Physicochemical, antioxidant, DNA cleaving properties and antimicrobial activity of fisetin-copper chelates.

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Streszczenie

Fisetin (3,3',4',7-tetrahydroxyflavone) metal chelates are of interest as this plant polyphenol has revealed broad prospects for its use as natural medicine in the treatment of various diseases. Metal interactions may change or enhance fisetin biological properties so understanding fisetin metal chelation is important for its application not only in medicine but also as a food additive in nutritional supplements. This work was aimed to determine and characterize copper complexes formed in different pH range at applying various metal/ligand ratios. Fisetin and Cu(II)-fisetin complexes were characterized by potentiometric titrations, UV-Vis (Ultraviolet-visible spectroscopy), EPR, ESI-MS, FTIR and cyclic voltammetry. Their effects on DNA were investigated by using circular dichroism, spectrofluorimetry and gel electrophoresis methods. The copper complex with the ratio of Cu(II)/fisetin 1/2 exhibited significant DNA cleavage activity, followed by complete degradation of DNA. The influence of copper(II) ions on antioxidant activity of fisetin in vitro has been studied using DPPH, ABTS and mitochondrial assays. The results have pointed out that fisetin or copper complexes can behave both as antioxidants or pro-oxidants. Antimicrobial activity of the compounds has been investigated towards several bacteria and fungi. The copper complex of Cu(II)/fisetin 1/2 ratio showed higher antagonistic activity against bacteria comparing to the ligand and it revealed a promising antifungal activity.

Słowa kluczowe

Fisetin, Copper complexes, Antioxidant activity, Mitochondria, antimicrobial activity