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Modification of Starch of Fruit Origin – Chemical, Enzymatic Processes and Application

Tonna A. Anyasi¹, Victoria A. Jideani², Afam I.O. Jideani^{3,4}

¹Agricultural Research Council - Tropical and Subtropical Crops, Nelspruit 1200, South Africa. ²Cape Peninsula University of Technology, Bellville 7535, South Africa. ³University of Venda, Thohoyandou 0950, South Africa. ⁴Postharvest- Handling Group, ISEKI-Food Association, Vienna, Austria

Abstract

Underutilized starches of fruit origin, present morphological and structural compositions that can influence their use for food and non-food applications. Chemical modification of fruit starches involves the introduction of functional groups into the starch molecules through a reaction of chemical reagents with the hydroxyl groups of the starch polymer. Chemical modification techniques including cationization, cross-linking, etherification, esterification, grafting and oxidation of the native fruit starches, resulting in weakening and strengthening of bonds, cleavage and depolymerization as well as alterations of the amorphous and crystalline regions of the starch granule. These modification techniques produce starch with lower swelling power, decreased paste clarity, increased granule surface area and granule porosity, reduced retrogradation and syneresis and resistance to mechanical shear. Enzymatic modification technique involves alteration of the native starch through activities facilitated by hydrolysing enzymes. Enzymatic modification methods such as debranching lead to hydrolysis of amylopectin thereby forming short linear starch molecules. However, recent trends have seen the use of dual modification methods: chemical and enzymatic, chemical and chemical or chemical and physical modification techniques for improved functionalities in the modified starches. The paper examines the chemical and enzymatic modification of fruit starches, their alterations, and industrial applications.

Biography: Dr Tonna Ashim Anyasi

Tonna Ashim Anyasi is a Senior Researcher at the Agricultural Research Council –Tropical and Subtropical Crops, Nelspruit, South Africa. He holds a PhD in Agriculture (Food Science and Technology) from the University of Venda, South Africa and is a National Research Foundation of South Africa Y2-Rated Researcher. His area of research includes agro-processing and postharvest preservation and of fruits, vegetables, cereals, legumes as well as root and tuber crops. He also conducts research on plant bioactives and antioxidant activities of foods. Dr Anyasi is a member of the Early Career Scientist Section of the International Union of Food Science and Technology, Toronto, Canada; a member of the Institute of Food Technologists, Chicago, Illinois, USA; and a professional member of the South African Association for Food Science and Technology, South Africa.