



Australian Government

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Nuclear-based science benefiting all Australians

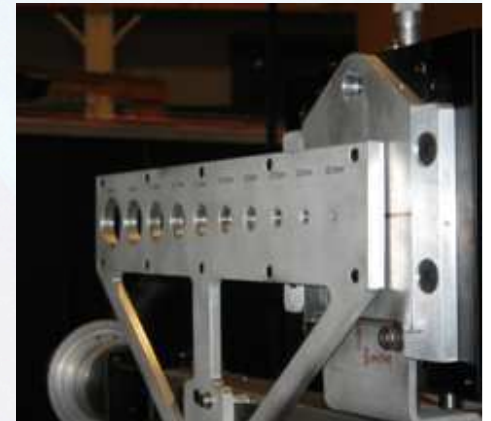
Quokka

Elliot Gilbert, Katy Wood, Chris Garvey



SPECIFICATIONS AND PERFORMANCE

- $0.0006 \text{ \AA}^{-1} < q < 0.7 \text{ \AA}^{-1}$ (with focusing optics, without $Q_{\min}=0.004$, largest pinhole)
 - Q_{\max} to increase to 1.3 \AA^{-1} with modified nose cone – in design
- 10-position source aperture (5 – 50 mm diameter)
- 10-position sample aperture (2.5 - 30 mm diameter)
- Incident beam polarisation (Fe/Si sm & rf sf)
- MgF_2 lens and prism focussing optics (8.1 \AA , 17.1 \AA)
- 1 m^2 area detector (Ordela 21000N), 5.08 mm pixel - Transverse offset to 450 mm
 - Higher count rate detector under consideration
- ^3He filter for polarisation analysis to be installed in December 2011
- Space availability in upstream optics for further devices including chopper for TISANE ...
- Estimated maximum sample flux $> 2 \times 10^7 \text{ n/cm}^2/\text{s}$ @ $\lambda=5\text{\AA}$, 10% FWHM
- Dedicated Food Structure Programme





~ 20 m
collimation
system

~ 20 m
detector
tank

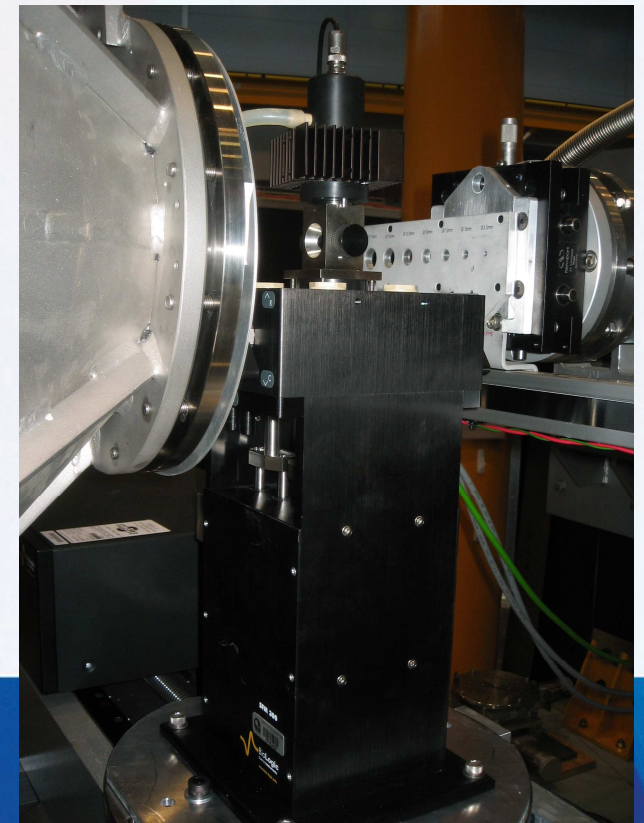
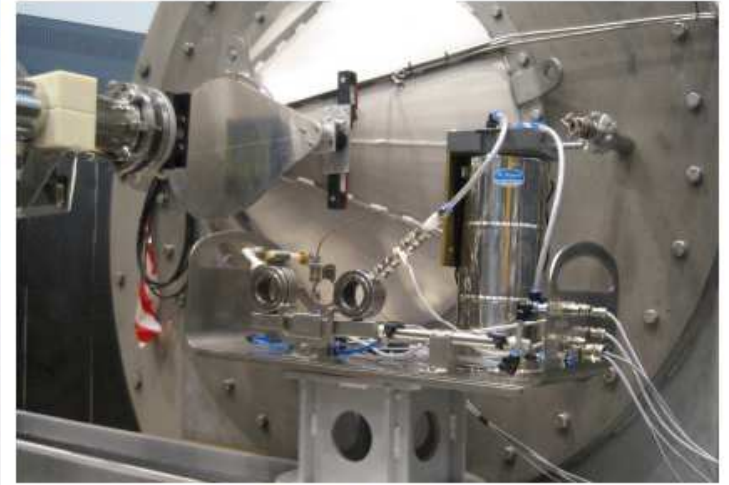
*Detector
1x1m²
~5mm res,
450 mm offset*

