VALIDATION METHODS ANALYSIS OF COPPER AND IRON METAL IONS BY SPECTROPHOTOMETRY AND VOLTAMETRY

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ABSTRACT

This research aims to develop a method of analyzing copper and iron in trace concentrations using voltammetry techniques. The quality of method development will be compared with spectrophotometric method.

In this research paper, the development of selective electrodes for copper and iron elements will be carried out, with solid membrane system using voltammetric anodic stripping measurement techniques. The construction of this electrode using diethyldithiocarbamate and 1,10-orthophenanthroline compounds which are selective toward copper and iron elements. Electrode which will be developed is a coated wire solid membrane. The electrodes are optimized by the presence of membrane components in order to find the best condition. Furthermore, the electrode performance is characterized on the potential variable, detection limit, measurement range, response time, life time, and electrode selectivity. Moreover, the electrodes will be implemented for voltammetric analysis of copper and iron in a hypothetical sample.

The results of this paper showed that the regression line(s) equation of the UV-Vis ion Cu(II) Y = 0.12386x + 0.00879 and Fe(II) Y = 0.20438x - 0.06987 ions with r values of 0.994305 and 0.99583 respectively. The results showed that the regression line(s) of the voltammetric method of ion Cu(II) Y = 10,265ln (x) + 330,47 and Fe (II) Y = 36,507ln (x) + 990,73 with r values 0, 9321 and 0.9667 respectively; The optimum rate is 20 mV/s; five repetitions for each measurement of one electrode represented a good stability and repeatedly. Uv-Vis Spectrophotometry method has better measurement than the Voltametri, it can be seen from the linearity correlation value. However, while it is observed by the reading ability, the voltammetry method is better than the U-Vis. From this research, it can be concluded that the voltammetry method can be used to analyze up to concentration of $1x10^{-11}$M while the UV-Vis method is only up to 1.5 ppm or $2.36x10^{-5}$M.

Kata Kunci: *copper and iron, spectrophotometry, voltammetry, diethyldithiocarbamate and 1,10-orthophenantroline*