

OLIGOSACCHARIDE ACCEPTOR PRODUCTS FROM ALTERNANSUCRASE

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Dextranucrase and alternansucrase are bacterial enzymes that transfer glucosyl units from sucrose into long-chain polymers of glucose [1]. In the presence of suitable acceptor molecules, glucosyl transfer can also occur to the acceptor, forming glucose-oligosaccharides of varying molecular size (degree of polymerization, DP) [2]. A major difference between commercial dextranucrase and alternansucrase is that dextranucrase makes a homologous series of oligosaccharides in which the isomers differ by a single glucosyl unit, whereas alternansucrase synthesizes one DP 3 product, two DP 4 products, etc. For the example of maltose as the acceptor, if one considers only the linear, unbranched possibilities for alternansucrase, the number of potential products increases exponentially as a function of DP. This function is an example of a Fibonacci series. We will present data showing that only certain isomers of DP>4 are formed from maltose in measurable amounts, and that these oligosaccharides belong to the oligoalternan series rather than the oligodextran series. This information is especially important in light of the fact that mixtures of these oligosaccharides are undergoing evaluation as prebiotic agents for human and animal food use [3]. This also provides useful information regarding the specificity and possible mechanisms of the enzyme action. Structures of acceptor products arising from glucosyl transfer to other sugars will also be presented, including various mono-, di- and trisaccharides. These reactions represent novel synthetic routes to unusual oligosaccharides.

[1] Côté, G. L.; Robyt, J. F. *Carbohydr. Res.* **1982**, *101*, 57-74.

[2] Côté, G. L.; Robyt, J. F. *Carbohydr. Res.* **1982**, *111*, 127-142.

[3] Holt, S. M.; Miller-Fosmore, C. M.; Côté, G. L. *Lett. Appl. Microbiol.* **2005**, OnlineEarly edition.