



RHEOLOGICAL PERFORMANCES OF ANCIENT WHEAT VARIETIES

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INTRODUCTION

Ancient wheat varieties are recently gaining an interest since several studies have targeted them as healthier alternatives to modern wheats. However, impaired baking properties compared to modern varieties, constitutes a great technological challenge. Aim of this study was to conduct a comparative evaluation of the rheological properties of ancient wheat species such as emmer, spelt and khorasan varieties.

MATERIALS AND METHODS

The wholegrain flours of emmer, spelt and khorasan varieties were prepared and evaluated for mixing and thermal properties using Mixolab® device, according to Chopin+ protocol: Mixing speed 80 rpm, Dough weight 75 g, Temperature 1st step 30 °C, Duration 1st step 8 min, 1st temperature gradient 15min – 4 °C/min, Temperature 2nd step 90 °C, Duration 2nd step 7 min, 2nd temperature gradient 10min – 4 °C/min, Temperature 3rd step 50 °C, Duration 3rd step 5 min.



Table. Mixolab parameters of wholegrain emmer (EF), spelt (SF) and khorasan (KF) flour

Mixolab parameter	EF	SF	KF
Water absorption (%)	62.2	62.2	60.0
Dough development time (min)	3.48	6.33	4.53
Dough stability (min)	5.40	6.53	9.70
Dough elasticity (Nm)	0.10	0.05	0.09
Resistance to thermo-mechanical stress, C1-C2 torque (Nm)	0.756	0.680	0.548
Maximum consistency, C3 (Nm)	1.670	1.663	1.891
Hot paste stability, C3-C4 (Nm)	0.064	-0.007	0.002
Retrogradation rate, C5-C4 (Nm)	0.639	0.800	1.141

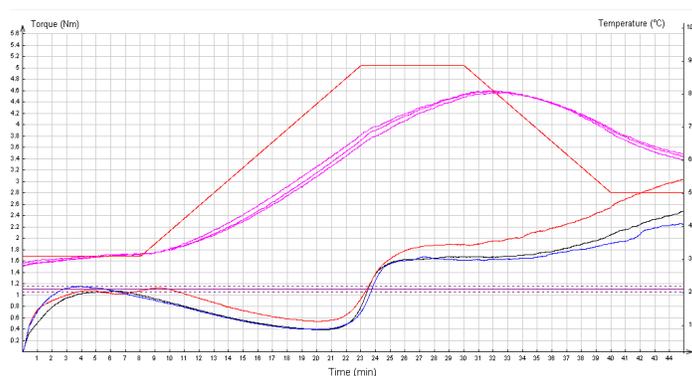


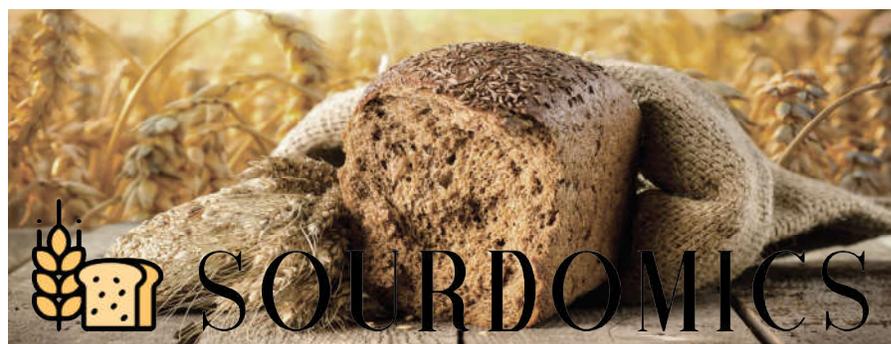
Figure. Mixolab profile of wholegrain emmer (—), spelt (—) and khorasan (—) flour

RESULTS AND DISCUSSION

Rheological measurement have shown that spelt and emmer flour were characterized with similar rheological profiles in terms of water absorption, dough stability, dough weakening upon mixing and heating and starch pasting properties. These two flours differ only in dough development time (DDT) and elasticity, where spelt flour exhibited almost twice higher DDT than emmer flour, while emmer flour was two times more elastic than spelt flour. On the contrary, khorasan flour was characterized with two peaks during dough development, grater dough stability and higher starch gelatinization and retrogradation rate.

CONCLUSION

Considering the obtained results, among the ancient wheat varieties, khorasan can be the most suitable for bread-making. In general, making bread from ancient wheats will require modified baking techniques in order to satisfy the increasing consumer demand for these products, while improving wheat genetic biodiversity.



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