

# Sourdough 2.0

Happily **sourdoughs** are again **playing a more important role in production practice** along with the interesting current trends of more sustainability, more digestibility, **more clean label and more organic.**

*Stefan Schütter*



Photo: Diosna 2021

*Diosna's system portfolio extends from plug-in standard fermenters to fully-automated pre-dough systems.*

Over the last few decades most production has been focused on speed, volume and low prices with the haptics and taste of the baked products often suffering as a result. However, Diosna have noticed that this trend has now been waning significantly and quality is once again in demand. This signifies a back-to-basics approach, in other words a return to the functionalities and natural characteristics of pre-doughs – swelling, acidification and the formation of flavourings and aromas.

## Versatile starter cultures

Consumer awareness of nutrition, environment and quality is much more pronounced today than in the past. Young people in particular are vociferously committed to the sustainable and environmentally-friendly production of food products. Organic production continues to be an important aspect and food products producers are servicing this demand, whether out of conviction or so they can also service this customer-base in future. However, it is not all that easy to observe all the rules, to adapt recipes and ingredients and to provide all the necessary items of proof. This is why, in addition to its organic-certified starter cultures from the DIO-

Start range, Diosna is offering a consultancy service for this along with an inspection of the organic ingredients list and the optimisation of recipes. And in this context the in-house organic starter cultures open up many other opportunities. For example, the targeted addition of LAB (lactic acid bacteria) impacts the characteristics of sourdoughs and creates an individual enzymology in pre-doughs and main doughs. Furthermore, according to the clean label

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**1** The rye and wheat fermenters like the AF 100 in the picture are flexible and can be used for rye sourdoughs and wheat pre-doughs.  
**2** On the AF 100 with its hygienic stainless steel structure the anchor mixer with its wall scraper can be detached for easy cleaning.  
**3** The bread fermentation technology from Diosna for rye and wheat is based on specific starter cultures and the appropriate system technology.



**4** In the bread fermentation system the bread inserted in one piece is added at the outset to the water and flour, crushed and mixed with the sourdough batch. **5** The sourdough mixed weekly with the bread fermentation can be used for up to 6 days without refrigeration with good operating hygiene.

trend, the ingredients list is significantly reduced and “cleaned” by rye sough doughs, wheat sour doughs as well as pre-cooked additions and soaked grains. The ingredient sugar which is often added to round off the aroma can not only be replaced by other sweet ingredients or food additives, but also by using pre-doughs which ensure a partial transformation of the starch into sugars. Yeast-free bakery products can also be produced with the appropriate starter culture which

provides gas-active lactic acid bacteria as an addition to the “wild” yeast. Furthermore, certified starter cultures such as DIOStart Rice also improves the haptics of gluten-free bakery products. The precursors added in this way make the crumb softer and extend the freshness period. Precursors can also be of help in a ketogenic diet which is posing specific challenges to the bakery products industry because the baked goods do not have the usual starchy-base.

## The problem of FODMAPS

FODMAPs, along with fermentation processes, are currently a big issue in the media and in the bakery sector. FODMAPS or “fermentable oligo-, di-, mono-saccharides and polyols“ are natural substances which can be found in many vitamin and mineral-rich food products. These substances have considerable benefits for healthy people who can easily metabolise them because they contribute to healthy intestinal flora and intestinal activity. However, the proportion of people suffering from digestive disorders is on the increase. Currently about 6 to 15 percent of the global population suffer from irritable bowel syndrome and this can increase the incidence of health disorders in the gastro-intestinal tract. In this context bread has unjustifiably been held responsible as one of the main causes of this type of metabolic complaints. However, by no means are all bread lovers affected, only those who have too few of the necessary enzymes in the gastro-intestinal tract. In these individuals FODMAPS cannot be completely broken down, they are only partially absorbed and they then move undigested into the large intestine where the “free“ FODMAPS are metabolised by the intestinal bacteria. In this process many gases can form. These often cause flatulence, bloating (discomfort) and abdominal pain, even severe stomach pains and cramps. Diarrhoea can also occur in extreme cases. These symptoms are the same as for a grain, wheat or gluten intolerance, which often leads to confusions, but which can be avoided with a good differential diagnosis. A change of diet can also bring relief to irritable bowel syndrome. There are two different routes to pursue in this regard. Firstly to use food products that naturally have a

low FODMAP content, and secondly to eat fermented food products. In this context pre-doughs and sourdoughs form the ideal basis for natural and digestible bakery products. Studies have proven that yeast and lactic acid bacteria, for example, already metabolise FODMAPS in sourdough and pre-dough and in the process create gases, acids and other metabolic products. One of the results of this is a better tolerance of the finished bakery products. Here the new lactic acid bacteria-based starter cultures from Diosna can make the micro-organism metabolism even more efficient.

