

TASTE

SOURDOUGH

WHITE PAPER

FOREWORD

The nutritional value of bread is an indisputable and highly appreciated, well-known fact. However, the main appeal of bread lies in its taste, hence the importance of the quality and choice of ingredients, the art of mixing, the different fermentation methods, the baking technique and the baker's dexterity. Although the choice of the appropriate raw ingredients, varietal of wheat, or fermentation mechanism plays an important role in improving the taste of bread, it is true that yeast and sourdough (two key and complementary factors in the fermentation and aromatic development processes) are still the main tools used to produce diverse aromatic profiles. Achieving a variety of tastes is the leading trend among bakers today and the subject matter of this white paper.



A TASTE CULTURE

The term 'flavour' refers to all the sensations perceived in the mouth. It expresses the combination of tastes (sweet, savoury, sour or bitter) in a meal, together with the attendant aromas, which are perceived by the back of the throat. "This is the basis", explains Emilie Bryckaert, head of the Lesaffre sensory analysis and application department, "that serves to define the 7 main families of aromatic compounds: those obtained from cereals, milk, fermentation, spices, roasting, fruit and flavours. The various notes, which can be found in the aroma palette, are used to characterize the flavour of bread. We have learnt from experience, in fact, that these are the notes that will best describe the taste of bread."

FERMENTATION

The characteristic flavour of bread is obtained through fermentation, which is brought about by special agents. Yeast and sourdough contain a combination of yeast cells and bacteria. It is the partial consumption of the sugar in flour by these agents which produces the carbon dioxide and ethanol responsible for the increase in volume achieved during baking. But that's not all. The fermentation process also produces a large amount of aromatic molecules. The end result is a loaf containing over 200 flavour molecules!

Most consumers associate good flavour with a well-made product.

Fermentation helps dough to rise, ensures optimum air-holes and produces aromas... However, it also improves the shelf-life of foods, their digestibility and in most cases reduces their glycaemic index and increases the bioavailability of their micronutrients. It is also sensitive to factors such as time and temperature, as pointed out by Pascal Lejeune, an engineer from Lesaffre's research and development department. 'A 3-hour fermentation at 28° will produce a completely different product in terms of taste and texture from that obtained after 16 hours' fermentation using the same ingredients.'

THE NUTRITIONAL VALUE OF BREAD

Bread is produced from a combination of wheat or other cereal-based flours, water and salt. Bread is known to be an important nutritional source of complex carbohydrates (50% starch on average), vegetable proteins and fibres. It is rich in minerals, such as magnesium, sodium, potassium, phosphorus, calcium, iron and zinc. It also helps cover some of our vitamin requirements, especially group B vitamins. For example, it covers 16% of man's recommended vitamin requirements based on his consumption of at least 174g of any type of bread per day, 14% of the recommended B6 vitamin intake and 10% of his B2 vitamin requirements. For a woman consuming more than 110g, it delivers 14% of her daily needs in B1 vitamins, 12% of her B6 requirements and 7% of her vitamin B2 intake. Given that a loaf of bread is virtually devoid of simple carbohydrates and has a very low fat content (1%), it is regarded as a priority dietary ingredient. It is even recognised for its ability to stabilize fluctuating weight by contributing to satiety or achieving a rapid sense of a full stomach.

TASTE THROUGHOUT THE AGES

What actually is taste? How can we define it? The Latin word 'gustus' is related to the Indo-European root 'geus' meaning to sense, assess. The etymology of the English term 'taste' derives from the French verb 'tater' meaning to touch, handle, with 'tater' itself deriving from the Latin 'tastare'.

Current trends indicate a desire to return to tradition and authenticity. We are also witnessing a growing insight into bread and its gustatory importance on the part of professionals. "This is evident among our customers, who are becoming increasingly clear about what they want", concedes Loic Ledru, technical baking adviser at Lesaffre, with whom we work to achieve good flavours. "When customers present us with their requirements, it's perfectly clear to us. Our solution will be the right one".

