

## VII. Reactions of Polysaccharides

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Study of radical reactions of polymeric carbohydrates is a challenging undertaking. The reactions that occur are documented by changes in physical properties that come from polymer degradation (e.g., reduced solution viscosity, differences in solubility, and gel formation). Changes in physical properties have been recorded in the reactions of the hydroxyl radical with cellulose,<sup>8,32</sup> hemicellulose,<sup>32</sup> starch,<sup>16</sup> and various dextrans.<sup>33</sup>

Studies of dextrans [polymers of 1→6 linked  $\alpha$ -D-glucose with  $\alpha$ -(1→3) linked side chains], for example, show essentially indiscriminate attack by hydroxyl radicals produced from reaction of  $\text{Ti}^{3+}$  with  $\text{H}_2\text{O}_2$ .<sup>33</sup> (The polymers studied had molecular weights ranging from 10,000 to 500,000 Da) These reactions cause depolymerizations (as evidenced by reduced solution viscosity) and an increase in the number of carbonyl and carboxyl groups in the polymer fragments. Upon lowering or raising the solution pH, the first-formed radicals appear to rearrange in a manner similar to the rearrangement of first-formed radicals derived from D-glucose.

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