PC2

Potential of Double-Null Partial Waxy Starch in End-Use Quality of Wheat

Honam Agricultural Research Institute : Jung-Gon Kim* and Chul Soo Park

Objectives

We summarized experimental data of double-null partial waxy wheat recently developed from U.S. to provide information for improving quality of Korean wheats.

Materials and Methods

○ Materials
- Wild Type & Waxy Wheats
- Partial Waxy Wheats
  : Single and double-null partial waxy wheats

○ Methods
- Flour Characteristics : Amylose content and pasting properties of starch
- Noodle Characteristics : White salted noodles and Instant Noodles
- Bread Characteristics : Pan Bread and French Bread

Results

○ Starch of double-null partial waxy wheat was lower in amylose content and higher in pasting viscosity than that of wild-type wheat.

○ Noodles, including white salted noodles and instant noodles, produced from double-null partial waxy wheat flours were softer and more cohesive than noodles prepared from wheat flours of wild type amylose content.

○ White salted noodles prepared from waxy and double null partial waxy of reduced starch amylose content generally required shorter cooking time than those prepared from wheat flours of wild type in starch amylose content.

○ Double null partial waxy wheat flours can reduce the cooking time of instant noodles and produce soft and elastic texture of instant noodles, without unsuitable properties.

○ Wheat flours with low starch amylose content and high protein content, as in double-null partial waxy wheat flours with >15% protein, produce bread with softer crumb texture, and slower firming rate during storage than wheat flour of wild type amylose content.

○ French bread baked from double null partial waxy wheat flours can extend the shelf life because of an advantage in retarding bread staling during storage.

○ Therefore, double null partial waxy wheat should be produced to improve bread and noodle quality of Korean wheat.

Corresponding Author : Chul Soo Park E-mail : pcs89@rda.go.kr Tel : 063-840-2153

Table 1. Composition and Pasting Properties of Wheat Flours and Noodle Dough[a]

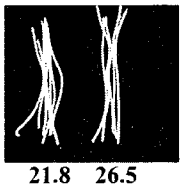
Flour[b]	Ash (%)	Protein (%)	Amylose (%)	Amylogram (BU)[b]		Noodle Dough[c]	
				PV	BD	Abs (%)	Thick (mm)
Wild Type	0.45	12.3	26.7	396	80	34	1.73
Single Null	0.49	14.2	21.3	681	200	32	1.95
Double Null	0.41	13.5	16.3	768	325	34	1.93
Waxy Wheat	0.44	18.2	2.8	731	349	38	1.85

[a] Averaged data.
[b] PV, peak viscosity; BD, breakdown.
[c] Abs, optimum water absorption; Thick, thickness.

Table 2. Characteristics of White Slated Noodles and Instant Noodles from Reconstituted Flours with Various Amylose Content[a]

Flour	Amylose (%)	White Salted Noodles				Instant Noodles				
		Cooking Time (min)	Texture[b] HD (N)	SP (Ratio)	AD (Ratio)	Free Lipids (%)	Cooking Time (min)	Texture HD (N)	SP (Ratio)	AD (Ratio)
I	3.0	7	2.45	0.92	0.69	35.8	6.0	1.39	0.90	0.70
II	7.7	7	3.21	0.91	0.68	32.5	7.0	1.69	0.91	0.70
III	12.4	9	3.83	0.90	0.67	29.0	7.5	2.23	0.90	0.70
IV	17.1	13	3.81	0.88	0.65	25.4	9.0	2.79	0.90	0.68
V	21.8	16	4.82	0.88	0.64	23.3	10.0	3.39	0.90	0.68
VI	26.5	16	7.00	0.88	0.63	23.3	12.0	3.57	0.87	0.65

[a] Prepared by blending gluten, tailings starch, and soluble fractions of hard white wheat flours, and prime starch isolated from soft white wheat (wild-type) and waxy wheat flour.
[b] HD, hardness; SP, Springiness; AD, Adhesiveness.



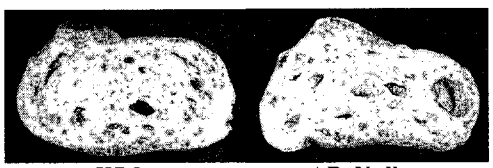
Amylose (%) 3.0 7.7 12.4 17.1 21.8 26.5

Fig. 1. Appearance of instant noodles from reconstituted flours

Table 3. Characteristics of Bread Baked from Wild Type and Double Null Partial Waxy Wheat Flours Stored for 1 Day at 22℃ and for 7 Days at 4℃

Flour	Loaf Volume (ml)	1 Day After Baking		7 Days After Baking	
		Firmness (N)	Moisture (%)	Firmness (N)	Moisture (%)
HRS[a]	908	2.05	44.4	5.84	37.1
BD Null	1025	1.03	43.5	4.60	35.7
AB Null	1000	0.92	44.6	4.04	37.1

[a] HRS, hard red spring wheat for bread baking.



HRS **AB Null**

Fig. 2. Crumb structure of French bread baked from hard red spring wheat flours (HRS) and doubled null partial waxy wheat (AB) with *sur pouliche method.*