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学 位 論 文 要 旨
Dissertation Abstract

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学位論文題目：
Title of Dissertation

Study on the Palatability of Chinese *Japonica-type* Rice Varieties
（中国産ジャポニカ型水稲品種の食味に関する研究）

学位論文要旨：
Dissertation Abstract

This study was carried out in order to clarify the palatability characteristics of Chinese *japonica-type* paddy rice, and to construct a breeding method for palatable rice varieties in China.

1. Palatability evaluation in the sensory test by the Chinese panel and Japanese panel: To grasp the taste preference for rice of the Chinese consumer, the sensory test of palatability was conducted by the Chinese panel and Japanese panel. On the whole, the Chinese and Japanese panels tended to be similar in their evaluations of palatability. However, there were differences between the Chinese and Japanese panels in the estimated contribution ratio of each evaluation item to overall eating-quality. These results indicate little difficulty in applying the Japanese sensory test for palatability studies in China. However, to successfully introduce the Japanese method to Chinese sensory testing, it will be necessary to determine more precise evaluation standards for each item and to construct a sensory test method that takes adequate account of Chinese consumer preferences.

2. Varietal difference of physicochemical properties in Chinese varieties: A wide range of genetic variation was found in physicochemical properties of examined Chinese varieties. Amylose content showed a significant negative correlation with breakdown value and showed a significant positive correlation with hardness/adhesion ratio, which is preferable for palatability. However, protein content showed a significant negative correlation with amylose content and showed a significant positive correlation with breakdown value, which is unfavorable for palatability. These results suggest that the most considerable physicochemical property of

Chinese rice varieties is their protein content.

3. Comparison of physicochemical properties between Chinese varieties and Japanese varieties : Chinese and Japanese varieties did not differ significantly in amylose content. However, for Chinese varieties, protein content and hardness/adhesion ratio were significantly higher than for Japanese varieties, and maximum viscosity and breakdown value were significantly lower. In Japanese varieties, a positive but non-significant correlation was observed between amylose content and protein content. In contrast, a significant negative correlation was observed in Chinese varieties between them. These results show that the disruption of the negative genetic correlation between protein content and amylose content is the most important issue for palatability breeding in China.

4. Effect of the amount of nitrogen application on physicochemical properties : The effects of nitrogen application on physicochemical properties and yield are analyzed. Protein content and yield increased with increased nitrogen application, but maximum viscosity and breakdown value decreased. Taste value tended to decrease. Based on taste value and yield relative to maximum plot, the appropriate amount of nitrogen application for high palatability and high yield in China was estimated at 15–20 g N m^{-2}.

5. Correlation between physicochemical properties and cooked rice properties : Cooked rice properties showed small varietal differences. There was no significant correlation between physicochemical properties and cooked rice properties, and their correlation coefficient was very small. These results show that physicochemical properties and cooked rice properties are independent characteristics, and it is difficult to evaluate cooked rice properties in terms of physicochemical properties.

6. Correlation between palatability evaluation in the sensory test and physicochemical properties : The correlation between physicochemical properties and sensory test was examined. About 47% of the varietal difference in overall eating-quality was explained by protein content, maximum viscosity and hardness/adhesion ratio. The varietal difference of other evaluation items in sensory test were 30–50% explained by these 3 physicochemical properties. From these results, in the early generation involving many lines, the palatable lines should be roughly selected on the basis of these physicochemical properties; in middle to late generation, lines should be selected based on a sensory test.

7. Palatability and yield performance of Jinchuan 1 in different producing area : Palatability and yield of Jinchuan 1 which planted in Tianjin and Baoying County of Jiangsu Province were examined. Yield introduced from Tianjin to Baoying County visibly decreased. Palatability of rice produced in Baoying County tended to improve. Based on these results, it may be concluded that Jinchuan 1 cannot be introduced into Jiangsu Province because of its low yield but can serve as the parent material for breeding palatable rice.