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# Polarographic determination of some Sulphonamide derivatives in pharmaceutical preparations

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**A polarographic catalytic method is developed for the determination of sulpha drugs in presence of chromium (VI). The drugs produced a catalytic peak at - 1.7 V vs Saturated Calomel Electrode (SCE) in a buffer solution of pH 9.6. Optimum conditions are established for the analytical method. The method can be used for the determination of Cr (VI) as well as hydrolysed drug in micro quantities.**

MANY organic compounds containing nitrogen and sulphur produce polarographic catalytic hydrogen waves in presence of certain metal ions such Co (II) and Ni (II)[1-3], Cr (VI) and W (VI)[4]. The waves produced due to evolution of hydrogen can be used for the determination of metal ions as well as sulpha drug in trace quantities[5,6]. The present communication describes a method for the determination of sulpha drugs such as sulfamoxole, sulphaacetamide and sulfadoxine.

Experimental solutions are prepared with double distilled water and Analar grade chemicals. A Lingane type of H-cell, digital pH meter and a pen recording Polarograph (ELICO make, Hyderabad) are used in these studies.

A stock solution of 1 x $10^{-3}$ M chromium (VI) is prepared in distilled water. All the three sulpha drugs are hydrolysed as indicated in the procedure given below. One hundred mg of the powdered drug is weighed into a 100 ml standard flask containing 50 ml of 5 M HCl. The flask is heated in a water bath for 30 minutes, cooled to room temperature, 20 ml of DMF is added and the solution is made up to the mark with distilled water. 10 ml of this solution is neutralised with 10 ml 5 M NaOH and diluted to 100 ml with distilled water. This solution is used in further studies after appropriate dilution.

Required quantity of the hydrolysed drug (HS) is transferred into a 25 ml standard flask containing 1o ml of buffer solution of pH 9.6. Three ml of $NH_4Cl$ (0.4 M) is added as supporting electrolyte. Required quantity of Cr (VI) solution is added and the solution is made up to the mark with distilled water. It is shaken well and is transferred into a polarographic cell. Pure nitrogen gas is passed for 10 minutes and the polarogram is recorded.

Polarographic experiments were carried out with the following three solutions. (a) Cr (VI), (b) hydrolysed sulfa

Table - 1: Analysis of Pharmaceutical Samples

| Sample | Labelled amount (mg/tab) | Amount found (mg/Tab) | % Recovery | Standard deviation |
|---|---|---|---|---|
| Sulfamoxole | 500 | 499 | 99.8 | 0.008 |
| Sulfacetamide | 500 | 498 | 99.6 | 0.03 |
| Sulfadoxine | 100 | 99 | 99.0 | 0.002 |

drug and (c) a mixture of Cr (VI) and sulfa drug. The results revealed that chromium (VI) produces a wave of negligible height. The mixture showed a peak at - 1.7 V vs SCE. A buffer solution of pH 9.6 containing 0.4 $NH_4Cl$ as electrolyte was found to be suitable for getting a well defined wave with a peak. The kinetic nature of the wave is established by studying in the effect of organic solvents, mercury column height and temperature. Further studies relating to the effect of surfactants revealed that there is no influence on peak current. Hence the maximum is not of streaming type but due to a chemical reaction. Sulpha drugs on hydrolysis produce sulphonic acid group. Sulphonic acid group contains a loosely bound proton. Reduction of this proton produces catalytic hydrogen waves. The authors noticed bubble formation at the dropping mercury electrode which confirms the reduction of hydrogen at d.m.e.

This analytical method can be used for the analysis of Cr(VI) as well as the sulpha drug. The method has been applied to the analysis of commercially available dosage forms. The results are shown in Table 1.


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