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Perten INSTRUMENTS a PerkinElmer company

Asociación Española de Técnicos Cerealistas

Taller práctico: Rapid Visco Analyser (RVA)

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Viscosity in heating-cooling cycles

The majority of foods are systems resulting from “cooking plant tissue components in excess of water”.

Rheology in temperature cycles

Processing

Textures

Stabilities

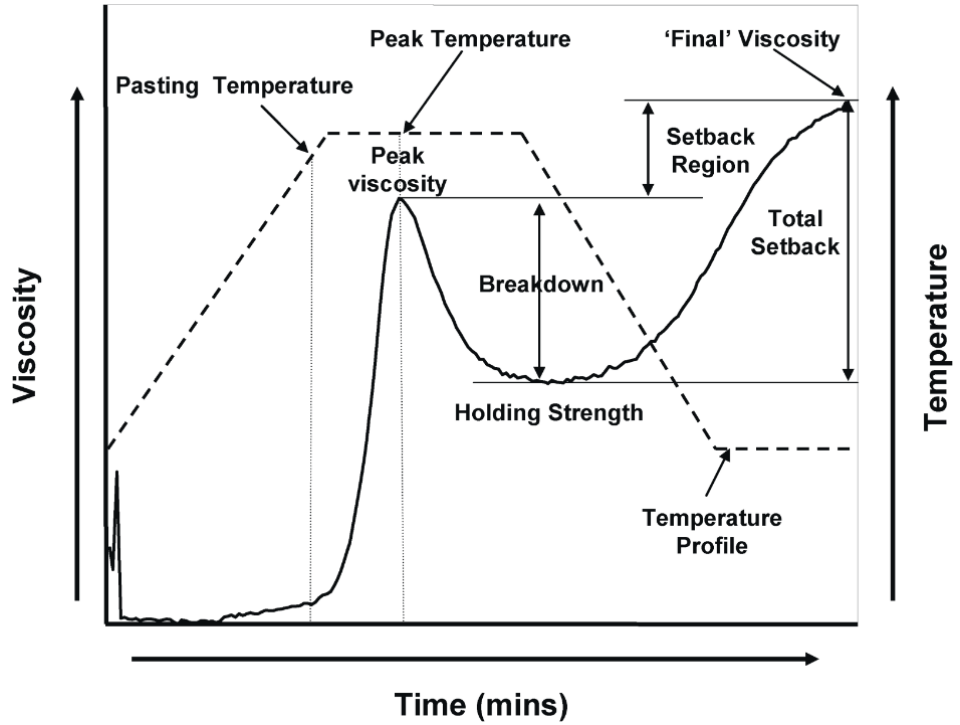
Rheological indicators

Some examples of RVA applications

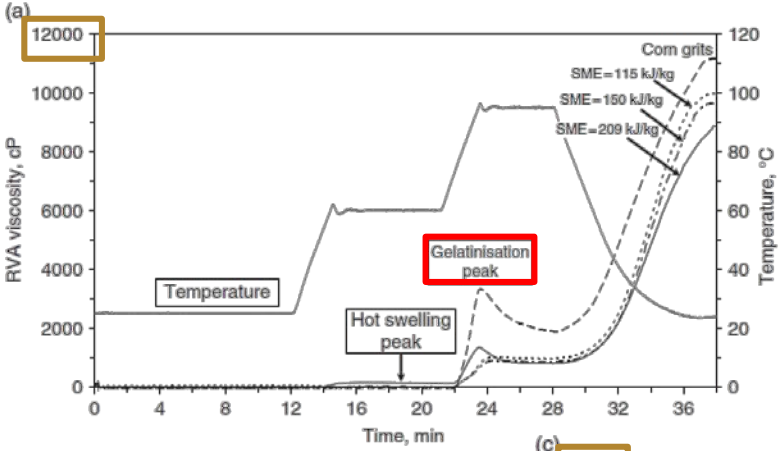
General pasting curve
Degree of cooking
Endosperm matrix (plant tissue matrix)
Emulation of retorting processing
High temperature general pasting method

