

**Aspinall G O & Ferrier R J.** A spectrophotometric method for the determination of periodate consumed during the oxidation of carbohydrates.  
*Chem. Ind. Lond.* **1957**:1216.  
[Chemistry Department, The University, Edinburgh, Scotland] 1979

**A convenient micro-method is described for** following the oxidation of carbohydrates by periodate. The spectrophotometric procedure is based on changes in the ultraviolet light absorption of periodate at its maximum at 223 nm, and corrections are made for absorption by iodate formed. [The *SC<sup>®</sup>* indicates that this paper has been cited over 280 times since 1961.]

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June 29, 1978

"Advances in science depend on the availability of reliable and convenient experimental procedures. Useful techniques, which are very necessary tools of the trade, may find wide application without being highly original in conception or of great scientific significance. In common with the vast majority of 'Citation Classics' the present paper clearly falls into this category. It is one to which reference is made in the small print at the end of the 'Experimental Methods' section, but rarely in the main discussion.

"The well-known Malaprade reaction, in which 1,2-diols and 1,2,3-triols are oxidized by periodate, has been widely exploited in carbohydrate chemistry starting from the early work of C. S. Hudson<sup>1</sup> and E. L. Hirst<sup>2</sup> and their various collaborators in their respective studies on simple sugar derivatives and the more complex polysaccharides. During investigations on the structure of cell wall arabinoxylans from barley it was necessary to determine the proportions of sugar derivatives in a

two-component mixture in which one component contained a diol group but the other did not. The quantities of material available were inconveniently small for the standard titrimetric estimation of reagent consumed during the oxidation. My collaborator, Robin Ferrier, proceeded to modify a recently published procedure<sup>3</sup> in which the oxidation of nucleosides had been followed by changes in light absorption of periodate on reduction to iodate. He allowed for a significant light absorption by iodate and checked the accuracy of the method for monitoring the oxidation of 10-15 milligram samples of a variety of carbohydrate substrates.

"In commenting on its significance I cannot regard this paper as being more than a useful contribution to science. In saying so I am sure that Robin Ferrier, then a graduate student at the University of Edinburgh and to whom any credit is due, would agree. Robin, who has developed his own research programme in synthetic carbohydrate chemistry and is an internationally recognized authority on unsaturated sugar derivatives, is now professor of organic chemistry at Victoria University, Wellington, New Zealand. My own research has continued in the field of structural polysaccharide chemistry. It is in these respective areas that each of us considers our most important papers to have been published.<sup>4,5</sup>

"Whilst acknowledging the flattery I feel compelled to say that prospective membership in the 'Citation Classics Club' only confirms my worst fears about the use of citation statistics in assessing individual scientific quality. I can only hope that frequency of citation will find only minor use in tenure decisions or in evaluating research grant applications."

1. **Jacksoa E L & Hadson C S.** Studies on the cleavage of the carbon chain of glycosides by oxidation. A new method for determining ring structures and alpha and beta configurations of glycosides. *J Amer Chem Soc* **59**:994:1003. 1937.
2. **Halsall T G, Hirst E L & Jones J K N.** The structure of glycogen. Ratio of non-terminal to terminal glucose residues *J. Chem. Soc.* 1399-400. 1947.
3. **Dixon J S & Lipkim D.** Spectrophotometric determination of vicinal glycols. Application to the determination of ribo furanosides. *Anal Chem* **26**:1092-93. 1954.
4. **Aspinall G O & Fanshawe R S.** Pectic substances from Lucerne (*Medicago Sativa*) Part I. Pectic acid. *J. Chem Soc.* 4215-25. 1961.
5. **Ferrier R J & Prasad N.** Unsaturated carbohydrates. Part X. Epoxidations and hydroxylations of 2,3-Dideoxy- $\alpha$ -D-hex-2-enopyranosides. The four methyl 4 6-di-O-acetyl-2,3-anhydro- $\alpha$ -D-hexopyranosides. *J. Chem. Soc.* C:575-80. 1969.