Curcumin: Molecule which Captures Heavy Metals

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The Curcumin molecule is the active ingredient of turmeric; it can capture heavy metals. The purpose of the research is to evaluate the capability of curcumin to combine with copper ion. For this reason, the combination ratio Curcumin/Copper ion is measured. To establish this, Job's method is used. The method consists in preparing different solutions, mixing curcumin and copper ion reagents so that the total concentration [Curcumin]+[Copper ion] is unchanged and the [Curcumin]/[Copper ion] ratio is changed. The Absorbance of each solution is measured at a wavelength selected on its Visible-UV spectrum. A graph of the Correct Absorbance against the curcumin mole fraction defined as [Curcumin]/([Curcumin]+[Copper ion]), is plotted. On this graph the maximum corrected absorbance value is obtained when the composition of Curcumin and Copper ion mixture is equal to the combination ratio of the main compound. The Corrected Absorbance is: Measured Absorbance minus Absorbance that Curcumin and Copper ion would have if they did not react. Suitable solutions of curcumin plus copper ion are prepared, so that their ratio and their sum have established values. The Absorbance is corrected using only the curcumin data as the copper ion has negligible values of absorbance for the two wavelengths. Experimental results show these combination ratios between curcumin and Copper ion are 2:3, 1:1, 3:2, 2:1. The formation constants follow this order (from the biggest to the smallest): K[3:2], K[1:1], K[2:1], K[2:3] evaluated by means of the curvature calculus of the function that connect the points on graph.

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