combination of three curcuminoids	Long-term safety profile up to 12,000 mg daily	**Dementia**: Insufficient evidence	A
Longvida®	Solid lipid particle structure with improved solubility	↑ 100x bioavailability	**Cognition/Mood**: ↑ attention, memory, fatigue, calmness, contentedness, ↓ LDL and total cholesterol	B
			Endothelial Function: ↑ nitric oxide, blood flow, ↓ oxidative stress	C
Meriva®	Phospholipid micelle formulation	↑ 29x bioavailability	**Osteo-Muscular Pain**: ↓ pain, ↑ physical function	B
Theracurmin®	Highly dispersible, water-soluble & low aggregability	↑ 27x bioavailability	↓ Osteoarthritis pain	B
			↑ Attention & memory	C
			↓ AT-LDL	C

Associated Depletions and Interactions

Curcumin has been shown to be a strong inhibitor of CYP3A4, CYP2C9, CYP2D6, and CYP1A2 and may, therefore, interact with pharmaceuticals that are metabolized by these cytochromes. Curcumin may interact with caffeine, talinolol, and iron.

Mechanism of Action and Metabolism

Curcumin has limited bioavailability and is quickly metabolized. Phase I hepatic metabolism reduces the compound's double bonds through alcohol dehydrogenase in liver microsomes. Phase II metabolism also rapidly conjugates curcumin into glucuronides and sulfates. Curcumin may be excreted unchanged or as conjugates in urine.