

**RECENT DEVELOPMENTS IN THE DETERMINATION OF
HYDROGEN PEROXIDE AND PERACIDS USING CCD
TECHNOLOGIES, NEW REAGENTS AND DERIVATIZATION
TECHNIQUES**

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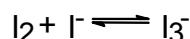
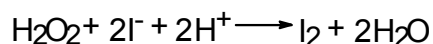
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Hydrogen peroxide and peroxy-carboxylic acids have been identified to be ecologically beneficial reagents for disinfection and bleaching purposes [1]. Due to the considerable increase of peroxide consumption in industrial processes, the development of selective and accurate analytical methods has stimulated research in this field [2].

A method is described here based on the separation of hydrogen peroxide and peracids on a reverse-phase HPLC system following post-column reaction with a concentrated solution of potassium iodide.

The reaction of peroxides with acidified KI in the presence of ammonium molybdate as catalyst was used:



The measurement of I_3^- by its optical absorption forms the basis of the triiodide method. The high molar absorptivity of I_3^- ($26500 \text{ M}^{-1}\cdot\text{cm}^{-1}$) and fast reaction rate makes the I_3^- method convenient for the determination of both hydrogen peroxide and peracids. A series of standard solutions containing H_2O_2 , PAA (peroxyacetic acid) and mCPBA (3-chloroperbenzoic acid) were injected through a 20 μl injection loop. Detection was performed at 352 nm. Under the optimal HPLC conditions good separation was attained.

The method was applied to monitor the formation of PAA in the course of a washing cycle performed with a laundry detergent marketed under the trade name 'Persil'. The method was compared with that using direct UV detection of the studied compounds. The proposed method

features improved analytical characteristics with most salient the low detection limit at 10^{-6} M levels.

Recently our group has synthesized 4-aminopyrazolone derivatives as chromogenic agents for the spectrophotometric determination of phenols [3]. These simple and long conjugated chromophores were used as substitutes for 4-aminoantipyrine in Trinder reaction [4].

The reaction of such chromophores (4-amino-5-(p-aminophenyl)-1-methyl-2-phenylpyrazol-3-one (**DAP**) with water-soluble hydrogen donors i.e. N-ethyl-N-sulphopropylaniline sodium salt (**ALPS**) [5] in the presence of peroxidase has been utilized to develop a new, simple and fast method for the determination of hydrogen peroxide at nanomolar levels.

The coloured product formed is monitored spectrophotometrically using a 50 cm optical fiber liquid waveguide capillary cell and a CCD (Charge Coupled Device) detector.

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