THE COMPLETE SOLUTION FOR THE MILLING INDUSTRY

MIXOLAB
Quality control for cereals, flour and milling products.
The Mixolab measures the consistency of dough subject to the dual stress of mixing and a temperature rise. The Mixolab analyses protein and starch quality using a 50 g flour sample.

1. MIXOLAB STANDARD
The “Chopin +” standard protocol is used for analyzing:
1. Behavior during mixing (hydration, stability, etc.)
2. Protein quality
3. Starch gelatinization
4. Amylase activity
5. Starch retrogradation.

2. MIXOLAB PROFILER
The software measures all the standard curve parameters and converts them into six qualitative indexes:
1. Absorption index
2. Gluten+ index
3. Amylase index
4. Mixing index
5. Viscosity index
6. Retrogradation index

These parameters are perfectly suited to set simple and effective criteria in the specifications.

3. MIXOLAB SIMULATOR
The Simulator protocol gives results fully comparable to the Farinograph®:
- Hydration
- Weakening
- Development time
- Stability

BENEFITS
✓ Standardized
Compliant with ICC173/1, AACC 54-60-01, NF V03-765, NFV03-764, GOST P 54498-2011 standards.
✓ Simple
Automatic water addition, fully removable mixer and quick cleaning.
✓ User-friendly
PC control for complete traceability.
Software available in more than 10 languages.
✓ Versatile
Suitable for both flours and ground products.
✓ Flexible
Fully customizable protocols.
✓ Adaptable
Used in Quality Control and R&D.
THE MIXOLAB HELPS SELECT WHEAT.

The Mixolab can be used to differentiate the main flour categories (cake, French bread, pan bread, etc.) based on the mixing behavior and starch gelatinization (C3-C2).

The Mixolab is also capable of differentiating various wheat grades within the same variety (growing method, region, climate, etc.).

THE MIXOLAB ESTIMATES ALVEOGRAPHIC PARAMETERS

Upon wheat reception, the Rapidwheat+ protocol estimates, in less than 15 minutes (using ground wheat), its quality by predicting the Alveographic parameters.

IMPORTANT: the prediction model should be checked, reinforced and/or amended for each new harvest (same as for NIR calibration).

THE MIXOLAB DETECTS BUG-INFESTED WHEAT

Using a specific variable speed protocol of 28 minutes, the Mixolab detects bug-infested wheat. The principle consists in measuring the drop in consistency after a resting phase.
ANALYZE THE VARIOUS FLOUR MILL STREAMS

Analyzing the various flour streams (break and reduction flours, sizings, middlings, tailings) with the Mixolab helps ensure a consistent production. The flour streams are fully characterized, incorporating the protein and starch quality.

APPLICATION OF BLEND LAW

The Mixolab helps to determine blend composition. In the example opposite, the calculated curve of the blend (shown in yellow) is identical to the curve measured with the Mixolab (shown in green). It is thus possible to anticipate the behavior of a flour blend with the Mixolab. It simulates the Mixolab results for a blend of several flours analyzed individually and saved in the database.

FLOUR QUALITY: EXAMPLE OF DAMAGED STARCH

The Mixolab detects any process deviation very early. The impact of damaged starch on the rheological behavior of dough is clearly visible on the Mixolab curve. In a single test, the following points are identified:

- Water absorption increases (C1)
- Amylase activity intensifies: difference between C3 and C4 increases
- Slower retrogradation (the product has a longer shelf-life): difference between C5 and C4 decreases
The Mixolab software and a series of accessories have been specially developed to study the impact of additives. A bread-making flour not meeting customer quality criteria can be corrected using an additive selected using the Mixolab.

**VITAL WHEAT GLUTEN ANALYSIS**

The Vital Wheat Gluten (VWG) is a key improver in the cereal industry. With the Wheatgluten1 protocol, it is now possible to obtain an analytical and repeatable analysis of VWG quality and its impact on the rheological properties of dough.

**GUARANTEE CONSISTENT DELIVERY QUALITY**

**PROFILER**

The Profiler is a unique tool converting the Mixolab curve into 6 indexes. Incorporated in the specifications, it sets simple but comprehensive criteria. It thus helps guarantee consistent flour quality.

In the example (lift corner), conventional analyses focusing on mixing properties are not able to detect non-conforming flours. With the comprehensive Mixolab analysis, non-conforming samples are detected with certainty.
The method is simple and the same for developing any predictive model:
- Test samples on Mixolab.
- Compare the results with “reference” method via a statistical tool to create a prediction model.
- Validate the model with new samples.

The Applications laboratory has developed different models. The performances are shown in the table on the right.

Equipment Parameter | Matrix | Mixolab prediction (r²)
--- | --- | ---
Amylograph | gelatinization peak | white flour | 0.929
| rye flour | 0.87
| maximum resistance | white flour | 0.88
| extensibility | white flour | 0.74
| energy | white flour | 0.9
| ratio | white flour | 0.77
| peak | white flour | 0.76
| holding strength | white flour | 0.7
| final viscosity | white flour | 0.89
| setback | white flour | 0.85
Falling Number | Falling number | white flour | 0.9
| wholegrain flour | 0.92
| rye flour | 0.88
Farinograph | Hydration | white flour | 0.99
| Development time | 0.96
| Weakening | 0.806
| Stability | 0.883

BREAD MAKING CORRELATION

Bread making tests remain a reference method for assessing the baking quality of a flour. Prediction models have been developed using the Mixolab for Belgian bread making (CRA-W), French bread making (NF V03-716), “Sponge and Dough” bread making (AACC 10-11.01) and Russian bread making (GOST). The Mixolab predicts each bread making method accurately*.

- Over 90% of the samples tested have an accurately predicted volume (within repeatability limits).
- The main parameters can be predicted for the “Sponge & Dough” test.

- 88% of the samples tested have an accurately predicted volume.
- It is possible to predict the main parameters of the French bread making test.

### Performance of the models developed

<table>
<thead>
<tr>
<th>Equipment Parameter</th>
<th>Range</th>
<th>Uncertainty of NF V03-716</th>
<th>Sp. in° NF V03-716</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume (cm³)</td>
<td>1963-2650</td>
<td>150</td>
<td>100%</td>
</tr>
<tr>
<td>Absorption (%)</td>
<td>55-63</td>
<td>1.5</td>
<td>99%</td>
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* % of predicted samples with an error of less than ± once the limit (limit set by partner)

**Performance of the models developed**

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<td>99%</td>
</tr>
<tr>
<td>Total score (100)</td>
<td>104-268</td>
<td>13</td>
<td>75%</td>
</tr>
<tr>
<td>Dough score (100)</td>
<td>17-190</td>
<td>13</td>
<td>78%</td>
</tr>
<tr>
<td>Crumb score (100)</td>
<td>76-100</td>
<td>7</td>
<td>92%</td>
</tr>
<tr>
<td>Bread score (100)</td>
<td>76-100</td>
<td>7</td>
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* % of predicted samples with an error of less than ± once the limit (limit set by standard)
The Mixolab analyzes wheat flour with the Chopin+ protocol, but also has the flexibility required to analyze barley, rye, rice, corn, quinoa, spelt, kamut, triticale, millet, fonio, teff, buckwheat.

The Mixolab is thus an essential tool for defining gluten-free blends with given rheological properties.

The Chopinwheat+ protocol is specific to the analysis of whole wheat flour.
CHOPIN Technologies in the world

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