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The Substrate Specificity of Pyranose Oxidase: the Activity of L-Gulono-1,4-lactone Oxidase

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The catalytic efficiency of pyranose oxidase (EC 1.1.3.10.) determined for various sugars showed that D-glucose is the preferred substrate and the enzyme oxidized the various aldonolactones. The specificity constants of pyranose oxidase determined for deoxy- and deoxyfluoro-D-glucoses showed that a hydroxy group at C-4 of D-glucose acts as a hydrogen-bone acceptor, at C-6 as a hydrogen-bond donor, and at C-1 as a hydrogen-bond donor. The reaction products of pyranose oxidase for D-glucose and L-gulono-1,4-lactone was identified as *D-arbino*-hexos-2-ulose and L-ascorbic acid respectively. D-glucose showed mixed type inhibition of partial competitive and pure noncompetitive inhibition against the aldonolactone-oxidizing activity of pyranose oxidase. The transient intermediate produced by pyranose oxidase for L-gulono-1,4-lactone was identified as *L-xylohexulonolactone*.