



## Curcumin as a Therapeutic Option in Rheumatologic Diseases: A Narrative Review

Ennio Duranti<sup>1\*</sup>, Diletta Duranti<sup>2</sup>

<sup>1</sup>Private Practice, Arezzo, Italy.

<sup>2</sup>Diletta Duranti, Laboratory Doctor, Arezzo Hospital, Italy.

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**Corresponding author:** Ennio Duranti, Private Practice, Arezzo, Italy.

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### Abstract

Curcumin, the principal polyphenol derived from *Curcuma longa*, has been increasingly investigated for its anti-inflammatory and immunomodulatory properties. This narrative review summarizes current evidence on curcumin use in rheumatologic diseases, with a focus on rheumatoid arthritis (RA), osteoarthritis (OA), and emerging applications in systemic autoimmune disorders. Data from systematic reviews and randomized controlled trials suggest potential clinical benefits, although heterogeneity in formulations and methodological limitations persist.

**Keywords:** Curcumin; *Curcuma longa*; Rheumatologic diseases; Rheumatoid arthritis; Osteoarthritis; Inflammation; Immunomodulation; NF- $\kappa$ B; Cytokines; Oxidative stress; Complementary therapy; Autoimmune diseases

### Introduction

Chronic inflammatory and degenerative rheumatologic diseases remain a major global health burden. Interest in complementary therapies has grown, particularly in natural compounds with anti-inflammatory potential. Curcumin has demonstrated the ability to modulate multiple inflammatory pathways relevant to rheumatology, including NF- $\kappa$ B signaling, cytokine production, and oxidative stress [1,3]. This review synthesizes available clinical evidence and highlights future research needs.

### Mechanisms of Action

Curcumin exerts pleiotropic effects on immune and inflammatory pathways: Downregulation of TNF  $\alpha$ , IL 1 $\beta$ , IL 6, and COX 2  
Inhibition of NF  $\kappa$ B activation  
Modulation of macrophage and T cell responses  
Reduction of oxidative stress through antioxidant activity  
A comprehensive molecular review confirms curcumin's broad anti-inflammatory and immunomodulatory potential, supporting its relevance in chronic inflammatory diseases [3]

### Review of the dosages used

In clinical trials on rheumatologic diseases, curcumin has generally been used in oral doses ranging from about 250–500 mg two or three times daily ( $\approx$ 500–1500 mg/day) of standardized extracts, up to 2 g/day in some studies, usually divided into multiple doses. In rheumatoid arthritis, randomized trials summarized in recent meta-analyses most often employed 500–1000 mg/day of curcumin or curcumin–phospholipid complexes, sometimes combined with piperine to enhance bioavailability, over treatment periods of 8–12 weeks.

Trials in arthritis more broadly (including osteoarthritis) have used similar or slightly higher total daily doses—typically 1000–1500 mg/day—with some studies comparing these regimens head-to-head with NSAIDs such as diclofenac, reporting comparable analgesic efficacy and fewer gastrointestinal adverse events. Overall, across rheumatologic indications, effective regimens cluster around 500–1500 mg/day of curcumin equivalent, administered in enhanced-bioavailability formulations, with safety profiles comparable to placebo in the short term.

### **Curcumin in Rheumatoid Arthritis**

RA is the condition with the most robust clinical evidence for curcumin supplementation. A 2026 systematic review of placebo-controlled randomized trials demonstrated significant reductions in DAS28, tender/swollen joint counts, ESR, and CRP, supporting curcumin as an effective adjunct therapy [1].

A 2021 systematic review of clinical trials reported improvements in pain, stiffness, and inflammatory markers, with a favorable safety profile and minimal adverse events [2]. Broader reviews on inflammatory complications confirm curcumin's potential role in autoimmune diseases, including RA [3].

These findings suggest that curcumin may reduce disease activity and improve patient-reported outcomes, although variability in dosage, formulation, and study design limits comparability.

### **Curcumin in Osteoarthritis**

Although OA-specific studies were not included in the retrieved sources, numerous external randomized trials have shown: Reduction in knee pain and functional improvement Comparable efficacy to NSAIDs (e.g., diclofenac) Fewer gastrointestinal adverse effects.

These results align with the anti-inflammatory mechanisms described in broader reviews [4,5].

### **Curcumin in Other Rheumatologic Diseases**

Evidence remains preliminary for:

Systemic lupus erythematosus (SLE) Ankylosing spondylitis (AS) Psoriatic arthritis (PsA)

Preclinical studies suggest potential benefits through modulation of Th17/Treg balance and oxidative stress, but high-quality clinical trials are lacking. Mechanistic insights from molecular studies provide a rationale for future investigation [3].

### **Safety and Tolerability**

Across RA trials, curcumin demonstrates an excellent safety profile:

Adverse events comparable to placebo [1,2] Most common side effect: mild gastrointestinal discomfort No significant hepatotoxicity or renal toxicity reported A major limitation is poor bioavailability, prompting development of enhanced formulations (nanoparticles, phospholipid complexes, piperine-enhanced extracts).

### **Limitations of Current Evidence**

Small sample sizes in most trials short follow-up periods (typically 8–12 weeks) Lack of standardized clinical endpoints Limited long-term safety data

These limitations underscore the need for more rigorous research

### **Future Directions**

Key priorities for future research include:

Large, multicenter randomized controlled trials Standardized, high-bioavailability curcumin formulations Long-term safety and efficacy assessments Comparative studies with conventional DMARDs and biologics Exploration of curcumin's

immunomodulatory effects in systemic autoimmune diseases

### **Conclusion**

Curcumin shows promising anti-inflammatory effects and clinically meaningful improvements in rheumatoid arthritis, supported by multiple systematic reviews [1,2]. Evidence for other rheumatologic diseases is emerging but remains limited. Given its excellent safety profile, curcumin represents a compelling adjunctive therapy. Standardization of formulations and high-quality clinical trials will be essential to define its therapeutic role in rheumatology.

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