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Polarographic determination of formaldehyde, acetaldehyde and propionaldehyde by calibration method

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Formaldehyde is widely used in the manufacture of many resins, polymers and construction materials. It is also used as a preservative, disinfectant and biocide. Formaldehyde is one of the volatile organic compounds that are widely used in household materials which is associated with many health risk factors. Acetaldehyde is a Group-1 carcinogen. Propionaldehyde is used in the manufacture of plastics, in the synthesis of rubber chemicals and as a disinfectant and preservative. Present paper deals with polarographic determination of formaldehyde, acetaldehyde and propionaldehyde by calibration method. In alkaline medium it is possible to have well defined and separated waves relative to the reduction of formaldehyde, acetaldehyde and propionaldehyde. The determination of these aldehydes are carried out effectively in presence of $3.8 \times 10^{-6}\%$ methyl red and $5.94 \times 10^{-7}\%$ bromocresol green as maxima suppressor and 0.025 N lithium hydroxide and 0.0025 N lithium chloride as supporting electrolyte at pH 12 by calibration method. Polarograms of all systems were recorded on Toshniwal manual polarograph using Dropping Mercury Electrode as cathode and Saturated Calomel Electrode as anode. The determination error is 0% with low standard deviation. The values of $E_{1/2}$ ranges from -1.692 to -1.772V for formaldehyde, -1.490 to -1.514V for acetaldehyde and -1.600 to -1.590V for propionaldehyde. From a comparison with the understood polarographic behavior of these aldehydes, number of electrons (n) involved in the reduction is found to be 2. Formaldehyde, acetaldehyde and propionaldehyde give a single well defined reduction wave of irreversible nature.

Biography

Swaroop Rani N Gupta has completed her PhD in Chemistry from Nagpur University, Maharashtra, India in 1993. She is an Associate Professor in the Department of Chemistry, Brijlal Biyani Science College, India. She has published more than 20 papers in reputed international journals.

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