Semolina Method

Scope

- Study mixing characteristics of samples that are difficult to develop, e.g. semolina.
- High speed mixing.
- Emulate industrial mixing.

doughLAB

The doughLAB is a flexible dough rheometer with conventional z-arm mixing action. It includes automated systems to control bowl temperature and dispense water into the sample, and variable temperature and speed controls. The instrument uses standard or custom test configurations to determine water absorption, dough mixing profile, development time, stability and softening of wheat, rye, durum and composite flours for milling, baking, and foods laboratories.

Description

The variable temperature and speed control capability of the doughLAB allows testing of samples that are normally difficult to handle. Semolina is a strong flour, requiring long test times in order to obtain meaningful results.

This method describes an accelerated procedure for testing semolina samples using the doughLAB. Using a faster mixing speed, results can be obtained quicker and more accurately. A new target torque will be required for the accelerated test. This new target torque can be determined by testing a wide range of similar samples to provide a calibration curve. Generally, target torque at 63 rpm is 500 FU (300 g: 4902 mNm, 50 g: 980 mNm), at 120 rpm is 650 FU (300 g: 6373 mNm, 50 g: 1275 mNm), and at 180 rpm is 750 FU (300 g: 7353 mNm, 50 g: 1471 mNm).

The method is applicable to flour that is very strong or is difficult to develop.

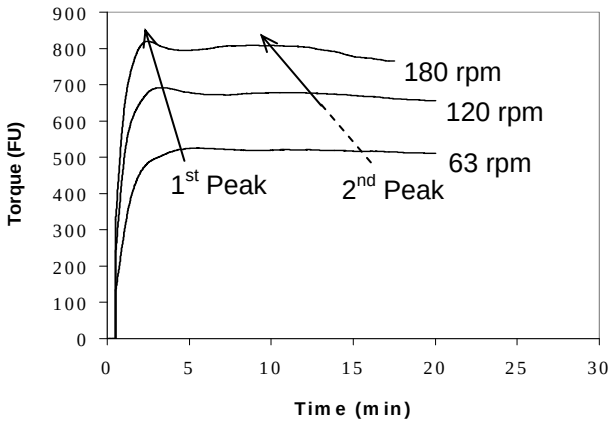

Fig. 1. doughLAB curve of a semolina flour tested on the doughLAB at different mixing speeds. Results can be obtained quicker and more accurately at higher mixing speeds. Note the occurrence of the second peak when higher mixing speeds were used. Source: Dang *et al.* (2004).

Method

Ten minute mixing profile (modified AACC International Method 54-21.01, modified RACI Official Method 06-02, modified ICC Standard No. 115/1).

Sample Preparation

300.0 g (or 50.0 g) sample at 14% moisture. The first water absorption (WA) estimation is entered by the user. The doughLAB will automatically dispense the correct amount of water for the sample size used. At the end of the test, the doughLAB will calculate the correct WA to reach a peak of XXX FU (Generally XXX = 500 FU for 63 rpm, 650 FU for 120 rpm, and 750 FU for 180 rpm).

Profile

Time	Type	Value
00:00:00	Temp	30°C
00:00:00	Speed	63 rpm
00:00:30	Speed	120 or 180 rpm
00:10:00	End	
Premixing time: 60 s Premixing speed: 63 rpm		

Measure

PT: Peak torque (FU)
WA: Water absorption (%)
DDT: Dough development time (min)
Stab: Stability (min)
ST: Softening (FU)
MTI: Mixing tolerance index (FU)

Target torque may vary by country, e.g. the target torque is commonly 600 FU (5882 mNm for the 300 g bowl, 1176 mNm for the 50 g bowl) in the UK.

EXAMPLE

Speed	Regression	R^2	RMS
63	dL WA = 1.049 Farino WA – 2.002	0.977	0.51
120	dL WA = 1.047 Farino WA + 2.416	0.977	0.49
180	dL WA = 1.126 Farino WA + 0.422	0.999	0.16

R^2 is the estimate of the variability accounted for by the regression; RMS is the root mean square of residuals of the fit. Mixing speed is in rpm.

Table 1. Comparison of WA between Farinograph and doughLAB

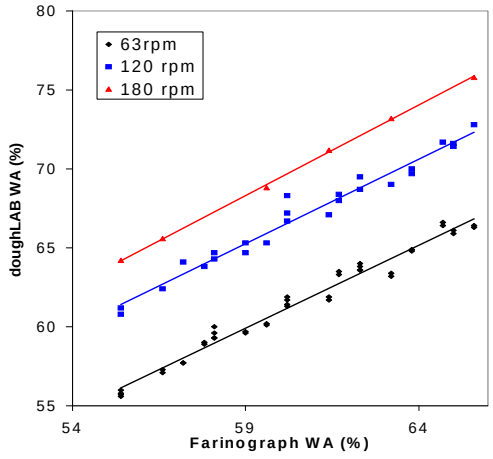

Fig. 2. Comparison of WA between the Farinograph and doughLAB for twenty semolina samples, tested at 63, 120 and 180 rpm. Source: Dang et al. (2004).