Testing Protein Stability, Feeling the HEAT

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Now we understand what it is, how do we test it?

Deceptively simple question?

The reference method remains, 6 hours at 80°C

But there are a lot of things that can go wrong with even this simple test.
Bentonite fining trial.
Mimic production scale!

1. **Representative sample of juice or wine**
   - same solids content as the bulk wine

2. **Bentonite preparation**
   - same bentonite, same slurry, same water

3. **Bentonite addition and mixing**
   - mixing regime and contact time similar to plant conditions

4. **Test to predict stability**
   - allow to settle then filter prior to test
Bentonite fining trial

Filter samples

Bentonite rate (g/L): 0.0, 0.2, 0.4, 0.6, 0.8, 1.0
Measure turbidity of unheated samples

Ineffective filtration
- ensure all filtered samples are <1 NTU

Bentonite rate (g/L)

0.0 0.2 0.4 0.6 0.8 1.0
Heating step

Water bath 80°C

Common mistakes

- Water entering vials during heating
  - ensure vials are not below water level
Heating step

Water bath 80°C

Heating mantle

Common mistakes

- Temperature not reached
Heating step

Water bath 80°C

Heating mantle

Time 2-6 hours
Measure turbidity of heated samples

Bentonite rate (g/L)

0.0  0.2  0.4  0.6  0.8  1.0
Interpretation

Δ NTU

Bentonite rate (g/L)

<table>
<thead>
<tr>
<th>0.0</th>
<th>0.2</th>
<th>0.4</th>
<th>0.6</th>
<th>0.8</th>
<th>1.0</th>
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<tbody>
<tr>
<td>56.0</td>
<td>30.7</td>
<td>16.8</td>
<td>9.7</td>
<td>0.34</td>
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<tr>
<td>56.4</td>
<td>31.0</td>
<td>17.1</td>
<td>10.1</td>
<td>0.98</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Industry: Δ<2.00
AWRI: Δ<0.50
Transfer of wines from test tubes to NTU tubes

Incorrect judgement
- measure NTU before and after heating on all samples
- visual assessment (2 people)
How to determine a bentonite addition

Suggestions / questions / comments? email the calculator services staff | Print

Bentonite addition

Desired addition rate of bentonite

Volume of wine/ferment/juice

Concentration of bentonite solution

Calculate litres of bentonite solution to add
Temperature and time of heating effect the estimated bentonite dosage

Correct fining rate

Elapsed time once temperature was reached (hours)

Estimated bentonite dosage required for stability (g/L)

- 60°C
- 70°C
- 80°C
The time of the cooling step after heating also influences the result.
Cooling step

- Water bath until 20°C
- On the bench overnight
- On ice
- Under running water

2 hours
Ability of tests to predict stability

All bright (except Riesling) after storage
(<20° C for 24 months or 35° C for 1 month)
The Australian Wine Research Institute

Bento test

All bright after storage (<20°C for 2½ years or 20°C-35°C for 1 week or 35°C for 1 month)

Bentonite required to pass the test (g/L)

Bentotest

80°C 6 hrs

80°C 2 hrs
Take home messages

- Check stability of final blend prior to bottling

- Perform bentonite trials
  - Get the method right
  - Use the same conditions in the lab and cellar
  - Use consistent methodology – heating and cooling times
  - Use NTU and Visual assessment

- Understand bentonite-type choice
How to set up a fining trial

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How to set-up a laboratory-scale fining trial

- Always carry out a fining trial before any additions are made in the cellar
- Incorrect additions might result in under- or over-finings, quality loss (stripping), product loss (lees), added expense etc.
- Always include a control
- Always use the same batch of fining agent in the laboratory trial as used in the cellar
- Use fresh samples