찰밀가루 첨가비율에 따른 밀가루 호화특성

작물시험장 : 이춘기[1)], 김재철, 강문석, 구본철, 박광근, 강문석, 남중현; 충북대학교 : 민용규

Pasting Characteristics of Composite Wheat Flour with the Addition Rates of Waxy Wheat Flour

National Crop Experiment Station : Choon-Ki Lee*, Jae-Chul Kim, Moon-Seok Kang, Bon-Cheol Koo, Kwang-Geun Park, and Jung-Hyun Nam

Chungbuk National University : Young-Kyoo Min

Objectives

This study was carried out to verify the addition effects of waxy wheat flour from different sources on the pasting properties of non-waxy wheat flour.

Materials and Methods

○ Samples tested
- Waxy wheat : Suwon 292(Sinmichal), SW97134(SW97134-B-WF1-12), SW97105(SW97105-B-WF14), SW97110(SW97110-B-WF23-13)
- Non-waxy flour(Base flour) : 10 varieties including Geurumil, Keumkangmil, etc.

○ Wheat flours : Prepared from Buhler Pilot Mill

○ Waxy wheat addition rate : 10, 20, 30, 40, 50% to base flour

○ Rapid Viscogram : Measured from the Rapid Visco-Analyzer(Newport Sci. Australia) using 3g sample in 25ml of water with the time and temprature profiles of one minute of holding time at 50℃, 3.7 minutes of heating time during which the temperatures are increasing from 50℃ to 95℃ with the heating rates of 12.16℃/min, 2.5 minutes of holding time at 95℃, and then 3.8 minutes of cooling time during which the temperatures are decreasing from 95℃ down to 50℃ with the cooling rate -12.16℃/min.

Results and Discussion

1. From the comparison of the pasting profiles between waxy and non-waxy wheat, it was found out that the viscosity ascending slopes during heating time were much sharper in waxy than non-waxy wheat pastes; the latter showed two stages of slopes, consisted of a slow one at near the gelatinization temperature and then a rapid one above the temperature.

2. The peak, minimum and final viscosities of the composite pastes decreased inversely with the addition rates of waxy wheat flours, while the decreasing rates were differed depending on base wheat flour. As the addition rates of waxy flours were increasing, the second peaks were developed at the temperatures near to the peak viscosity temperatures of waxy wheat flours, whereas the first peak viscosities originated from non-waxy wheat decreased. The decreasing rates of the first peak and the increasing rates of the second peak were largely depended on the kinds of base flours. It was noted that there were three types of responses on waxy flour additions among non-waxy wheat varieties. The first groups, including Geuru, showed smaller decreases in the first peaks but greater increases in the second peaks with the increase of waxy flour addition rates. The second groups, including Seodun, Woori, and so on, responded quite contrary to the first groups. The last groups, including Kobun, and so on exhibited the intermediate responses between group 1 and 2.

* 연락처 : 이춘기 E-mail : lee0ck@rda.go.kr 전화 : 031-290-6679

3. On the pasting profiles of composite flours, the effects were high in order of the kinds of non-waxy wheat flours> the addition rates of waxy wheat> the kinds of waxy wheat flours.

4. The first peak viscosity, breakdown, consistency and final viscosity of the composite flours were linearly decreased with the increase of waxy flours. The decreases by every 10% addition of waxy flours ranged from 3 RVU at Keumkang to 12.8 RVU at Urimil in the first peak viscosity, from 2.0 RVU at Geuru to 7.4 RVU at Seodun in breakdown, from 5.2 RVU at Keumkang to 7.9 RVU at Uri in consistency, and from 6.1 RVU at Keumkang to 13.4 RVU at Uri in the final viscosity. The accuracies of regression equations for the parameters were high in order of final viscosity> breakdown> the first peak> consistency.

Table 1. RVA pasting curve areas of various wheat flours at different addition rate of waxy flour during 12 minutes of RVA running after 1 minute of holding time at 50℃

Additive	Addition rate	Geuru	Seo -dun	Kobun	Al-chan	Jin-pum	Tap-dong	Keum -kang	Ol-geuru	Eunpa	Uri	Joeun
		Area (×4,000 RVU · sec)										
Control		13,8	8,9	14,4	16,1	14.0	15,0	13,9	15,3	14,8	13,0	17,1
SW97134	10%	14.9	7.6	14.6	15.7	14.2	14.3	13.7	13.8	13.8	10.1	15.3
	20%	13.6	7.4	13.3	14.8	13.6	14.4	13.6	14.8	13.2	9.0	15.3
	50%	13.7	6.8	13.3	14.6	13.5	14.4	13.8	13.5	12.2	9.2	13.8
Suwon 292 (Sinmichal)	10%	13.9	9.2	15.4	16.6	14.3	15.4	14.3	16.1	14.6	11.2	16.2
	20%	12.9	6.5	12.6	12.9	12.7	13.8	12.6	12.9	14.2	9.7	14.2
	50%	14.1	10.6	13.2	14.9	13.7	14.1	13.7	13.9	12.3	10.2	11.4

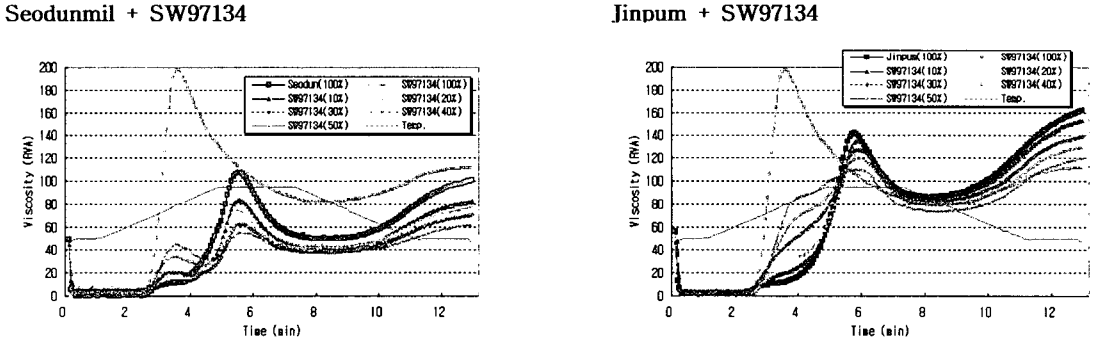

Fig. 1. Pasting profiles of Seodunmil and Jimpummil with the additions of SW97134

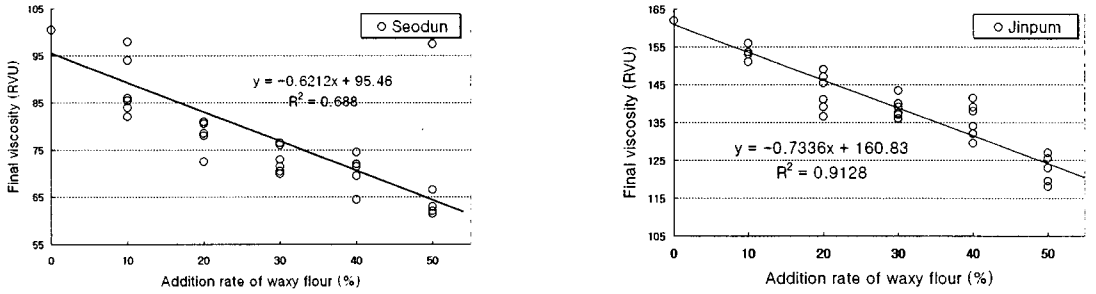

Fig. 2. Effects of waxy flour additions on final viscosities of various non-waxy wheat flours