

W0303

Neutron Diffraction Analysis of the Sodium Salt of Iota-Carrageenan. Rengaswami Chandrasekaran, Srinivas Janaswamy, Whistler Center for Carbohydrate Research, Dept. of Food Science, Purdue Univ., West Lafayette, IN 47907.

Since biopolymer structures are stabilized mainly by intra- and inter-molecular hydrogen bonds along with ionic and van der Waals interactions, the precise positions of hydrogen atoms are very important in understanding the fine structural details. Neutron diffraction is capable of locating hydrogen atoms accurately. For example, the spline of hydration in the major and minor grooves of A DNA and B-DNA and the hydrogen bonding schemes in cellulose I and II are better known from neutron analysis.

Iota-carrageenan is a gel forming polysaccharide extracted from red algae used in the food and pharmaceutical industries. According to our x-ray analysis, it forms a double helix stabilized by a series of interchain O-6H...O2 and O-2H...O5 hydrogen bonds reinforced by periodic water molecules. Although the trigonal unit cell packing involving three helices is devoid of direct inter-helical interactions, sodium ions and water molecules connect the peripheral sulfate groups of adjacent helices. We are now extending the analysis to neutron diffraction data towards improving its three-dimensional structure. The study is expected to yield a more accurate description of the hydroxyl group orientations, hydrogen bonds and the packing arrangement.