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Jay-Lin Jane

Iowa State University, USA

Resistant starch: Structure, properties, processing and health benefits

Type-2 diabetes and related health problems, including obesity are results of over consumption of sugar and rapidly digestible starch. After ingesting foods of high-glycemic index, such as breakfast cereal and bread, the blood glucose level of the individual increases quickly and reaches a peak in 30 min, resulting in a hyper-glycemic state. Insulin secreted with the increase in the blood glucose level triggers the absorption of glucose from the blood stream and causes a hypo-glycemic response, repeating of these processes results in insulin resistance and the type-2 diabetes. Methods to prevent the type-2 diabetes are to reduce the intake of rapidly digestible carbohydrates, replace rapidly digestible starch with resistant and slowly digestible starch and increase vegetable and dietary fiber portion in the diet. There are five types of resistant starch, i.e. physically inaccessible starch, the B-type crystalline starch, retrograded amylose, chemically modified starch and the amylose-lipid complex. This presentation includes structures and properties of different types of resistant starch, approaches available to facilitate the formation and increase the contents of resistant and slowly digestible starch by selecting ingredients and proper cooking methods and effects of ingesting resistant starch on levels of blood glucose and insulin secretion comparing with the normal starch as control. Different types of resistant starch have also shown characteristic impacts to microbiota developments in the gut and influence animal behavior. Resistant and slowly digestible starch has demonstrated health benefits. Therefore, it is important to select healthy starchy foods and proper processing methods to preserve and increase resistant starch contents in the diet.

Biography

Jay-Lin Jane is a Charles F Curtiss Distinguished Professor, Emeritus in the Department of Food Science and Human Nutrition, Iowa State University. She has received her Bachelor's degree from National Chung-Hsing University in Taiwan, Master's degree from Texas Woman's University and PhD degree from the Department of Biochemistry and Biophysics at Iowa State University. Her primary research interests are in starch structures, properties, applications, effects of resistant starch on health and biopolymers. She has published 215 referred publications and 10 patents with 10,000 citations and an h-index 53. She has received numerous awards, including the Alsberg-French-Schoch Award, the highest award for starch research, and a Fellow Award from the American Association of Cereal Chemists, International, the Merit of Science Award from the Japanese Applied Glyco-science Association and the Distinguished Faculty Award from Iowa State University.

jjane@iastate.edu

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