

PA-67

## Physicochemical Modification of Starch Granule of Rice Flour Varieties by Different Transplanting Date

Chae Min Han<sup>1\*</sup>, Sang Kuk Kim<sup>2</sup>, Jong Hee Shin<sup>1</sup>, Jung Bae Kwon<sup>1</sup>, Tae Young Kwon<sup>1</sup>

<sup>1</sup>Division of Crop Research, Gyeongsangbuk-do Provincial Agricultural Research & Extension Services, Daegu 41404, Republic of Korea

<sup>2</sup>Bioresources Research Institute, Andong, 36614, Korea

### [Introduction]

Four different transplanting dates used in five varieties for rice flour, grown in Daegu and Andong, Republic of Korea, were examined to determine the changes in morphology, X-ray diffractograms, and pasting viscosity of their starch.

### [Materials and Methods]

The study was conducted at the paddy fields of Gyeongsangbuk-do Agricultural Research & Extension Services in Daegu and Andong, Korea. The five rice flour varieties, 'Seolgaeng', 'Hangaru', 'Milyang317', 'Suweon542', and 'Hanareum4' grown for 20 days in nursery beds were transplanted on May 20, May 30, Jun. 10, and Jun. 20. The planting distance was 30 × 15 cm, and the type and quantity of the fertilizer used were N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O = 9-4.5-5.7 kg/10a. Split fertilization was performed in the basal-tillering stage and panicle initiation (50-25-25 ratio). The rice grains were ground in a mixture grinder and stored at room temperature prior to their use in the actual experiment. The X-ray diffraction pattern of starches was obtained with copper, nickel foil-filtered, K $\alpha$ -radiation using a diffractometer RINT 2000 at 40 kV and 30 mA.

### [Results and Discussion]

All rice flour varieties displayed an A-type X-ray diffraction pattern showing the strong diffraction peak at around 2 $\theta$  values 15°, 17°, 18° and 23°, and a small peak at 20° 2 $\theta$ . X-ray diffraction angles showed a typical A-type crystallinity. The crystallinity of the starch granule in five rice flour varieties, 'Seolgaeng', 'Hangaru', 'Suweon542', 'Milyang317', and 'Hanareum4' was 23.9%, 25.0%, 24.7%, 22.4%, and 25.5%, respectively. The degree of crystallinity in 'Seolgaeng' was higher than that in 'Hangaru', 'Suweon542', 'Milyang317', and 'Hanareum4'. It is generally considered that A and B-type starches reflect the presence of parallel stranded double helices. These are packed quite closely in A-type structures but are more loosely associated in B-type starches. These results suggest that the crystalline regions of amylopectin against amorphous regions had similar microstructure.

### [Acknowledgements]

This work was carried out with the support of "Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ012960062018)" Rural Development Administration, Republic of Korea.

\*Corresponding author: Tel. +82-53-320-0276, E-mail. tastypeach86@korea.kr