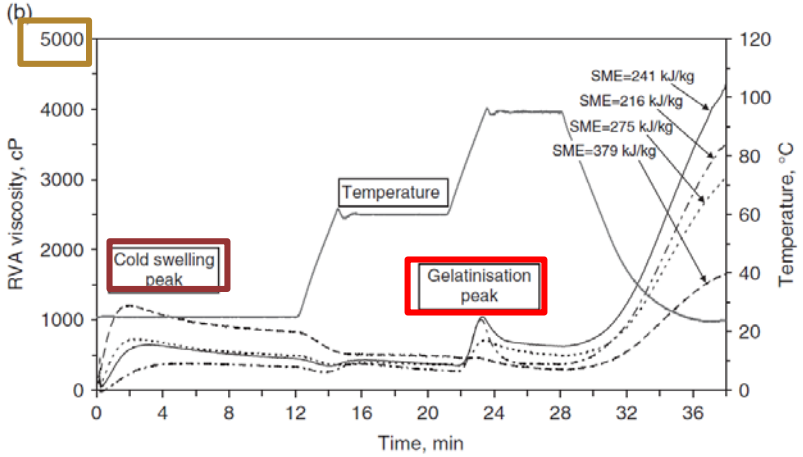
Thermorheological properties of flour/ starch

- Container (liquids/ solids, pastes).
- Heating/ cooling cycles.
  - Time
  - Temperatures
  - Heating/ cooling rate
- Shear rate.
- Measure apparent viscosity through torque determination.

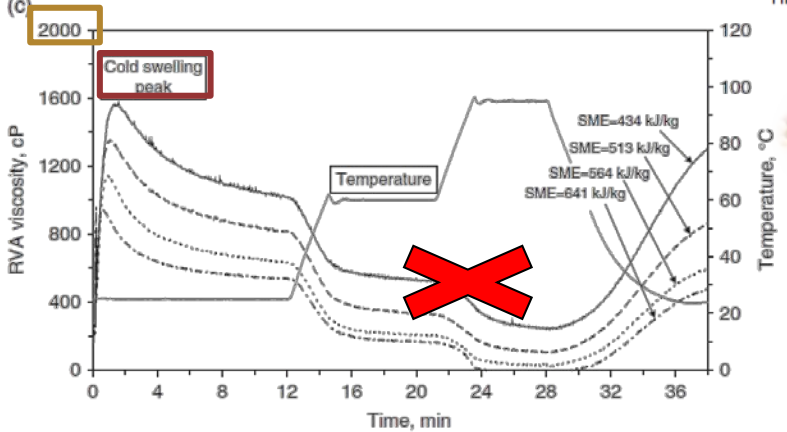


Degree of “cooking”

