

1985 PITTSBURGH  
CONFERENCE  
NEW ORLEANS, LA

NO. 462

HPLC CHARACTERIZATION OF GLUCOSE OLIGOMER DISTRIBUTION  
IN CORN STARCH HYDROLYZATES

Attached is documentation of a presentation given at the 1985 PITTSBURGH CONFERENCE held in New Orleans from February 25 to March 1, 1985. The published abstract is included below.

CRAIG A. DORSCHER, W. ROY DAY, PETER G. ALDEN and HERMAN S. SCHULTZ, Waters  
Chromatography Division of Millipore Corporation, 34 Maple Street, Milford, MA 01757

Corn starch is treated with acid and/or enzymes to produce dextrins and corn syrups. The products of acid or enzyme hydrolysis consist of glucose oligomers of varying molecular weights. The distribution of these oligomers is determined by the reagent (acid or enzyme) used and by the duration of the hydrolysis process.

High performance liquid chromatography may be used to monitor the hydrolysis process and characterize the final products. This paper will discuss the use of reversed-phase and ion-exchange/size exclusion materials for this purpose.

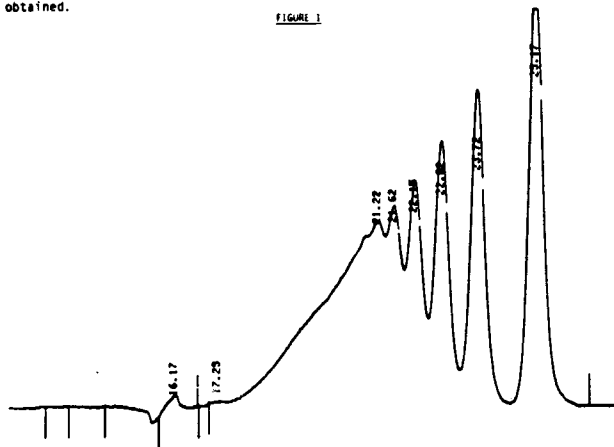
The Dextro-PAK Radial-PAK™ cartridge provides excellent resolution in the DP (degree of polymerization) 1 through DP 10 range, in a reversed-phase mode. Examples of chromatography on corn products ranging from 5 DE (dextrose equivalence) through 42 DE will be presented, especially illustrating how enzyme treated materials may be distinguished from acid treated materials.

Ion-exchange columns such as the Sugar-PAK™ I resolve simple sugars and complex polysaccharides by a complex mechanism involving both size exclusion effects and interactions with metal ions associated with anionic sites on the column. The mean pore size of the analytical resin greatly affects the ability of the column to resolve polysaccharides.

A set of columns has been packed with experimental polymer-based, calcium-loaded, cation exchange resins having mean pore sizes of 100, 500, and 10<sup>3</sup> Å. Various combinations of these columns have been used to analyze the starch hydrolyzates cited above. Depending on the sample, it is possible to obtain partial resolution of individual oligomers in the range DP 1 - DP 12 using these columns, as well as distribution patterns for the higher oligomers. In particular, it will be shown that sets of these experimental columns provide information about the samples unobtainable with reversed-phase or small pore ion exchange columns, and that very subtle differences between samples may be detected.

A chromatogram of a 42 DE syrup obtained on a 100 - 500 - 10<sup>3</sup> Å column set (Figure 1), showing identifiable oligomer peaks through DP 7, is typical of the results obtained.

FIGURE 1



Any questions regarding the paper should be directed to the author listed at the bottom of this page. Slides are available through Marketing Communications in Milford (X2303) or directly from the photographer, Kevin Monaghan (617/528-8579).