This is the context in which the baker must work and he knows he must diversify his offering and promote the quality of his products. Given that bread is first consumed and enjoyed with the eyes, the baker must know how to arrange his shop to promote the products he sells.

THE APPROACH TO TASTE

The cultural dimension of taste is undeniable. Hidden deep within the consumer's psyche is his need to satisfy this requirement and find the 'best' taste. We need to eat a product that tastes good and makes the mouth water. Whether it is the product of industrial or craft bakers, whether fermentation is based on yeast or sourdough, bread is no longer simply used to soak up a sauce, or as a mealtime tool. These days, it is a food in its own right.

(...) it is not just an accompaniment to something else, it is a food fit for "connoisseurs". And when it accompanies other foods, it turns them into genuine 'taste enhancers'".

For around twenty years, we have been consuming bread for pleasure. Not only does it supplement our diet, it also contributes to dietary balance. Not that bread is now a functional food, but

PASCAL LEJEUNE



Research and Development engineer - Lesaffre

One purpose of the profession is to create diversity from living ingredients in the knowledge that the same diversity depends upon the baker's control over a micro-organism during manufacture and baking off!

"To produce yeast or sourdough is to produce the entire biomass needed to make bread, in other words the flora contained in sourdough or yeast. It is a natural living thing."

"To sum up Lesaffre's core profession, let us take the example of spontaneous yeast. It is a mixture of flour and water that we allow to ferment in several stages (around sixty hours is needed for the entire process). Flour provides 1000µ of organisms per gramme to arrive at 1 billion and conversely 60 to 70 strains are required to arrive at three.

“We have yet to discover the many secrets of yeast and sourdough metabolisms!”

it does fulfil certain energy and nutritional requirements. For this reason, a good loaf of bread may be assessed via a synergy of perceptions relating to tradition, health, well-being and food safety. It is the baker's task to find the key to maximising the consumer's satisfaction and opening his mind to new sensations.

FOR ALL TASTES

There is no one universal loaf. Consumers' expectations vary, with some preferring a denser, or not so dense crumb, a finer or a thicker crust, a sour or a fruity flavour, more or fewer air-holes, or a firmer or melt-in-the-mouth texture... Emilie Bryckaert sums up this diversity perfectly: “take a traditional loaf produced from a poolish based on yeast that has been cold-stored for 72h, and you will have an amazing product with a completely different aromatic profile than a sourdough loaf, which also has its own characteristic taste”.

Given the different product behaviours and formulations, it is important to identify and describe the interactions informing our sensory perceptions in order to produce a series of benchmarks. Lesaffre, a producer of yeast and baking solutions for over 160 years, has acquired sound international experience in this field.

Developing a sourdough entails allowing its flora to proliferate and ensuring the selection of certain micro-organisms. The task is to ask it to produce everything we might need to obtain the optimum aromatic mix and at the same time retain only the preferred strains. However, this practice is rarely used in bakeries these days. It is up to Lesaffre to take over the baton. The starters we offer provide the full biomass required and thanks to our ready-to-use sourdough, the product we offer may be implemented immediately. In fact, we are addressing a very tricky stage in the process.”

“The two major components of taste are fermentation and the baker's dexterity. Here, at Lesaffre, we ensure the quality and diversity of the fermentation process so that the baker can then bring all his best skills to bear! It is the baker's job to adapt the micro-organisms we offer him as he sees fit. Lesaffre takes care of the complex scientific angle so that the baker can work his creative magic.”

“Controlling fermentation is also a question of time. And Lesaffre knows precisely how much time is needed to produce top-quality products. For instance, it took us 3 years to develop our new living sourdough brand Livendo into a flawless top-quality product. Same thing for starters. In fact,



Its knowledge of bread from all over the world has given this family-run group an in-depth understanding of the language of bread. Each loaf is analysed using highly technical sensory techniques by a panel, whose task it is to highlight the organoleptic properties (appearance, smell, sound, texture and taste) of a product. Firstly, a genuine taste culture is created. The taste that is developed from yeast or sourdough contributes fundamentally to the aromatic development of the loaf. Secondly, it requires an international culture to be able to adapt and respond to the specific baking techniques of the different countries. Transforming the baker's experience into scientific fact is our business", concedes Pascal Lejeune. "What we don't want is to offer breadmaking at the 'push of a button'. We are here to give bakers the best ingredients to allow them to give free rein to their creativity."

