Fluorescence Sensor Based on Quenching of Curcumin for the Determination of Heavy Metal Ions

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It is envisaged that fluorescent quenching based on solution or extract deriving from plants could post as a new chemosensoring process for selective recognition of metal ions. In the fabrication of this type of chemosensor, organic compound prepared from various kinds of plants could be utilized instead of the conventional harmful inorganic substances and therefore constitutes an alternative choice of a clean and environmentally friendly utilization. Recently, it has been reported that solution of locally available plants, Curcumin exhibits strong fluorescent intensity which could be suitable as effective chemosensor. The purpose of this work is therefore to compare the effectiveness of the Curcumin solution to the determination of several metal ions. The stocked Curcumin solution was initially prepared by dissolving 1.0 g of curcuma powder with 200 ml of ethyl alcohol. The solution was then further diluted to the appropriate concentration of 0.0625 g of curcuma powder in 100 ml of ethyl alcohol which exhibited highest fluorescence intensity. Various metal ions were used to test the responding of Curcumin solution including Li+, Na+, K+, Mg2+, Ca2+, Al3+, Pb2+, Cr3+, Mn2+, Fe2+, Fe3+, Co2+, Ni2+, Cu2+, Zn2+, Cd2+, NH42+, Hg2+ and Ag+. The results showed that Cu2+, Fe3+, Ni2+, and Co2+ could quench the fluorescence intensity of Curcumin solution. The fluorescence intensity of Curcumin solution was decreased with increasing concentration of metal ions in the range of 0.20 - 0.30 mM for Cu2+, 0.25 - 0.35 mM for Fe3+, 0.45 -0.35 mM for Ni2+, and 0.30 - 0.20 mM for Co2+.