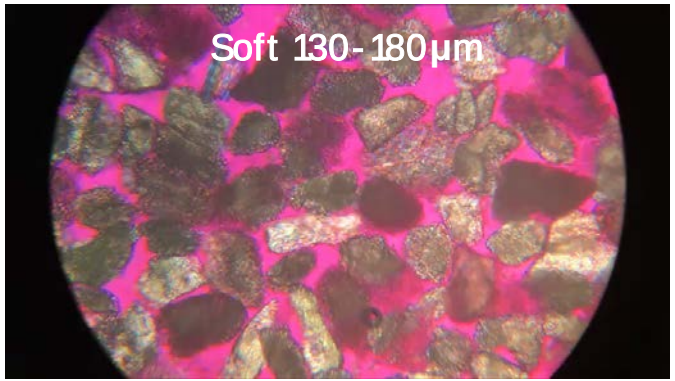


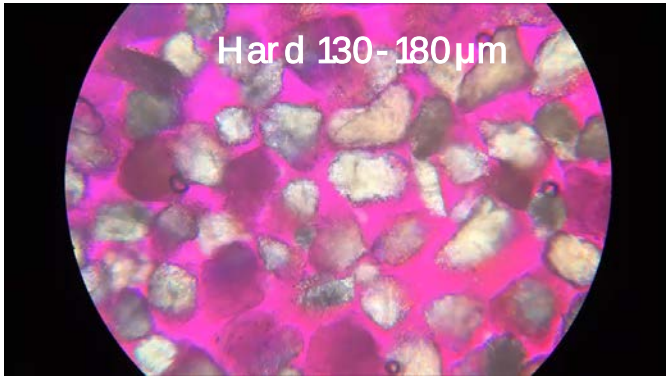


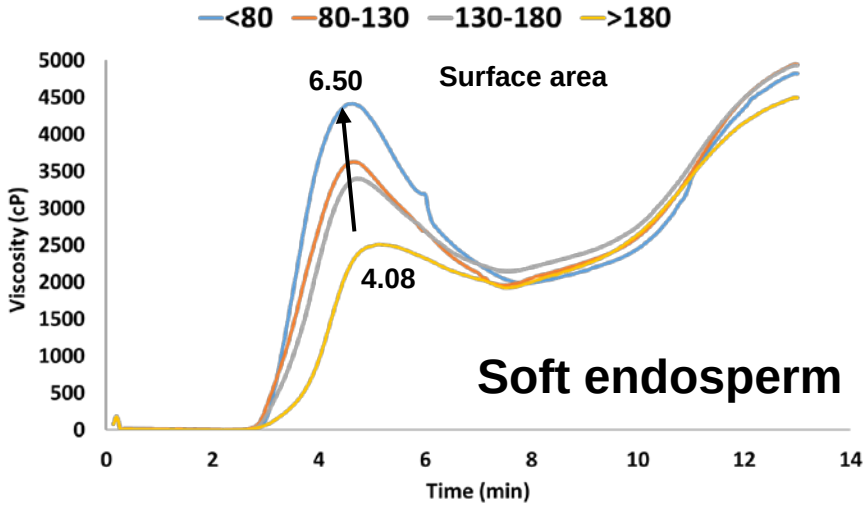
Bouvier & Campanella (2014)

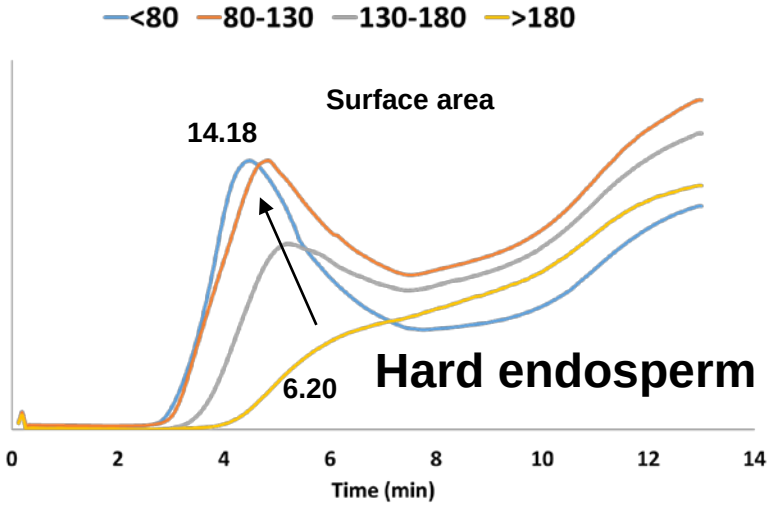


Endosperm hardness (plant tissue matrix)



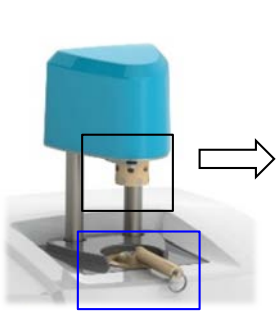


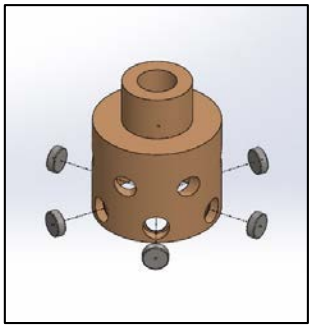




New RVA 4800

- The RVA 4800 can run the same tests (<100 °C).
- It also includes a high temperature test mode with:
  - A magnetically coupled drive (rare-earth magnets).
  - A self-pressurizing sealed vessel operating up to 140 °C.
  - Its own disposable cans & paddles.