CREATING TASTE

"A nice-looking loaf, a golden crust "that crackles and sings", with a toasty, sour or dairy smell; a pearly, creamy, or amber-coloured crumb, "with random air-holes"; aromas of fruit, spice and honey..." That bread inspires its own vocabulary is an undeniable fact. The taste is constantly evolving.

The easiest way to diversify quality in bread is to experiment with the composition or type of cereals used. At advanced stages of development, adding fractions of cereals, such as germs, malt and bran accentuates certain aromatic notes. It is therefore possible to enhance any 'grilled', 'toasted', or 'sugary' notes and give a flavour a touch more acidity or even mask other aromas. It is also possible to add complementary cereals in order to improve the typicality of the bread, by using rye, buckwheat, spelt, meslin, corn, flax, in meal or grain form.

for all our products it takes 3 to 5 years of tests and research for us to bring a sourdough or yeast concept to physical fruition".

"The other point to remember is never to market a product straight from the Research and Development phase. We commence bread making using clearly defined recipes directly after the strain selection phase to know whether or not our products will be easy to use, or possibly taste unpleasant or strange. The new bread formula is then sent to the sensory analysis laboratory to determine its positioning."

"It's no mean task to create yeast, bacteria or sourdough. The fact that Lesaffre has all these ranges and brands to offer is because we have had 160 years' experience with selecting special strains and have devised the best processes. Our catalogue of products has real history behind it. And we have yet to discover the many secrets of yeast and sourdough metabolisms!"

“Yeast, sourdough: the art of complementarity”

CONTROLLING THE ART OF MIXING

Mixing can be boiled down to three types depending on the country: intensified, enhanced and slow. Intensified mixing is used to obtain a whiter, more voluminous loaf with a very fine crust. Slow mixing gives a dough that is not particularly conducive to the production of small products due to the limited loaf volume.

Enhanced mixing is a good compromise between the two. It allows the baker to produce a nice-tasting, properly developed loaf, which is also easier to keep. The important thing to remember is to stop mixing before the mixture becomes pale. “In any case”, Loic Ledru, “the slower the mixing the better aerated the mixture and therefore the less oxidation can occur. The crumb will be more yellow with a distinctive air-hole formation and a more pronounced flavour”.

THE CHEF’S EXTRA TOUCH

Bakers are experts in the art of taste. By drawing on a wealth of varied ingredients and various fermentation techniques, they can typify and personalise a loaf or a pastry as they see fit. A good loaf will depend largely upon the baker, that is to say his choice of breadmaking method! With even a small amount of curiosity, sensitivity, daring and technical expertise, any baker can experiment with the flavour of bread nowadays.

These combinations of complex flavours, unique to each type of bread, are the “hallmarks” of the breadmaking process and therefore the baker’s art.

LOÏC LEDRU



Technical baking adviser and sourdough specialist - Lesaffre

Yeast and sourdough are complementary in breadmaking. The former is less sour than the latter, which lingers longer on the palate, leaving a very pronounced flavour. So how do we know whether to use sourdough or yeast in a bakery product? Baking is a relatively complex process all over the world and consumers’ tastes can differ from one region to another. In some countries, bread can only be made with yeast because the results obtained with sourdough impact adversely upon taste sensibilities. I lived in China for 7 years and one of the things I discovered, among many others, was the steamed loaf. The ‘mantou’ is sometimes made using spontaneous yeast. I therefore tried out ways of making it with our Livendo starters. And it worked!

SOURDOUGH AND YEAST TODAY: THE PRACTICAL ADVANTAGE

Taking heed of bakers' needs, as well as the attendant human, technical or environmental constraints, Lesaffre (the historic partner of baking professionals) offers a comprehensive range of products capable of satisfying even the most exacting expectations for all types of bread.

