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Physicochemical properties, structure and digestibility of the novel waxy tapioca starch and its pyrodextrins

Wanphen Weil

Kansas State University, USA

An industrially-prepared sample of the novel waxy tapioca starch, which is not yet commercially available, was pyrodextrinized at 3 temperatures (130 °C, 150 °C and 170 °C) and time levels (1, 2 and 4 hours). Properties such as solubility, color, turbidity, morphology, enthalpy, viscosity, crystallinity, Integrated Total Dietary Fiber (INTDF) and glycosidic bonds were evaluated for unmodified and pyrodextrinized samples, plus normal tapioca starch and equivalent pyrodextrins. Novel aspects of this study include its in-depth investigation of waxy tapioca starch and analysis of various solvent concentrations and types. Results accorded well with previous work on waxy tapioca starch and pyrodextrinization. Key observations of the 170 °C/4 hours pyrodextrin of waxy tapioca starch included: Yellow color; 100% solubility; Type A crystallinity; 94.5% transmittance; no measurable viscosity, endothermic enthalpy or retrogradation; mean hydrodynamic radius of 3 nm; 40.6% Low Molecular Weight Dietary Fiber (LMWDF) and a significant level of new β -1,2; β -1,4; β -1,6; β -1,6 anhydro-glucopyranosol end group bonds. Future research should focus on the health benefits of pyrodextrins prepared from waxy tapioca starch and potential industrial application as a food ingredient with excellent clarity, low retrogradation, high solubility and high functional fiber content.

Biography

Wanphen Weil has earned her Bachelor's degree in Biotechnology from Rajamangala University of Technology, followed by a Master's degree in Biotechnology from Kasetsart University in 2002. For three years after this, she conducted research at the Thailand Cassava and Starch Research Laboratory. After 6 years of experience in industry, including QA Manager and Head of production, she decided to return to the research world, again with the Thailand Cassava and Starch Research Laboratory. During this time, she also started her own business, which manufactured newborn products from 100% cotton. In 2014, she started the PhD program at Kasetsart University, working with Dr. Klanarong Sriroth. She currently is researching as a Visiting Scholar in the Laboratory of Dr. Yong-Cheng Shi in the Department of Grain Science and Industry at Kansas State University. Her current research projects involve the properties of starch from the cassava plant as well as using buckwheat for gluten-free noodles.

wanphenl@ksu.edu
wanphenweil@gmail.com

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