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Evaluation of Hardness of Waxy Rice Cake Based on the Amylopectin Chain-length Distribution

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Waxy rice is used for staple and processed foods, and for its effective breeding an evaluation/selection index has been required. Here, the chain-length distribution of amylopectin from japonica waxy rice varieties with different hardness of rice cake were analyzed by the fluorescent labeling/HPSEC method, and the relation of the unit chain-length distribution to the hardness was examined. The difference among varieties was found in the amylopectin structure. Waxy rice producing soft cake, such as Hakuchoumochi, has more short chains (A+B1), and fewer long chains (B2+B3), than that producing hard cake, such as Koganemochi. The molar ratio of short chains (A+B1)/long chains (B2+B3), which is considered to be the number of chains comprising a cluster of amylopectin, was 10.1-11.7, being different among the varieties tested. The molar ratio determined by fluorescent response was much more reliable than the weight ratio determined by IR response because of the stable base line during HPLC. A negative correlation was found between the molar ratio and the hardening of rice cake. Therefore, the molar ratio (A+B1)/(B2+B3) of amylopectin unit-chains seemed to be one of useful evaluation/selection indexes for breeding of waxy rice. An index, or molar ratio, lower than 11 appeared to be suitable for processing use, and one higher than 11.5 for principal food use.

Key words: glutinous rice, waxy rice, chain-length distribution, amylopectin, hardness

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