

Ready, set, dough!

The consistency of perfectly formed dough depends entirely on the conditions during fermentation. DIOSNA develops pre-dough and dough fermentation systems that can ensure required parameters, with various degrees of automation.



© Diosna

✚ The stakes are high for pre-dough to develop perfectly, as it has a direct impact on the texture, flavor and shelf-life of the final bread. Automation tools have a decisive contribution to this result, and making the equipment flexible enough to work with widely different types of dough is key. The most useful automation features DIOSNA incorporates in the design of its pre-dough systems help to easily control production. They also offer a high level of flexibility, allowing recipe customization based on specific products and requirements, and system capacity adjustments, via DIOSNA's system control, according to the desired schedule.

Certain production stages can be performed by staff, when using a semi-automated system: the bowls can be handled manually. By reading their labels, the system will indicate on a display what route they need to follow between stations, from the dosing station to the kneader and lifting tipper, for example.

Spelt, wheat, organic pre-dough and more

DIOSNA's pre-dough systems can flexibly work with different fermenters, including organic dough. The company explains how: "Depending on the dough quantities, our control system can switch the number of fermenters used for organic, respectively non-organic pre-doughs. This automated occupancy control will be connected to the customer's production

planning." Parameters can be set for each type of dough:

- ✚ Spelt flour – a ratio of flour/water of 100:100 is possible, along with temperature control, cooling, cold storage
- ✚ Wheat flour – flour/water ratio of 100:100 is possible, and temperature control, cooling, cold storage
- ✚ Rye flour – flour/water ratio of 100:110 is possible, and even 100:120, depending on the rye quality; temperature control, 3-stage fermentation option, cooling, cold storage
- ✚ Wholegrain Barley flour – flour/water ratio of 100:140
- ✚ (Whole) Rice flour fermentation – possible flour/water ratio: 100:150 up to 100:180

Let the dough rest

Several recent developments can be incorporated into DIOSNA's dough resting systems. Depending on processing needs, they can range from multi-level solutions with an elevator, and automated tub or vat cleaning to process controls that allow the system to flexibly react to changing volume requirements.

A recent dough resting automation project shows how such features come together: a Biga dough system was built over two stories, with a capacity of over 100 containers that can rest in a vast dough resting room, each holding over 120 kg of dough. However, smaller batch sizes also need to be integrated regularly. DIOSNA's solution: "After the resting time, the containers are automatically moved out

from the resting room and are then transported following the first-in, first-out (FIFO) principle to a transfer station. Here, the containers are transported upwards and emptied into the stainless steel vats of a kneading system. The empty containers then move automatically to a cleaning station."

The elevator automatically handles the dough transfer to hoppers and conveyors. Combining a lifting tipper and a vat transport solution bridges distance flexibly. The elevator, like the entire dough resting system, is controlled by the PLC.

Automation stages

Partially automated systems are a flexible solution. A number of processes can be performed manually – and can be gradually automated later – if needed for more efficiency, such as dosing, moving the bowls and cleaning.

A fully automated, linear transport system offers the highest level of automation technology through a completely self-regulating process. It is essentially an individual solution for the bakery, designed for maximum flexibility. "A special feature of the linear transport system is the overhead guide-rail, which ensures maximum ground clearance and best cleaning options. The DIOSNA linear transport system can include several dosing, mixing and/or emptying systems. This means that several recipes can be made simultaneously, in different mixers, to serve several subsequent lines with different volumes or equal amounts of dough," DIOSNA elaborates. This system can be programmed with different dough resting periods, according to the recipes. Inside the system, an automated transport system handles the dough. The process sequence of individual movements is uniquely adapted to each product.

There are several options to program dosing and kneading on these flexible systems. The mixing energy is monitored throughout the process. The sequence of dosing and mixing processes can be programmed. The frequency control of the tools and bowls ensures individualized dough mixing. Once defined, mixing programs can be transferred between similar types of mixing systems.

In addition, remote monitoring and remote service can be booked for this system, by defining a sequential step program. DIOSNA illustrates that each step can be programmed with a certain recipe functionality, such as kneading by time or energy, or dosing with/without kneading. Next, each function of a recipe can be optimized according to several parameters. The kneading program can contain up to 40 recipe steps.

Automation features can be sequentially added over time. One of the tools usually retrofitted is an IoT system. "Production monitoring is becoming increasingly important,"

DIOSNA highlights. Data is a valuable asset in dough preparation: monitoring can show if production is still within the predefined parameters, it can detect errors, provide trend reports, and more. "Cloud-based solutions are also becoming increasingly interesting for production planning. Retrofitting is also no problem for existing machines and can usually be done within one day," DIOSNA observes.

Pre-dough production planning

To integrate a pre-dough system into a production planning system, several aspects need to be considered. "It is not just individual devices, such as dosing units, mixers and conveyors that must be included in planning; they must also interact harmoniously. For optimum results, dough resting time must be taken into account," DIOSNA underlines.

An automated kneading concept supports gentle dough development with low-temperature rise. "At the end of the mixing time, the finished pre-doughs are discharged through the electrically-controlled opening of the central discharge system into tubs, which are provided by a conveyor. The dough is then transferred to the dough resting system," DIOSNA explains its operating principles. Once it arrived here, the next step can begin: long, gentle dough fermentation. The doughs resting in the tubs are constantly cooled by a gentle air stream. When resting time is over, the tubs are automatically removed from storage and transported to a transfer station. Further processing often takes place with the aid of elevator tippers, which empty the tubs into the stainless steel vats of other kneading systems.

Several DIOSNA solutions are available for fully-automated production control, always depending on the products and dough types used. For example, the continuous pre-dough production system can process rye sourdoughs and wheat pastes in various capacities per fermenter. A special feature of DIOSNA's pre-dough system is the optimized process control for constant pre-dough quality. Such systems ensure the dough is ready for baking, and the end products will have the intended texture and flavor. +++

ADVERTISEMENT



Quality-brand and freshness with long tradition

KOENIG The Nut specialists

...einfach kernig!

**Almond- Hazelnut- and Peanut-Products,
roasted, sliced, diced and slivered.
Hazelnutfilling and Multi-Crunch.**

Please ask for products meeting your specifications.

KOENIG BACKMITTEL GMBH & CO. KG • Postfach 1453 • D-59444 Werl
Tel. 02922/9753-0 • Fax 02922/9753-99
E-Mail: info@koenig-backmittel.de • Internet: www.koenig-backmittel.de



This is an article from the specialist journal [baking+biscuit](#), which is published six times a year.

As a subscriber you will receive the specialist journal with reportage from actual practice, research and development reports, market analyses and company portraits immediately after publication. This will give you a soundly based, comprehensive overview of the current state of the art and of the baking sector.

Anyone who is interested can order a trial copy of the journal to get to know it, free of charge and without obligation, at

www.bakingbiscuit.com

In our archive on this home page you will also find all the reports as pdf files. You will find the specialist articles there, sorted by publication years; they can be searched using a full-text search.

++ Copyrights, quoting and using texts

Please note that the simple quoting of our texts is permitted, provided the length of the quotation remains within reasonable limits. In this respect we consider three sentences to be a good limit. Please link to our text. Please ask us beforehand at info@foodmultimedia.de only if you want to use the quotation for advertising or want to pass it on to third parties for commercial reasons.

The lengthy quotation or adopting of our texts is permitted only after agreement with f2m.

The re-use of images from our texts and videos is permitted only after licensing with the holders of the rights.

Otherwise the usual copyright rule applies: We, the f2m food multimedia gmbh, reserve all rights to the contributions on our web site.

++ Please contact us if you have any further questions.