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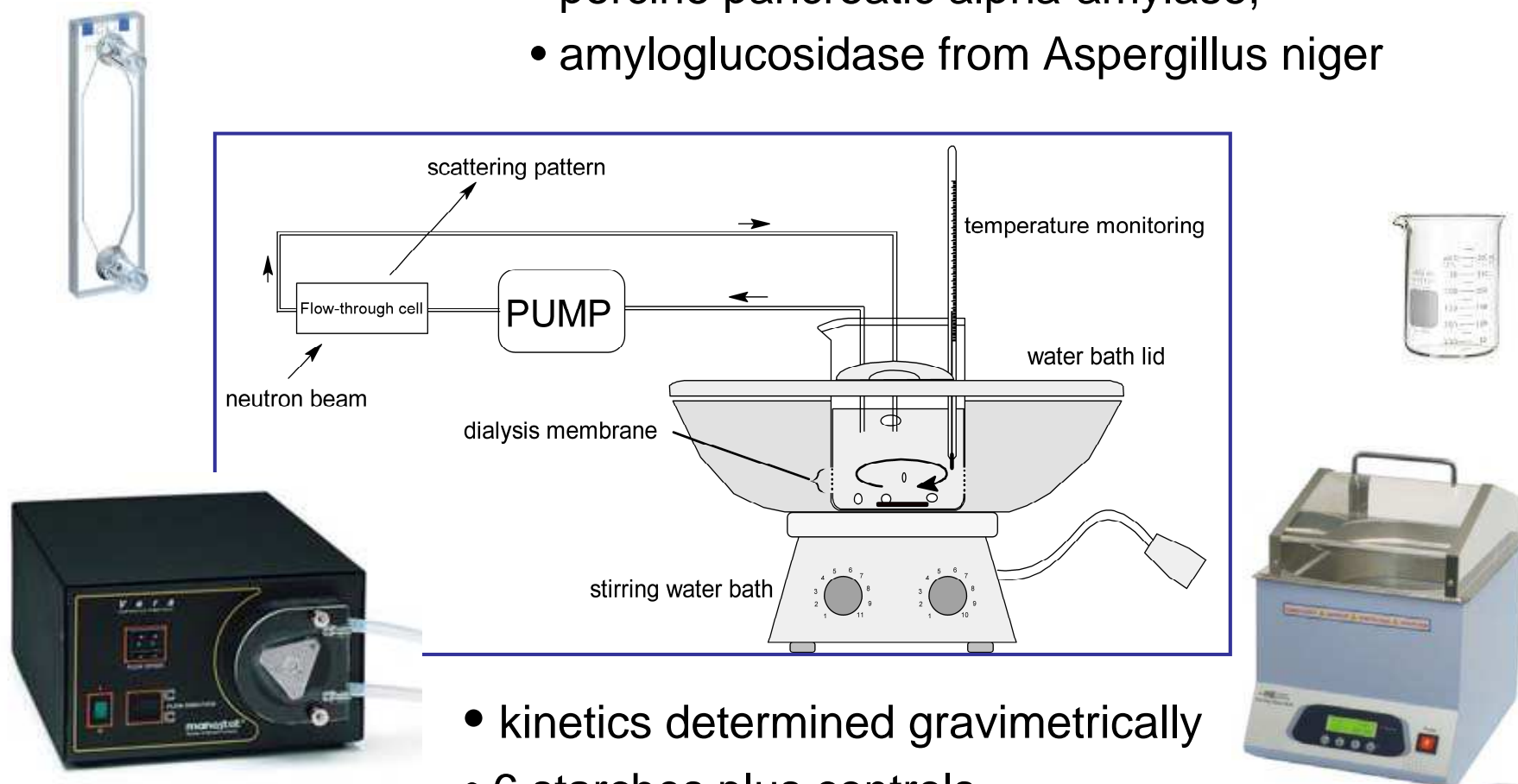
SAMPLE ENVIRONMENTS