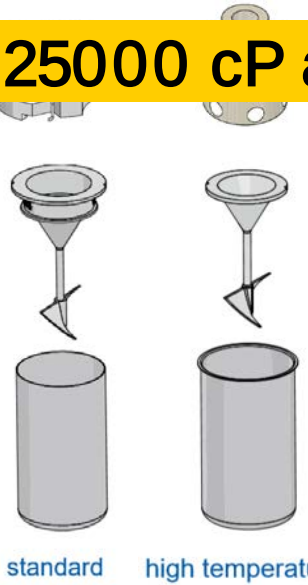




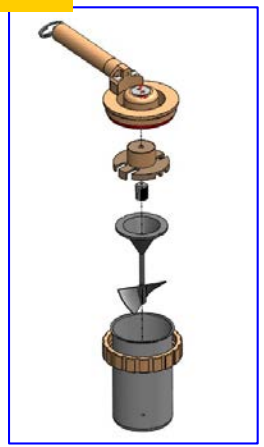
Coupling with magnets

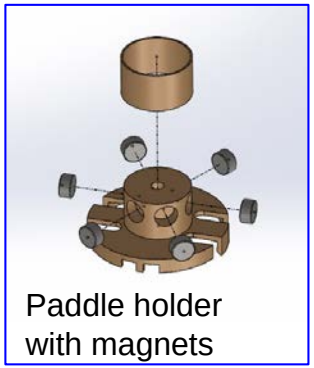
Decoupling limit at 25000 cP at 140 oC

RVA 4800



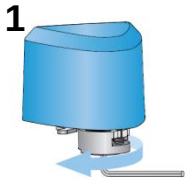
standard high temperature



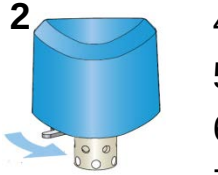


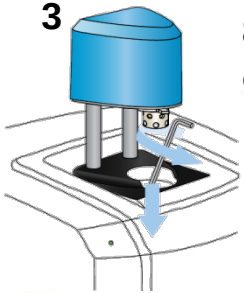
Paddle holder with magnets

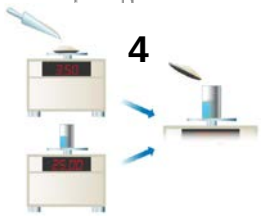
New RVA 4800

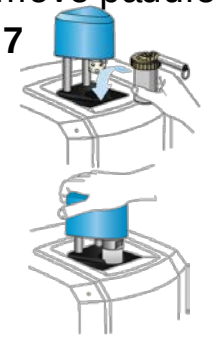


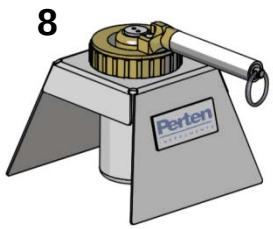
1. Remove standard coupling and fit HT coupling onto tower
2. Place HT safety switch in the forward position
3. Lower the ejector bobbin to its lowest position
4. Weigh sample and solvent into canister
5. Insert can through collar. Insert paddle into paddle holder on lid assembly
6. Place lid assembly on can and tighten onto collar
7. Insert can into RVA and push down tower
8. After test, remove canister and optionally place in stand to cool
9. Pull pressure release ring to equalize pressure
10. Open can and remove paddle



