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Structure and Properties of Endosperm Starches from Cultivated Rice of Asia and Other Countries

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Starch granules were prepared from mature grains of 75 cultivars (23 *indica*, 27 *Chinese indica*, 6 *japonica* and 19 *javanica*) of rice originating in Asia and the other countries, including Brazil (4), China (25), India (10), Indonesia (3), Japan (8), Korea (2), Laos (3), Myanmar (3), Nepal (4), Pakistan (1), the Philippines (1), Russia (1), Taiwan (3), Thailand (1) and the USA (6). They were cultivated and harvested in the paddy field of Prefectural University of Hiroshima in 2001. We showed that starches of non-waxy cultivars of the *indica* and *Chinese indica*, in general, had higher contents of the apparent amylose (AAM) and super-long chains (SLC) of amylopectin by GPC of *Pseudomonas* isoamylase-debranched starches and amylopectins through Toyopearl columns. High performance anion exchange chromatography with a pulsed amperometric detection (HPAEC-PAD) of isoamylase-debranched starches showed that the starches of non-waxy cultivars of the *indica* and *Chinese indica*, in general, had decreased amounts of branch chains with DP 6-12 (Fr. A). The Fr. A contents correlated positively with the alkali spreading score (ASS) of rice grains and negatively with the peak temperature (T_p) of gelatinization of the rice starches. Among the pasting characteristics of the starches measured using a Rapid Visco Analyser (RVA), setback (SB) and breakdown (BD) showed high positive and negative correlations with SLC contents, respectively, and both peak top viscosity (PV) and BD negatively correlated to AAM contents. There was a high positive relationship between

amounts of Waxy (*Wx*) protein and SLC contents in starch. This appears to show that *Wx* protein is concerned with synthesis of SLC. SLC contents in starches of rice originating in Asia and the other countries were evenly observed in the range of 0.0-13.4%.

Key words: rice starch, *indica*, *japonica*, *javanica*, super-long chain

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