AEC-NASA TECH BRIEF

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Rapid Analytical Determination of Glutaraldehyde Concentrations

The problem:

To develop a rapid analytical technique for determination of concentrations of glutaraldehyde (GA) which has become an important component of fixative solutions for tissue; concentration noticeably affects the quality of fixation.

The solution:

A simple, rapid, and precise method for determination in aqueous solutions and in common fixative solutions for tissue; by the iodimetric procedure, addition of a known excess of bisulfite to GA is followed by titration of the unreacted bisulfite with standard I_3^-.

How it's done:

Concentrations of GA greater than 6% are quantitatively diluted with water or buffer to between 2 and 6%. One milliliter of such solutions and 1 ml of distilled water are pipetted into separate 125-ml glass-stoppered Erlenmeyer flasks, to each of which 20.0 ml of 0.25M $NaHSO_3$ is delivered from a 50-ml burette. The same reaction time (5 to 10 minutes) is allowed for both the sample and the blank.

The unreacted $NaHSO_3$ in the sample and blank is titrated with standardized 0.1M I_3^-. The solution turns yellow, but within 0.2 ml of the endpoint it loses all color. Titration is continued until the solution again turns yellow and remains yellow for at least 3 minutes; the consumption of I_3^- is recorded. A carefully cleaned burette is necessary for accurate delivery of the iodine, since this solution tends to adhere to the walls.

The concentration of GA may be calculated:

$$GA(\%, w/v) = [I\,(V_2 - V_1)\,100.12 \times 100]/2S$$

where I is the concentration of the standard I_3^- in moles per milliliter, V_2 is the volume (milliliters) of iodine used in the blank titration, V_1 is the volume (milliliters) used in the sample titration, 100.12 is the molecular weight of GA, and S is the sample's volume. When S is the sample's weight, the percentage is w/w.

Notes:

1. This information may interest microscopists, food-research, biochemical, or medical laboratories, or drug manufacturers.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Division of Technical Information
   AEC Headquarters
   Washington, D.C. 20545
   Reference: B71-10047

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Technology Utilization Officer
Division of Technical Information
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