

FOAMSCOPE™

Milk Foam Analysis

Objective

Characterize the microstructural quality and short-term stability of dairy and plant-based milk foams for Barista applications.

Measurement

FOAMSCOPE™ is placed directly into the foaming device, allowing the foam structure to be monitored in situ during foam generation and subsequent ageing.



Sample	Semi-skimmed cow's milk
Camera settings	Exposure: 3.8ms - Gain: 0dB
Capture settings	Frequency: 1fps - Time: 600s

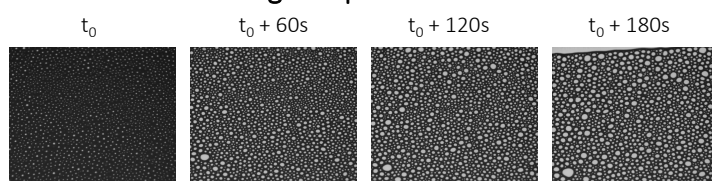
Key analysis parameters

FOAMSCOPE metric	Information provided
Sauter Mean Diameter (D32)	Characteristic bubble size; relevant for comparing foaming devices and/or milk formulations
Bubble Density	Number of bubbles per unit area
Span	Width of the bubble-size distribution
Liquid fraction	Evolution of the liquid content within the foam structure

In-situ studies of milk foam produced in a Nespresso Aeroccino 4 have shown that bubble size increases, bubble-size distribution broadens and liquid fraction decreases during post-foaming ageing, supporting the relevance of these parameters as indicators of milk foam drainage and microstructural stability [1] .

[1] Reference: Völpl, A.R. et al., In-situ rheological and structural characterization of milk foams in a commercial foaming device, Journal of Food Engineering 290 (2021) 110150

Foam structure images capture



t₀ — End of foaming

Bubbles are small and the population appears relatively homogeneous

t₀ + 60 s

The fine bubble network is still largely preserved, while post-foaming rearrangement is observed and some larger bubbles appear.

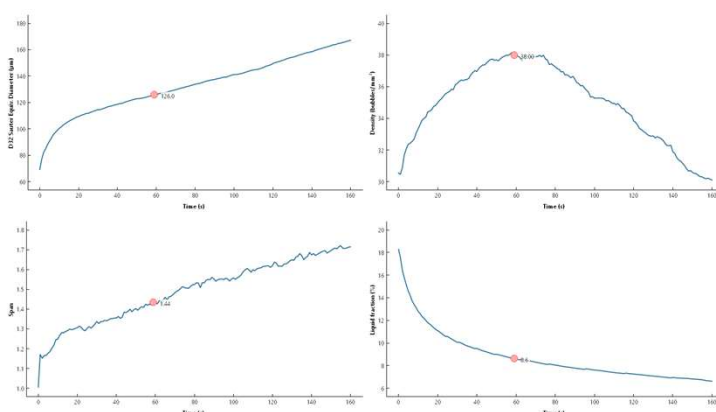
t₀ + 120 s

Bubble growth becomes more apparent.

t₀ + 180 s

Large bubbles are more prominent, and the distribution appears more heterogeneous.

Foam structure analysis



Bubble size ↑

Progressive bubble growth and foam coarsening.

Bubble density ↑ then ↓

Initial drainage/rearrangement temporarily increases bubble density, followed by a decrease as bubble coarsening progresses.

Span ↑

Bubble-size distribution broadens, indicating increasing foam heterogeneity.

Liquid fraction ↓

Rapid initial drainage followed by slower liquid loss.

FOAMSCOPE™ provides a quantitative characterization of milk foam fineness and short-term stability by monitoring drainage, bubble growth and bubble-size distribution over time.

Note: this sheet is designed as an application illustration, not as a scientific validation study.