

**PB-17**

**Establishment of Wheat HMW-GSs Composition Identification System by Lab-on-a-chip**

Dongjin Shin<sup>1\*</sup>, Jinkyung Cha<sup>1</sup>, So-Myeong Lee<sup>1</sup>, Jong-Hee Lee<sup>1</sup>

<sup>1</sup>Dept. of Southern Area Crop Science, National Institute of Crop Science, RDA, Miryang 50424, Korea

**[Introduction]**

HMW-GS represents approximately 10% of the total seed storage proteins and critically determines the strength and elasticity of dough with LMW-GS. x-type and y-type subunits of HMW-GS encoded in each *Glu-1* locus are tightly linked. Three to five proteins of HMW-GS are translated from three *Glu-1* loci due to gene silencing. 1Bx7<sup>OE</sup> encoded by *Glu-B1a1* contributes to improving the rheological properties, such as dough strength in hard wheat. Similarly, *Glu-D1d* (encoding the subunit pair 1Dx5 + 1Dy10) at the *Glu-D1* locus had a positive effect on the rheological properties and dough quality.

**[Materials and Methods]**

Nine wheat varieties covering diverse HMW-GS subunits were used to develop the numbering system for the HMW-GS subunits identification by Lab-on-a-chip. Three, four, and eight varieties were used to evaluate the protein amount of 8&10, 10&18, and 7<sup>OE</sup> subunits on electropherogram.

**[Results and Discussion]**

The current study established a high-molecular-weight glutenin subunit (HMW-GS) identification system using Lab-on-a-chip for 3, 6, and 3 of allelic variations at *Glu-1* loci which are commonly used in wheat breeding. The molecular weight of 1Ax1 and 1Ax2\* encoded by *Glu-A1* locus were of 202 kDa and 192 kDa, and positioned below 1Dx subunits. The HMW-GS subunits encoded by *Glu-B1* locus were electrophoresed in the following order below 1Ax1 and 1Ax2\*: 1Bx13 > 1Bx7 = 1Bx7<sup>OE</sup> > 1Bx17 > 1By16 > 1By8 = 1By18 > 1By9. 1Dy10 and 1Dy12 having 11 kDa difference were clearly differentiated on Lab-on-a-chip. Some of the HMW-GS, including 1By8, 1By18, and 1Dy10, having different theoretical molecular weights showed similar electrophoretic mobility patterns on Lab-on-a-chip. The relative protein amount of 1Bx7<sup>OE</sup> was two-fold higher than that of 1Bx7 or 1Dx5 and, therefore, translated a significant increase in the protein amount in 1Bx7<sup>OE</sup>. Similarly, the relative protein amounts of 8&10 and 10&18 were higher than each subunit taken alone.

**[Acknowledgement]**

This research was supported by the Research Program for Agricultural Science and Technology Development (PJ01505501), Rural Development and Administration.

\*Corresponding author: Tel. +82-55-350-1185, E-mail. jacob1223@korea.kr