- Rapid Heat Quench (T-jump) Cell
- 5 T horiz. Cryomagnet 4 – 300 K
- 11 T Cryomagnet
- Cryofurnace 10-600 K, Cryostat 1.8 – 300 K
- Stopped flow
- Couette rheometer (Anton Paar M250)
- Pouiseille shear cell
- 10-position heated Autochanger (to 250 C)
- High Pressure cell under development
- Rapid ViscoAnalyser

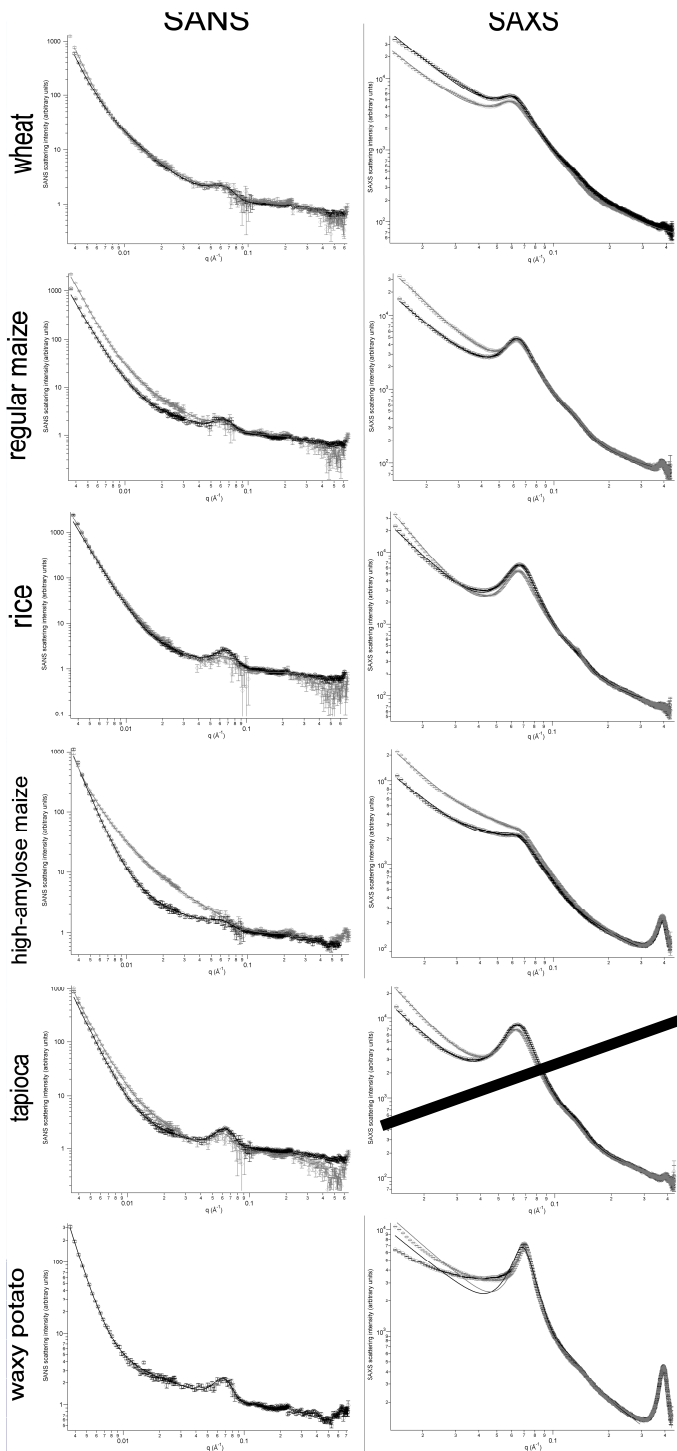


IN-SITU DIGESTION OF NATIVE STARCHES

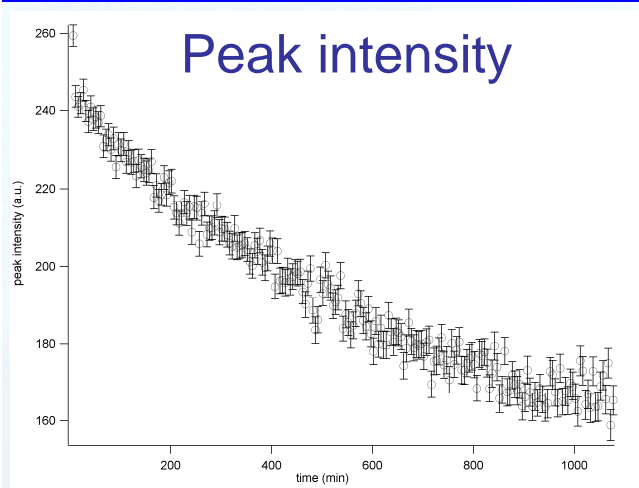
- porcine pancreatic alpha-amylase,
- amyloglucosidase from *Aspergillus niger*



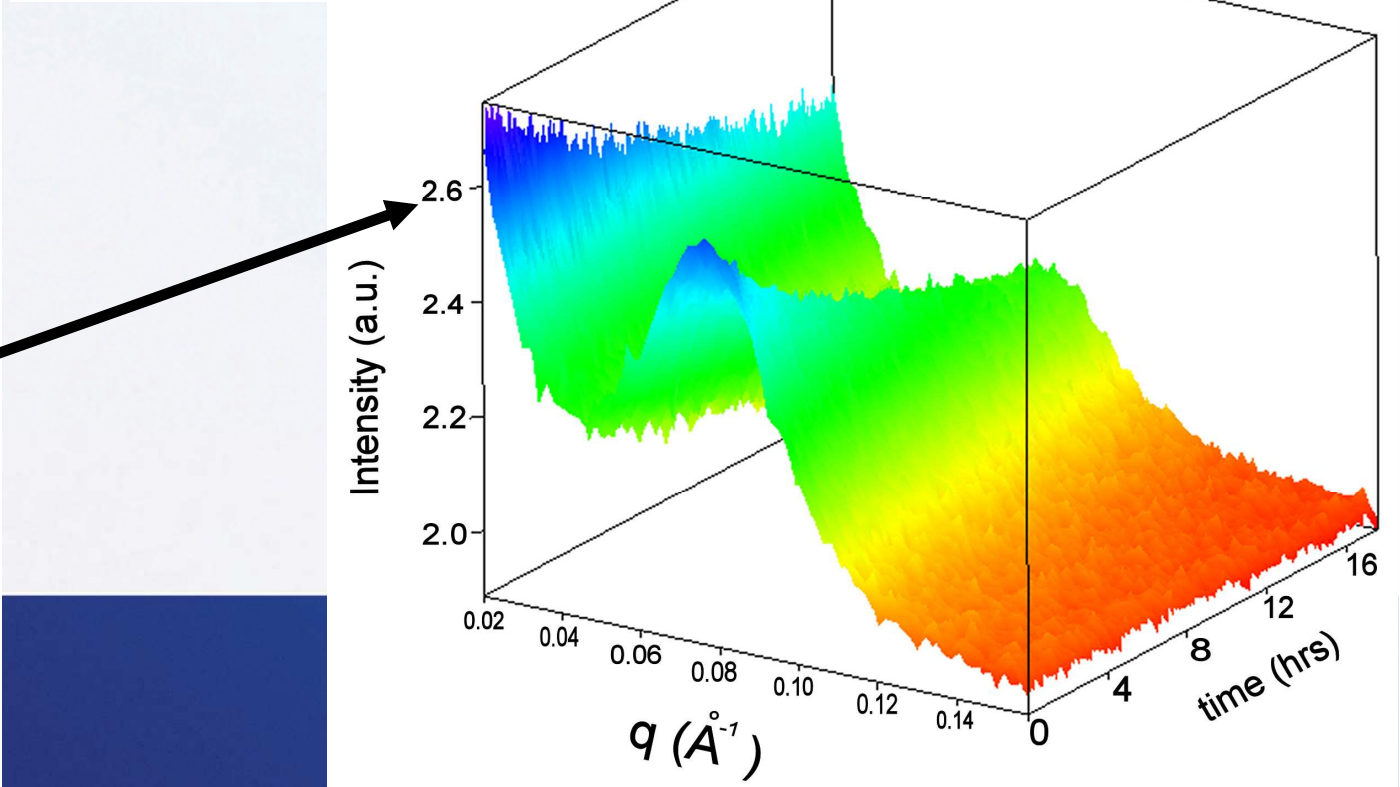
- kinetics determined gravimetrically
- 6 starches plus controls