### Coordinated processes

There are some very simple methods for dramatically increasing the digestibility of bread. It is not the selection of wheat varieties but the process selection that is decisive for the volume of FODMAPS. For example, an extension of the fermentation from one to three hours can reduce the FODMAP concentration to less than 30 percent. Depending on the grain variety composition, one further hour can even lower the concentration to under 10 percent. Current studies are therefore recommending the use of longer dough resting times and pre-doughs. These precursors break down the FODMAPS and transform them into acids and metabolic products. Bread also stays fresh for longer, has natural mould protection and also thanks to the metabolic products has significantly more aromatic taste. Depending on the selection of lactic acid bacteria in the sourdough production, baking yeasts can also be reduced or even be omitted altogether since with the metabolism of the FODMAPS there is a strong gas formation. In order to make fermentation processes reproducible, Diosna also offers the appropriate system technology alongside the starter cultures. Different settings options give the dough maker the choice of which components to place in the forefront. He decides how high the acid proportion should be, which metabolic products it should have and in particular which aroma his bakery product should have.

*For the processing of bread residue, the BM 500 bread mixer produces a runny bread paste with a dough yield of 350 or more.*



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## Sustainability with bread fermentation

Along with the keyword “food waste” bread fermentation is now a trending term. Reason enough for Diosna to also make its bread fermentation technology for rye usable for wheat-baked products through a new starter. Old bread is processed in the well-known bread fermentation systems but also in the versatile rye and wheat fermenters. Bread fermentation was invented back in 1980 and is currently enjoying a renaissance. The procedure offers a sensible potential use for breads which manifest small faults and which are therefore not placed on display counters. For this purpose a good 40 years ago a sourdough

culture was developed which is now in the position to allow high-quality sourdough to mature using such breads. The DIOStart bread fermentation enables up to 50 percent of the flour in the sourdough consisting of a starter culture, water and flour to be replaced by bread. In the bread fermentation system developed for this purpose the bread inserted in one piece is added to water and flour, crushed and mixed with the sourdough batch in one process. In the meantime, the starter culture which many bakers still know and appreciate from rye breads has also been adapted in a milder form for wheat and patented. The sourdough mixed weekly with the bread fermentation can be used for up to 6 days without refrigeration with

good operating hygiene. This means it is constantly available. The bread contained within it also provides an “extra portion“ of roasting aromas in the bakery products made with the sourdough. In specific terms bread fermentation in the rye sector is based on a warmer feed at more than 28°C, which delivers an intensive and aromatic taste to the bakery products. If the sourdough is fed a little cooler at 26 to 28°C then, due to the high gas activity, the amount of baker’s yeast to be added can be reduced accordingly. With the bread fermentation, up to 45 percent of the rye flour contained in the recipe can be acidified, and in some individual cases, even higher proportions are possible. It is also possible to continue the sourdough without a new batch with the starter for a limited period of time. In wheat bread fermentation the use of a rye starter would lead to an undesirable foam forming. On the other hand, with the use of the special wheat starter, no foam will form due to the targeted selection of bacteria. However, through the high acid concentration the flour volume to be acidified is limited to 10 percent, with higher proportions only possible in individual cases. In addition to rye and wheat, with a patented technology a rework fermentation is also possible in order to use scrap dough for example for cut-out pizza dough or Danish pastries.

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The various DIOstart starter cultures guarantee reproducible fermentation processes with precise acid levels and calculated maturation periods.

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## Comprehensive support

Diosna can provide a wide range of technical and technological support services. For example, when baking with insect proteins as a new protein source because the dough handling is not as easy as in the usual process.

For breads and small baked goods, but also for patisserie products for retail outlets, which want a longer freshness and shelf-life period, the TechnologyCenter also offers experimental support with the use of aroma items and pre-dough technology. Therefore, with pastries, for example adding a sourdough can round off the aromatic profile and “activate” the tongue receptors during consumption. This suggests more “sweetness” in the bakery products. For quality management purposes, Diosna’s measurement and control technologies such as a PH-meter can help with an integrated cleaning function for measuring acid development. Furthermore, the in-house technologists can advise on HACCP concepts and on hygiene – from site inspections through process analysis and assessments or hygiene sam-



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**6** AromaPieces – thermally produced pre-doughs of flour, whole grains or seeds – round off the bread taste through the maltose and aroma precursors created. **7** For cut-out doughs Diosna also offers a rework fermentation for the sustainable processing of scrap dough.

ple extractions and training courses through to hygienic design questions in dough processing. As a response to the Covid pandemic the Diosna service also covers digital

solutions such as a planned virtual tour in the TechnologyCenter or webinars for virtual events such as the Bäckerwelt Trade Show organised by Inger Verlag.