

ORAL PRESENTATIONS

CURCUMIN/CHALCONE-DERIVED SCAFFOLDS AS PROMISING BIOACTIVE AGENTS: A JOURNEY FROM SYNTHESIS TO BIOLOGICAL EVALUATION

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Curcumin, a naturally occurring polyphenolic compound isolated from the rhizomes of *Curcuma longa*, has attracted significant scientific attention due to its broad spectrum of biological activity, including antioxidants, anti-inflammatory, antimicrobial, and anticancer properties. Despite its promising pharmacological profile, the clinical applicability of curcumin is limited by its poor water solubility, low bioavailability, rapid metabolism, and chemical instability. To overcome these drawbacks, extensive research has focused on the structural modification of curcumin and the development of curcumin-inspired scaffolds with improved pharmacokinetic and biological properties.

Among these approaches, chalcone-based derivatives have emerged as highly attractive candidates in medicinal chemistry. Chalcones, characterized by α,β -unsaturated carbonyl systems, stand out as versatile intermediate and privileged structures capable of interacting with multiple biological targets. Structurally, curcumin itself can be considered as a bis-chalcone-like scaffold, and simplification or modification of the diketone portion has led to the design of mono-carbonyl curcumin analogs and chalcone derivative hybrids with enhanced stability and biological activity.

This study highlights the relationship between curcumin and chalcone chemistry, addressing synthetic strategies used to convert curcumin-inspired structures into biologically active chalcone derivatives. Emphasis is placed on recent advances in the synthesis, structural diversification, and biological evaluation of these compounds. Reported studies demonstrate that curcumin/chalcone derivative scaffolds exhibit significant anticancer, antibacterial, antifungal, antioxidant, and anti-inflammatory activities through various molecular mechanisms, including apoptosis induction, enzyme inhibition, modulation of reactive oxygen species, and interference with cellular signaling pathways.

Overall, curcumin-inspired chalcone derivatives continue to represent a promising class of multifunctional bioactive agents. The integration of rational design, synthetic modification, and biological evaluation offers valuable opportunities for the discovery of novel therapeutic candidates with improved efficacy and pharmacological performance.