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Structural, morphological, and physicochemical properties of rice starch on main and ratoon rice

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Abstract

Rice ratooning is the cultural practices to produce easily second rice from the stubble left behind after the main-crop harvest. The main advantage of rice ratooning is that in areas where rice is the main crop, double crop of rice can be grown for additional returns. Three early ripened rice cultivars were tested for estimation their milled rice quality and starch characteristics from main and ratoon rice. The main crop was harvested at mass maturity, after which the tillers were mowed to stubbles of about 10 cm tall. And then it left without any further input until the ratooned plant was ready for harvest. Highly significant variations were detected in the milled rice quality between main and ratoon rice. Protein and amylose contents of ratoon rice were more increased than those of main rice. The Toyo value (gloss) of cooked rice of ratoon crop was measured also higher than that of main crop. It resulted from higher air temperature during grain ripening compared with that of ratoon crop. The mean temperature during ripened period of ratoon rice was favorable for optimal maturation for early ripened rice cultivars. Normalized chromatograms of branch chain length distribution of amylopectin are demonstrated a distinct difference between main and ratoon rice flour. Ratoon rice had higher amount of short chains than that of main crop rice starches. Microscopic examination of rice flours with scanning electron microscopy shows starch granule shapes affected by the cropping types, main and ratoon rice. It showed significant differences among rice starch granule shapes and in granule size between main and ratoon rice. Starch of ratoon rice had more neat and smaller granules than that of main rice.

Keywords: ratoon-rice, grain yield, milled rice quality, starch, amylopectin

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