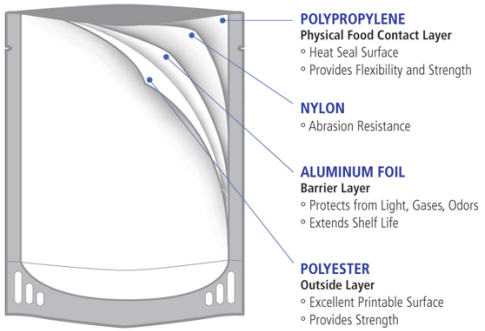








Applications of the new RVA 4800

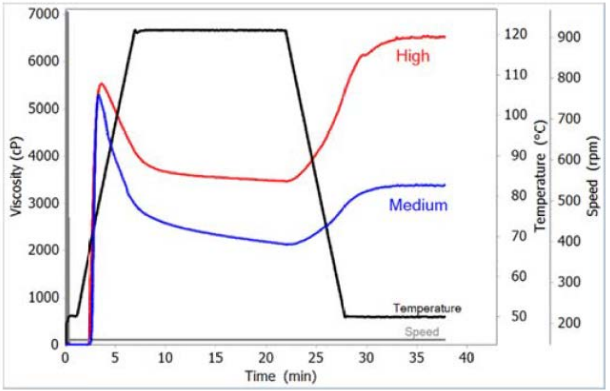


Perten Instruments Method Description
RVA Method 46.01

Retorting Method

Scope

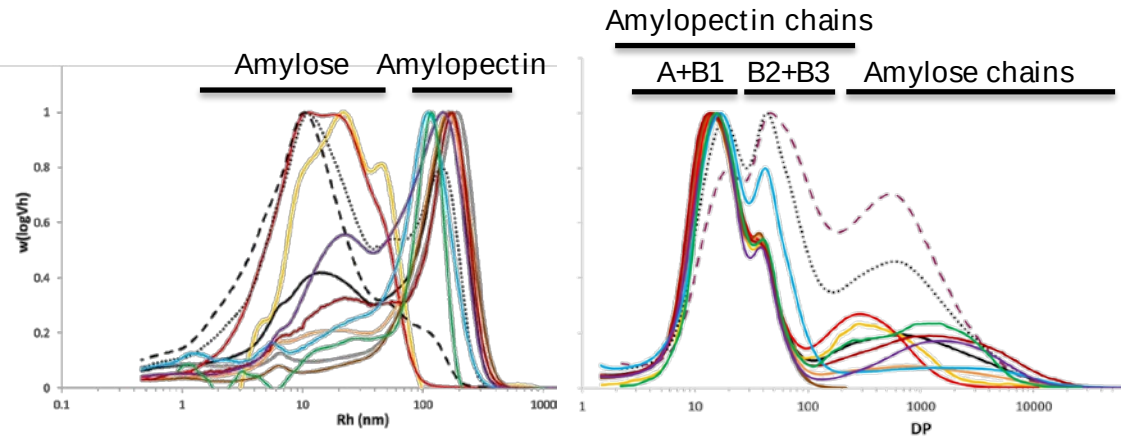
- Ingredient suitability for retorting
- Product development
- Sample sterilization
- Mimic the retorting process for quality assurance



Pasting curves of corn starch showing greater thermal tolerance of the more highly cross-linked sample to 121C retorting conditions.

Applications of the new RVA 4800

- Restricted granular swelling
  - AM-extender (ae) maize starches.
  - high-AM potato starches.
  - pulse starches.
- Because of:
  - glucan composition.
  - AM/ intermediate material and AP interactions.
  - tie chains (AM/ intermediate material that pass through the crystalline and amorphous lamellae).

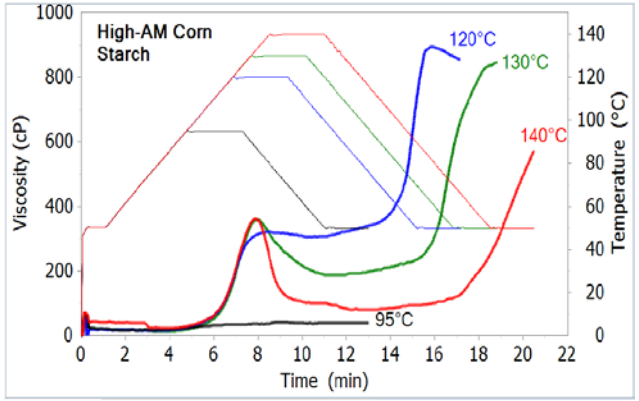


Perten Instruments Method Description
RVA Method 45.01

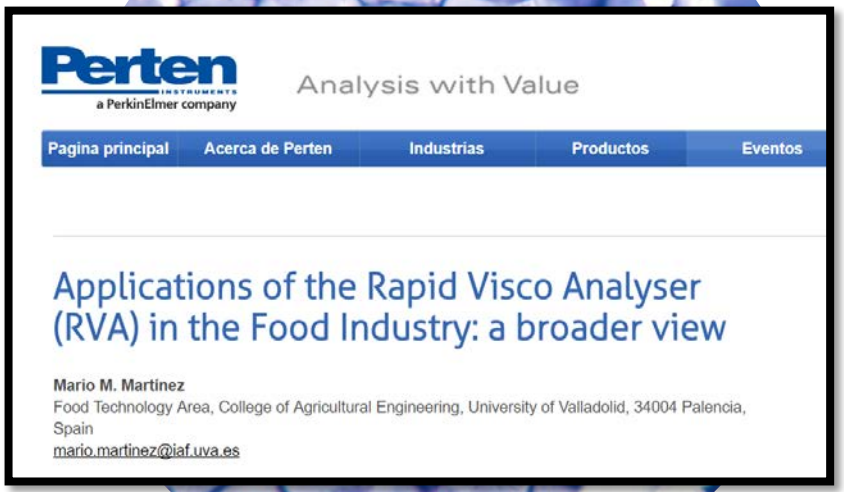
High Temperature General Pasting Method

Scope

- Ingredient suitability for high temperature processing
- Product development
- Process control
- Finished product and competitive product analysis



Pasting curves of high amylose corn starch.



- Useful rheological indicators in heating-cooling cycles.
- Thermorheological behavior of cereal tissues.
- General pasting as a fingerprint for degree of cooking.
- Endosperm hardness (plant tissue matrix).
- Expanded RVA uses with the new RVA 4800.
- Infinite uses in the food industry.

Acknowledgments

Thanks!

Any questions ?

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