

Technical Notes

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Farinograph®-AT, The New Definition of Quality

The Farinograph®-AT is an Advanced Thermo-rheological instrument, which allows complete characterization of wheat flour. Equipped with new Laboratory Information Management System (LIMS), the Farinograph®-AT goes beyond the traditional dimensions by providing more control in the hands of the user.

With its advanced next generation features, an operator can ::

- Create unique methods for different product applications
- Automatically titer water
- Set dosing temperature
- Titer additives in solution form enabling uniform distribution
- Define complex temperature and speed profiles
- Set own evaluation parameters
- Use desired units of torque (FE, FU, Nm, mNm).
- Calculate mixing energy
- Record dosing temperature as well as dough temperature.
- State upper and lower control limits of test parameters
- Match the evaluation with a reference curve
- Switch to control charts for better visualization of results.
- Control a circulator and temperature directly from software
- Print and export the results using different applications -pdf, XML, Excel or Access
- Can operate any version of USB Farinograph® with new software

Applications of the Farinograph®-AT

New Product Development:

The Farinograph®-AT has a special role in New Product Applications. Most pilot-scale plants typically used to require relatively large amounts of ingredients, that may range anywhere from 4-10 kg. Therefore, a small-scale manufacturing system such as a Farinograph®-AT, with user defined protocols enabling multiple speed and temperature profiles, would greatly facilitate development studies and evaluation of new formulations.

Standardization of Process Lines:

Dough formation process is the most critical step in the baking industry, which begins with the input of mechanical energy from mixer blades. Different mixers used in the industry operate at variable speed profiles, thus doughs produced by different models also vary in their properties. With the new Farinograph®-AT, evolution of dough structure can be easily simulated with the different process lines by creating your own mixing and temperature profiles. The torque profiles or reference curves can be matched with dough samples drawn from different stages of the process lines, to ensure consistency of different batches on a day to day basis.

Enzyme activities:

Application of enzymes, in the form of additives or as sprouted flours, has become a normal practice these days. As soon as water is added to the flour, enzymes become active and start modifying properties of flours. Adjustment of enzyme activity in mixing stage and resting/fermentation period is very critical for baked products. The Farinograph®-AT can give a good estimate of enzyme activity in the dough depending on the dosage applied. Simultaneously, temperature suitable for optimal enzyme activity can also be controlled to produce doughs yielding optimal baking effect.

Specialty Baked Products:

Dough structure formation is promoted by mechanical energy transfer from the mixer blades to the sample, effecting flour hydration and gluten network formation kinetics. Some baked products like hearth breads require doughs to be developed at high rpm so as to produce better product quality. The Farinograph®-AT has been specifically designed to meet such customized requirements of doughs for specialty baked products. Further, relevant evaluation parameters can be defined by the user based on personal experience to reach a qualitative agreement between the typical farinograph results and baked product quality.

Starch-Gluten Properties:

Flour hydration properties are principally determined by protein and starch, particularly damaged starch. Addition of water and mechanical energy transfer from blades transform incoherent granular systems to a plasto-viscoelastic material, ending in a consistent mass called dough. Some baking applications utilize gelatinization properties of starch playing a significant role in the development of a 3dimensional network of gluten embedding the starch granules and air.-Rheological differences and variations in baked products on account of heat induced changes in interactions of starch and protein, which effect properties of the final product, can be efficiently assessed with the flexible temperature profile features of the Farinograph®-AT.

Flour additives/Ingredients:

When optimization of complex additives is performed, flour quality, production procedure, process variables, effects of components on different quality properties and their synergism is very important. The Farinograph®-AT, with temperature controlled automated titration features, permits addition of ingredients in solution form thus allowing uniform distribution in the flour. Synergistic effect of ingredients and process variables like speed and temperature on the rheological properties of dough can easily be monitored. In addition, the torque profiles obtained and the interpretations given of each of the product matrix development stages from the farinogram® are useful in assessing the impact of Ingredients on the manufacturing process.

Agronomic practices:

Effect of various agronomic practices like irrigation and mineral fertilization on the technological properties of the flour, which is very important for breeders, can easily be studied on a Farinograph®-AT. Multi-year databases can be built while defining control limits for the desired evaluation parameters. Flours showing deflection in the set rheological parameters can be clearly visualized using control charts, therefore making the screening process easier.

Composite flours:

There is an emerging market for wheat substituted products with additional nutritional and economic benefits. Due to dissolution of gluten in such composite flours, development of dough might need more or less energy from mixing blades. The Farinograph®-AT, with its advanced user defined protocols, is helpful in optimizing composite flour doughs. Correlations can be established between rheological parameters of such doughs and final baked product quality. Based on the significant relationships, evaluation parameters can be redefined and control limits set to ensure consistency in the product quality.

Refrigerated and frozen doughs:

Ready-to-use doughs are much in demand these days. The baking industry needs increased dough stability and consistent product quality. The Farinograph®-AT is a suitable tool to investigate the effects of freeze-thaw cycles on dough stability as well as dough syruing on the consistency of refrigerated doughs.

Cheese:

The Farinograph®-AT is a suitable instrument for small-scale manufacturing of imitation cheese which is representative of that made in a traditional pilot-scale cooker. There are many different parameters that impact on the production and functionality of such cheese products. These parameters include the formulation of the blend and processing conditions like temperature, time and mixing action. The Farinograph®-AT with its flexible speed and temperature profiles may offer a means of directly examining the effects of formulation changes on the phenomena of casein hydration and fat emulsification during cheese manufacture. The different easily interpreted sections of the farinogram® facilitate gaining a physical insight of the technological parameters from a farinograph® test.

Miscellaneous:

The Farinograph®-AT is a versatile instrument with manifold applications in the food industry. It has been successfully used in various other avenues including chocolate, chewing gum, meat, egg foams, batters, noodles, pasta, rye flour and more.

What others say :

Migliori & Correrà :

" The Farinograph is the most diffused instrument to standardize dough samples in a controlled way and to study the effect of ingredient or other variables on the dough making process."

International Journal of Food Science and Technology 2013, 48, 121-127

Bakry et al. :

" The Farinograph may prove a useful tool for the manufacture of imitation cheese on a semi-micro scale with consequent cost savings for those engaged in formulation research.."

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