TIME-RESOLVED SANS



Blazek and Gilbert,
Biomacromolecules 2010



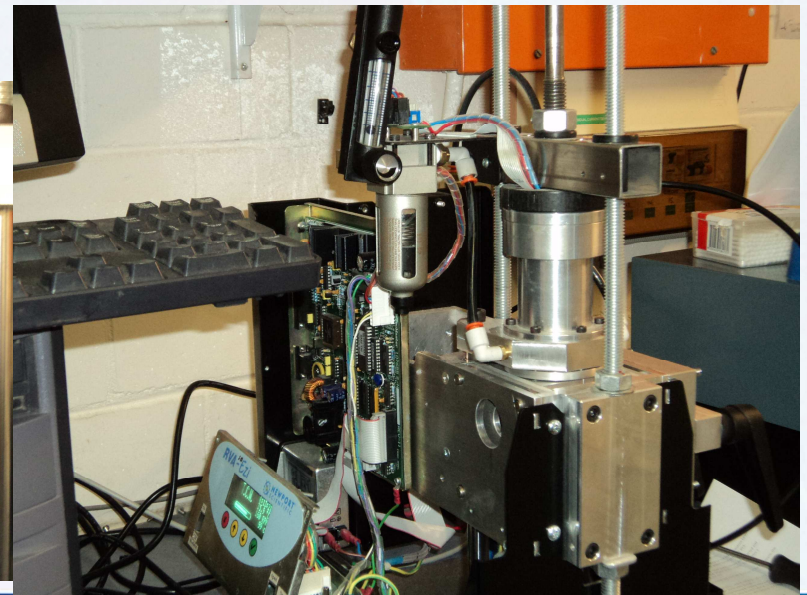
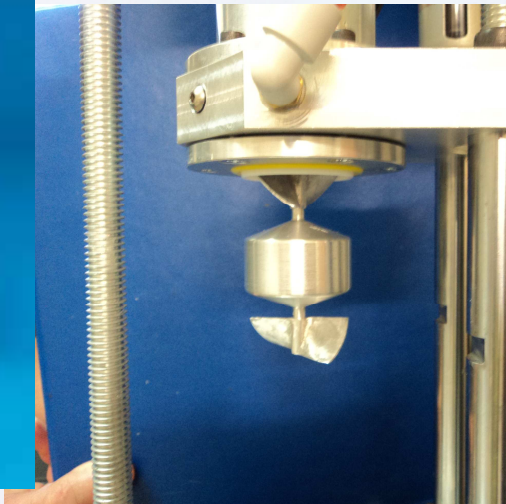
RAPID VISCOANALYSER

