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Structural and functional characterization of sweet and bitter cultivar of hydrolyzed and heat-treated cassava starches

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Abstract

Nigeria is the largest producer of cassava (Osundahunsi *et al.,* 2011). Insight into the properties of starches is of importance to establish the cultivar that will consistently produce starch of a given quality for specific application. Changes in crystallinity occur during food production processes such as drying, granulation, coating and milling by exposure to mechanical stress, temperature changes and different humidity levels. Amorphisation or crystalline transformation can also occur during storage. The variations may modify properties such as flowability or induce changes in solubility and bioavailability of the active ingredient (de Veij *et al*., 2009). The structural and functional properties of sweet and bitter cultivars of cassava starches obtained by molecular mass reduction (enzymatic: pullulanase, 25 U/g per 24 h) were evaluated. The starches were subjected to annealing (ANN), heat-moisture treatment (HMT) and temperature cycling (TCY). The recrystallized starches were partially hydrolyzed with porcine pancreatic _-amylase and amyloglucosidase prior to freeze-drying. The native starch and digested products were analyzed with scanning electron microscopy (SEM), fourier transform infrared spectroscopy (FTIR), gel permeation chromatography (GPC) and x-ray diffraction pattern. Morphological structure revealed variation from the regular shapes in amorphous starch to irregular mass of cohesive structure in the recrystallized starches. This is at variance with the report on annealing treatment with no change in size and shape of SEM structure (Osundahunsi *et al.,* 2011). The distinctive and on Fourier transform infrared (FTIR) did not show much variation. However, gel permeation chromatography and x-ray diffraction pattern ascertain that the crystalline nature was disrupted by the treatment process. Functionality, nutritional value and health implications of recrystallized starches depend on the conformation and physicochemical properties (Topping *et al.,* 2003).The value-added application of recrystallized cassava starch in food products may be as a prebiotics.

Biography

OSUNDAHUNSI, O. F. has completed her Ph. D. at the age of 30 years from the University of Ibadan, Nigeria and Postdoctoral studies Technion-Israel Inst. of Technology, Haifa, Israel. She is a receipient of Alexander von Humboldt research Fellowship which was spent at Technische Universitaet, Hamburg – Harburg, Germany. She is a Professor of Food Science and Technology and has published more than 40 papers in reputable journals. Osundahunsi is a reviewer for Starch, Carbohydrate Polymer, Food and Nutrition Bulletin International and Nigerian Food Journal. She is a member of IFT, USA; Nigerian IFST and Institute of Public Analyst.