

Van Soest P J. Use of detergents in the analysis of fibrous feeds. II. A rapid method for the determination of fiber and lignin. *J. Ass. Offic. Agr. Chem.* **46**:829-35, 1963. [Agricultural Research Center, Beltsville, MD]

This paper offered a method for the preparation of lignocellulose in a single step from food, feed or forages, the lignocellulose residue being a convenient preparation for further analyses of lignin. This application depended on the discovery of the remarkable ability of hexadecyltrimethylammonium bromide in acidic solution to dissolve proteins and other dietary substances in complex mixtures. [The SCI® indicates that this paper has been cited over 345 times since 1963.]

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"Scientific progress is often accelerated by the development of a convenient method which allows a greater range of observations in matters previously largely unexplored. In this respect, my 1963 paper did provide a convenient method for preparing lignocellulose from foods and feeds derived from plants. The number of citations no doubt reflects its wide and continuing use. Like most methodologies there have been improvements, and in many of the recent citations it would have been appropriate to use and cite a later paper.¹

"The lignocellulose residue obtained by acid-detergent extraction contains other minor but nutritionally significant fractions. Hence the less presumptive name 'acid-detergent fiber' or merely ADF. The residue has a quantitative recovery of silica and unavailable protein that occur in many foods, forages, and animal feeds. The method has been applied to analyses of human food, particularly after 1970, when the role of dietary fiber in human health and disease became of medical and nutritional interest.

"Prior to that time fiber was a comparatively esoteric topic in nutrition relegated in the minds of many as something peculiar to cows. The story of fiber in nutrition is one that historians of science should take note of and which does not lead to the greatest confidence in scientific objectivity and progress. Prior methodology still in use in many places is that of crude fiber, a wholly defective procedure developed not later than 1820.² Despite known defects since 1860, comparatively little effort has been made to unseat crude fiber as the legal method for testing foods and feeds."

"I began my work on fiber in 1957 while employed in the Agriculture Research Services, USDA, at the instigation of the late Dr. Lane Moore who believed that fiber was one of the Cinderellas of nutrition. Other administrators and biochemists thought, and I was told by several, that money and time was being wasted on a fruitless topic that would lead to no future. Dr. Martin Eastwood, Western General Hospital, Edinburgh, a pioneer in the medical aspects of dietary fiber has said that he experienced a similar attitude during the 1960s. Without Lane Moore's faith and support of my work the story of fiber may well have turned out differently.

"In developing my work on fiber it appeared that the central problem of fiber analysis was convenient separation of plant protein from lignin, both of which are alkali-soluble. To solve this problem, I explored the ability of various kinds of detergents to remove protein from plant tissue under different conditions of pH and temperature. I remember the day that I titrated the first Kjeldahl nitrogen from the residue of alfalfa left after an extraction with hexadecyltrimethylammonium bromide in hot acid solution. I had expected the endpoint at about 10 ml, actually it occurred at about 1 ml, and I badly overshot it. The remarkable peptising ability of quaternary detergents in acid solution became the basis for a new fiber method."

1. **Van Soest P J.** Collaborative study of acid-detergent fiber and lignin. *J. Ass. Offic. Analyt. Chem.* **56**:781-4, 1973.
2. **Van Soest P J & Robertson J B.** What is fiber and fiber in food? *Nutr. Rev.* **35**:12-22, 1977.