Processing effects on functionality of carbohydrates: Implications for food industry

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The role of carbohydrates in human nutrition requires a greater understanding of the physicochemical characteristics of food relating to their physiological properties. Food processing can alter the nutritional quality of carbohydrates with either desirable or adverse effects on the nutritional value. The bioavailability of starch is affected dramatically through processing, regarding both rate and extent of small-intestinal digestibility. This permits optimizing the digestion of starch by choice of raw materials and processing conditions. The food processes that lead to gelatinized, highly viscous and soluble starches result in high GI foods, while processes that limit the swelling of starch result in low GI foods. The degree of glycemic and hormonal response associated with carbohydrate load affects numerous functions within the body. Repeated changes in post-prandial glycemic levels may effect the long-term function of organs. The metabolism of carbohydrates may also be influenced by the presence of other macronutrients and their interactions. The importance of food fibers has led to the development of a large and potential market for fiber-rich products and ingredients. There is a trend to find newer sources of dietary fiber. Processing can influence the physiological effects of dietary fiber both in the upper and lower gastrointestinal tract. Formation of resistant starch and use of resistant oligosaccharides as food ingredients provide new opportunities to increase the amount of carbohydrate available for colonic fermentation. Food processes may lead to starch retrogradation, their implications for starch digestibility in vivo is poorly understood. The imperative is to define more precisely the links between the physiological actions of resistant starches and their chemical and physical properties. It is well known that carbohydrate availability affects both physical and mental performance. The impact of GI on cognitive function is poorly understood and further research is required. There is tremendous scope to develop functional foods to prevent cognitive impairment.

Development of carbohydrate-based functional foods with specific attributes is possible due to synergy between human nutrition, physiology, food science engineers and experts in the fields of food applications and industrial production, marketing and finally the consumer.

Biography

Asna Urooj, obtained MSc (1987) and PhD (1993) in Food science & Nutrition from University of Mysore, working as Professor, involved in post graduate teaching and research in the same University. Major research areas (i) Starch digestibility & glycemic responses (ii)Natural antioxidants-chemistry, health effects and applications (iii) medicinal plants as anti diabetic and hypolipidemic agents (iv) Disease specific food formulations. She has published 95 papers in reputed journals, serving as editorial board member and reviewer for international journals. She has completed 6 research projects, has 2 ongoing projects, guided 8 PhD candidates, 6 are working. Received Dr Kalpana Chawla-Young women scientist award (2009) by Government of Karnataka, young scientist awards and best paper awards several times.