

Application Data

Understanding equipment and processing effects

Description

Dough mixing and processing equipment have significant effects on the quality of bread and fermented products. Variations in equipment settings may be used to change the appearance and texture to meet specific quality standards. C-Cell data may be used to detect variations in bread quality and used as the basis for optimising product quality. C-Cell data also provide an objective basis for comparing the effects of different equipments designs.

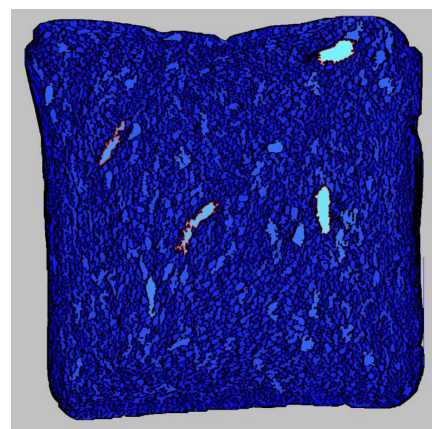
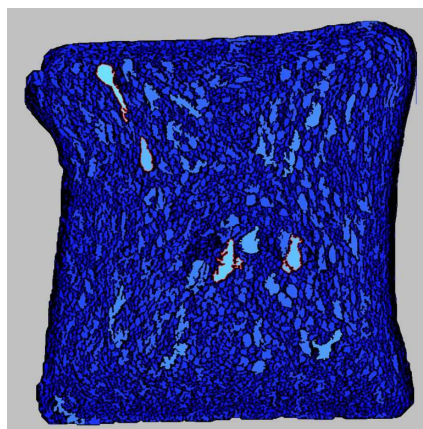
Data

C-Cell measures up to 48 different parameters and different combinations of these will provide the data required for the assessment of bread quality. Depending on bread product specifications 4-8 parameters may be used in the quality evaluation. Some examples of how C-Cell data may be used to evaluate the effects of equipment and processing follow

Impact of mixing technology

Different types of mixers and mixing conditions yield different bread structures and impact on the appearance of the crumb. Typical data may include:

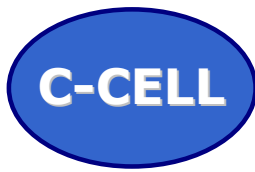
- Cell numbers**
- Average cell wall thickness**
- Average cell elongation**
- Cell contrast (between cell and cell walls)**
- Average cell size**
- Non-uniformity**
- Cell orientation**



Atmospheric pressure

Partial vacuum

Number of cells	8424	10210
Average cell diameter (mm)	1.835	1.564
Average cell wall thickness	0.421	0.404
Cell contrast	0.75	0.79
Non-uniformity	2.244	2.744

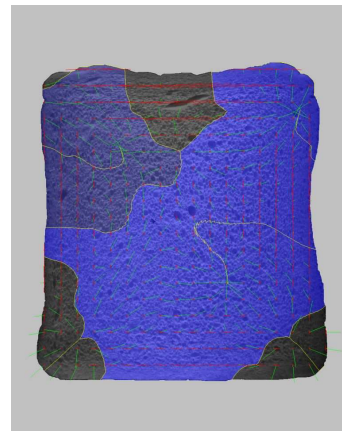
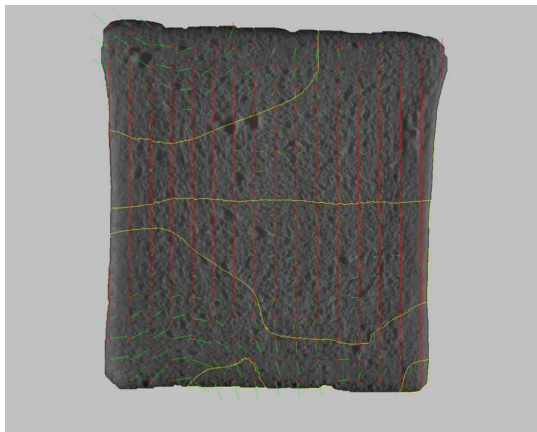


Application Data

These cell image examples overpage compare mixing at atmospheric pressure (left) and with the application of partial vacuum towards the end of mixing. The variation in cell sizes is visualised and features which are considered to be large enough to be described as holes identified. Small cells are coloured dark blue and larger ones in lighter shades of blue, green and yellow; features considered to be holes are outlined in red.

Impact of processing technology

The examples below compare single dough piece moulding with four-piecing



	Single piece (left)	Four piece (right)
Average cell size (mm)	1.499	1.395
Non-uniformity	1.763	0.986
Average cell angle to the vertical (°)	86.8	6.1
Average cell elongation	1.63	1.55
Degree of circulation	0	0.7
Curvature	804	860

The closer that the average cell angle is to 0, the more vertically orientated is the structure. Higher elongation values may be associated with the dough sheeting process. Higher circulation values (scale 0-1) indicate greater rotation of the cells and the curvature value is a measure to the extent that the cell orientation changes across the slice

More information is available from:

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