KS-5

ANTIOXIDANT PROPERTIES OF CURCUMIN

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We have investigated the antioxidant properties of curcumin (CC) in detail. The studies showed that CC is a potent scavenger for hydroxyl radical, superoxide anion, singlet oxygen and DPPH, a stable free radical. From pulse radiolysis, the rate for scavenging hydroxyl radical was found to be $4.76 \times 10^{10} M^{-1}s^{-1}$ which is comparable to many potent antioxidants like vitamin-E. Lipid peroxidation induced by radiation and iron or its chelates was strongly inhibited by CC. Increase in the lipid peroxidation during post-irradiation period was also inhibited by CC. Further, it also inhibited the oxidation of human LDL. CC protected plasmid pBR322 DNA against single strand breaks induced by singlet oxygen a reactive oxygen species with potential genotoxic and mutagenic properties. CC was more active than beta-carotene, vitamin-E, lipoic acid etc. CC was found to protect hemoglobin against nitrite induced oxidation. Further studies showed that the protection is due to its ability to scavenge nitrogen dioxide, an important reactive intermediate. We have compared the antioxidant properties of CC with other related compounds like desmethoxycurcumin, bisdesmethoxycurcumin, acetylcurcumin and feruloyl methane, a simpler analog of curcumin. SAR studies showed that the phenolic, the methoxyl, the 1,3-diketone system and the enolisable styryl ketone make significant contributions to the antioxidant properties of cc.