

The utilization of rare sugars as a functional food

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Abstract

Rare sugars are defined as monosaccharides that exist in nature but are only present in limited quantities. There are more than 50 kinds of rare sugars while naturally abundant monosaccharides such as D-glucose and D-fructose are very few in number. The rare sugars in a ring-form are called an "Izumoring". There are three different Izumoring: tetroses, pentoses, and hexoses. A scheme was drawn for the production of ketohexoses based upon the network composed of the four groups comprising all of the ketohexoses and hexitols. A symmetric Izumoring comprising of 16 aldohexoses, 8 ketohexoses, and 10 hexitols were drawn. All the compounds were connected to each other by enzyme reactions or by hydrogenation reactions. Rare sugars such as of D- Psicose showed high antioxidative activity and excellent food properties and were promising as a functional dessert for elderly people. Furthermore, rare sugars have the potential to be used in sweeteners and as food products with new functional characteristics to prevent diabetes, arteriosclerosis and obesity by suppression of lipid accumulation and hyperglycemia.