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SOURDOUGH TECHNOLOGY AND BREAD PRODUCTION

SOURDOUGH TECHNOLOGY

When we look at sourdough and common pan bread products side by side, we recognise that they have different appearances and anticipate that they have different flavours and eating qualities. They may have different methods of manufacture, yet the manufacture of both groups of products is largely based on the same underlying principles.

The manufacture of sourdough bread based on spontaneous fermentation by wild yeasts and lactic acid bacteria has been practised for thousands of years and represents the most traditional breadmaking process that we know. It is considered that the cultivation of wheat grains for human consumption started in the Turkey/Iran border regions and it is reasonable to assume that breadmaking also began in the same area. It is the ancient Egyptians who are credited with the manufacture of the first deliberately leavened breads. The discovery of spontaneous fermentation is likely to have been accidental with a portion of dough having been left for a longer period of period of time than normal before being used. Human curiosity was bound to take over and translate into some form of experimentation to see what changes could be induced in the final bread by prolonging the fermentation period. It cannot have taken long for people to recognize that the light and aerated texture of the baked products obtained with fermentation made their normal daily fare more pleasant to consume.

Leaving a flour-water mixture for any length of time in warm conditions before it is baked, allows the wild yeast spores and bacteria (mainly lactic acid bacteria) which were present in the atmosphere and raw materials, to break down the starch in the grains. The result of these actions is fermentation with the release of carbon dioxide gas, some of which may be trapped in the mixture causing the resulting dough to rise. In the last 200 years or so, the arrival of a reliable source of bakers' yeast enabled the production of different types of bread with more consistent qualities on an larger-scale, with sourdough production largely remaining in the hands of the smaller, artisan-type bakeries. More recently in many parts of the world, sourdough bread manufacture has moved to mainstream production and this requires a different, though complimentary approach to that used in the artisan bakery.

SOURDOUGH TECHNOLOGY

It is important to recognise that there is no single or unique sourdough technology. The origins of modern sourdough manufacture tend to be very individual and often based on unique sources of raw materials and process choices. The choices made by the sourdough baker will ultimately impact both the flavour and texture of the end-product. The shapes and forms of many sourdough products have a history of many hundreds of years; something which is often not appreciated by modern practitioners. Because of this individuality, both artisan and industrial-scale approaches require a thorough understanding of the contributions of the sour and the underlying principles of breadmaking to deliver consistent bread quality. Equally an understanding of the principles involved allows bakers to develop new forms, shapes and flavours for sourdough products.

The 'Mother' Dough and Types of Starters

Sourdough technology is based initially on the preparation of a 'mother' dough (sometimes referred to as the 'sour') which exploits the principles of spontaneous fermentation in a mixture of (commonly) wheat or rye flour and water. It is from this mother dough that portions will be taken for use as a 'starter' for the subsequent sourdough manufacturing process. The mother dough should be 'fully mature' before portions of the starter are removed; typically, a few days is required to achieve maturity. Since the fermentation process cannot proceed without the presence of suitable starch as a food source for the microbial activity, it is necessary to 'top-up' the food source with more flour (source of starch) on a regular, commonly daily basis. This is usually done by adding some new cereal flour to the mother dough, typically the level of addition is based on the quantity of dough removed as the starter for the main dough making process. The creation and maintenance of mother doughs means that the basic microflora may multiply and retain those special characters, not least with respect to flavour profile in the finished bread, which make individual sourdough process unique.

Today, there are bakers who manufacture and maintain their own mother dough in the time-honoured fashion and there are those who work with a more controlled environment to ensure that the variability in their product is limited. Consistent product quality begins by maintaining a constant solids to water ratio in the mother and starter doughs and consistent fermentation requires control of both temperature and time. These aspects of process control are critical to delivering the required flavour profile and functionality from the beginning to the end of sourdough manufacture. If the mother dough and starter conditions are carefully controlled, they will largely favour the activity of the preferred microorganisms. However, unwanted microorganisms may be brought in with the raw materials or enter the bakery atmosphere and may compromise the integrity of the starter. This can lead to the potential development of off-flavours and negative impacts on functionality in dough making.

Large-scale, sourdough bread production may well be based on a traditional starter culture, but the benefits of modern technology are sometimes used to deliver consistent and safe products to consumers. This means that in some cases sourdough breads utilize specialist prepared sours which have been dried for supply to bakers who do not wish to manufacture maintain their own starter. Rye bread concentrates (providing the sour component) are also available and which can be blended with wheat flour to yield a less acidic flavoured bread for those consumers who prefer it.