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Elongational properties and proofing behaviour of wheat flour dough

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Abstract

Two series of dough pieces were prepared: (a) at constant composition and different mixing conditions, and (b) by modifying only composition. For both, elongational properties were measured by lubricated squeezing flow (LSF) and proofing kinetics determined by 2D imaging. Elongational viscosity followed a power law in the strain interval [0.1, 1.25] and varied from 140 to 1400 kPa.s, for Hencky strain and strain rate values of 1 and $10^{-3}s^{-1}$, respectively. Strain hardening index varied little, in the interval [1.2, 2]. Positive correlation between consistency K and flow index n (series a) suggested that mixing conditions modify gluten network crosslinking, whereas negative correlation between K and n (series b) showed that liquid fraction plasticized the network. Porosity kinetics were found to be mainly governed by gas production factors, rather than dough rheology. Finally, elongational viscosity contributed to limit stability loss during fermentation, which could be attributed to the resistance it imparted to bubbles coalescence.

Keywords : elongational viscosity; fermentation; gluten; porosity; stability.