THE **RVA** HANDBOOK

Edited by Graham B. Crosbie and Andrew S. Ross



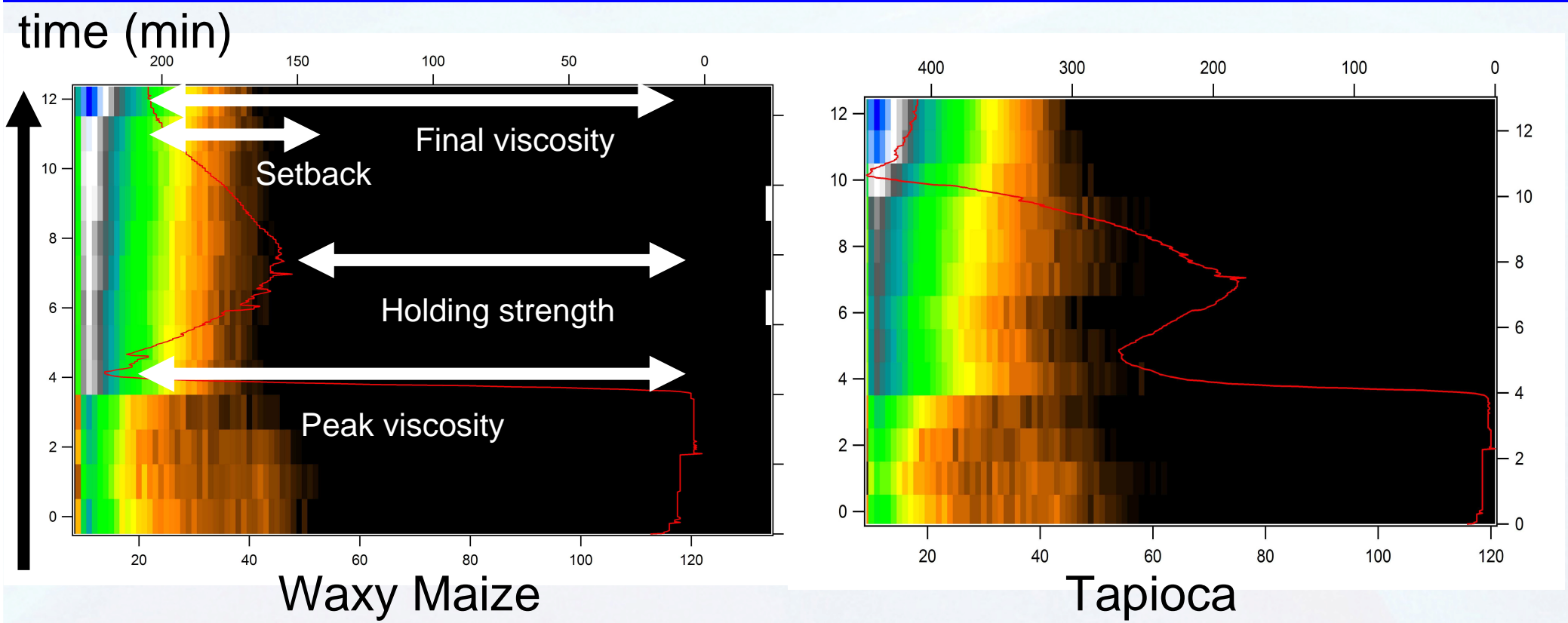
- Tool for product development, quality/process control, QA.
- Cooking, stirring viscometer with ramped T and variable shear optimized for testing viscous properties of starch, grain, flour, foods.
- Up to 700 cP at 160 rpm; 350 cP at 320 rpm



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H95 profile – 30 – 95 – 30 C over 13 mins



“Simultaneous Rapid Viscoanalysis & Small-angle Neutron Scattering study of Starch Pasting”

More recently – tested in streaming mode (x,y,t as single file – frames det'd post-experiment)