Volume Determination of Baked Products Method

Scope

- Process control
- Final product quality control
- Product development

Volume Measurement - BVM 6600

Superior quality and value of bread and other bakery products is associated with higher volume and aerated crumb. The BVM 6600 uses fast, automated laser topography to provide an alternative to time-consuming and unreliable seed displacement methods. It maps height, length, width and volume, and produces a three-dimensional rotatable product image. Product weight, specific volume and density are also reported. The variable radius laser arm allows optimizing laser to sample distance, giving maximum flexibility without sacrificing accuracy. The BVM 6600 provides accurate analysis that is repeatable and applicable from one production site to the next. The instrument is robust and easy to use for millers, bakeries, food companies, food ingredient suppliers, food research institutes and test kitchens.

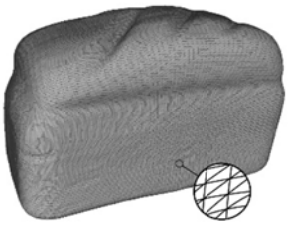

Figure 1. Laser topography image of a typical bread loaf. Insert shows surface mesh reconstructed from scanned point "cloud" surface coordinate data. Source: Anderson *et al.* (2014).

Description

Volume is the most important measure of quality for bread and many other baked products, and has traditionally been determined by seed displacement methods. These methods are cumbersome, are poorly suited to compressible, sticky or creased products, are prone to error, and to date, lack standardization.

In the BVM method, a sample is placed on the rotating support, and its volume is measured using a laser on the end of a rotating arm. Volume, dimensions, weight and density are calculated and shown, together with a three-dimensional image of the sample (Figure 1). The BVM method is faster and more accurate than seed displacement methods (Table 1), with typical tests completed within 30 s and accuracy typically within 2%.

Table 1. Mean volume of bakery loaves determined by various methods.

Sample	Volume determination by various methods(mL)			
	Water displacement	Seed displacement	BVM (30 s scan)	BVM (60 s scan)
A	1319	1173	1319	1323
B	1855	1773	1847	1856
C	1993	1860	1984	1994
D	1745	1650	1715	1747
E	2466	2380	2422	2465

Method

Product/Profile Set Up

If an Example Product and associated Profile are not available, perform a quick scan (10 s) for method optimization (to determine optimum laser distance and angle for the particular sample).

Sample Preparation and Testing

Place the sample on the central support shaft (use support accessory(ies) if needed) and scan using the chosen Profile.

Test requirements

Support accessory:	Flat/circular supports or adjustable/hooked attachments to suit the sample
Top support shaft:	If necessary, for tall samples

References

Anderson, S., Purhagen, J.K. and Bason, M.L. 2014. AACCI Approved Methods Technical Committee Report: Collaborative study on bread volume determination by laser topography using a bread volume meter. Cereal Foods World 59(6):294-296.