THE SPECTROPHOTOMETRİC STUDY OF COPPER (II) WİTH 1-[2-(ALLYLAMİNO)-1-METHYLETHYL] THİOCARBAMİDE İN PRESENCE HYDROFOB AMİNES

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A copper is used as a conductor of heat and electricity, as a building material, and as a constituent of various metal alloys, such as sterling silver used in jewelry, cupronickel used to make marine hardware and coins and constantan used in strain gauges and thermocouples for temperature measurement[1].

Some factors such as initial cost of instrument, technical know-how, consumable and costly maintenance of technique restrict the wider applicability of spectrophotometric methods, particularly in laboratories with limited budget in developing countries and for field work. In the literaturs wide variety of spectrophotometric methods for determination of Cu(II) have been reported, each chromogenic system has its advantages and disadvantages with respect to sensitivity, selectivity and convenience [2-4]. Many reagents used in photometric methods for the determination of Cu(II) contain sulfur in the molecule. Therefore, the synthesis of new sulfur content of organic reagents, the study of their complexation with Cu(II) is an urgent task.

In this work, a reagent 1- [2- (allylamino) -1-methylethyl] thiocarbamide (AMTIC) was synthesized according to the method [5] and a color reaction of AMTIC with Cu(II) and in the presence of hydrofob amines -phenanthroline (Phen)and α,α′ - dipyridine was carefully studied.

Cu(II) with 1- [2- (allylamino) -1-methylethyl] thiocarbamide the rapid reacts to form orange complex and also it to form to form brownish complexes in presence of the phenanthroline (Phen)and α,α′ - dipyridine (α,α′ -dip). The absorption spectra of the Cu(II) - AMTIC system is a curve with the maximum absorbance at 415 nm and molar absorption coefficient of $1.95 \cdot 10^4$ l mol^{-1} cm^{-1}. The absorption spectra of the Cu(II)- AMTIC- Phen and Cu(II) -AMTIC - α,α′-dip systems is a curve with the maximum absorbances at 437 nm and 443 nm and molar absorption coefficients of $2.94 \cdot 10^4$ l mol^{-1} cm^{-1} and $2.81 \cdot 10^4$ l mol^{-1} cm^{-1}, respectively. The absorbance was linear for 0.25–2.07 mkg ml^{-1} of Cu(II) in the Cu(II)- AMTIC system and 0.12 –2.56 mkg ml^{-1} and 0.18–2.45 mkg ml^{-1} of Cu(II) in the Cu(II)-AMTIC- Phen and Cu(II)-AMTIC- α,α′-dipsystems, respectively.

The effect of foreign ions on complexation of Cu(II) with AMTIC in the absence and in the presence of third components. The effect of cations, anions and complexing agents on the determination of only 1 mkg ml^{-1} of Cu(II) was studied. The criterion for interference was an absorbance value varying by more than 5% from the expected value for Cu(II) alone.

The precision of the present method was evaluated by determining different concentrations of Cu(II) (each analyzed at least five times). The relative standard deviation (n = 5) was 0%–2.0%, for 0.1–8 mkg of Cu(II), indicating that this method is highly precise and reproducible. The Sandell's sensitivity for Cu(II) were found to be 6 mkg cm^{-2} in Cu(II)- AMTIC system and 5 mkg cm^{-2} , 6 mkg cm^{-2} in the Cu(II)-AMTIC- Phen and Cu(II)-AMTIC- α,α′-dip systems, respectively.

References

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