YEAST

All types of yeast are noteworthy for their performance and stability. They provide ready-to-use, or custom solutions, enabling professionals all over the world to produce better products more easily.

Measuring only 6 microns across and invisible to the naked eye, yeast micro-organisms play an essential role in regulating fermentation activity and the aromatic profile of a loaf. They are the life force of bread, living organisms cultivated for what is one of the strongest of symbolic foods. Yeast comes in liquid, compressed, crumbled, dehydrated and frozen forms. It forms the basis for offering consumers what they need in terms of flavour, enjoyment and health.

SOURDOUGH

Yeast is not the only ingredient to offer state-of-the-art, effective solutions in keeping with the choices bakers have to make. Sourdough also presents a number of advantages. Natural sourdough produced on a refresher base is the product of a slower, more complex process, exposed to contamination risks and variable results. For these reasons, Lesaffre develops ferments using controlled and regulated production methods. They have the advantage of being easy to use, diverse in their implementation and possessing an aromatic typicity for all kinds of sourdough-based baking methods.

Apart from the taste, sourdough has other worthwhile functionalities in breadmaking. The impact is primarily upon texture through density, softness and aeration, crust colour and thickness, but also upon shelf-life.

Wherever they are, consumers are very demanding when it comes to the qualities of a loaf of bread. They all want a loaf that keeps well, looks good and tastes great. Bread is universal, but there are many ways of making it. Here at Lesaffre, we have unique skills in fermentation! Our knowledge of micro-organisms and how they proliferate to make yeast forms the core of our business. As a result of our expertise, we are able to offer some customers over 20 different types of yeast. We can therefore even prove our ability, albeit indirectly, to satisfy the taste needs of consumers all over the world. Not to mention those of some bakers producing over 15 different types of bread recipes every day. Using our yeast or sourdough, a baking professional can put taste to the test by combining, say, rice sourdough with rye sourdough, thus creating a bouquet of different aromas on the palate tinged with a few sweet and sour notes. This is, in fact, one of our strengths: the ability to offer our customers around a dozen different recipes and therefore taste solutions.

Finally, nutrition-wise, sourdough has a rosy future ahead. It improves the bio-availability of mineral salts, reduces the glycaemic index and helps to reduce acrylamide formation during the baking process.

Several solutions are now open to the baker:

STARTERS

These are formed from a combination of pure, carefully selected lactic acid bacterial and yeast strains. These solutions permit the production of highly developed acids and aromas in dough. They allow bakers to dispense with the constraint of refreshing a spontaneous sourdough.

LIVE SOURDOUGH

Live sourdough is obtained from the natural fermentation of cereal flour, including organic varieties. Ready to use in liquid form, live sourdough enables bakers to skip the sourdough preparation phase. It ensures the dough rises and lends a specific aromatic typicity to sourdough-based bakery goods.

DEVITALISED SOURDOUGH

Obtained from fermented flour (wheat, rye, spelt, etc.), devitalised sourdough requires no preparation and may be incorporated directly into the mix. It lends an aromatic typicity that is peculiar to fermented cereals and is used in all types of baking processes. One day producing hard wheat bread, the next a rye-based loaf...

SOURDOUGH-BASED PREPARATIONS

Due to its sensory expertise, Lesaffre proposes sourdough-based formulations, enriched with malt, organic acids, spices, etc.. These preparations help to extend and vary the aromatic notes present in bakery goods. When directly incorporated into the mix, they lend the finished product a unique taste and colour.

ÉMILIE BRYCKAERT



Head of the sensory analysis and application department of the Lesaffre group.

Lesaffre has been developing its expertise in fermentation, be it in bread or the production of micro-organisms, for more than 160 years.

It has put its knowledge into practice at international level for all types of recipes, processes or loaves, enriching it over the decades by dint of its human and cultural exchanges. Our sensory analysis laboratory was created over 12 years ago with the primary aim of acquiring a better understanding and defining our own taste products, especially our sourdough, and enhancing their impact on bread, from the point of view of appearance and smell, taste and aroma, texture and shelf-life. The complete global approach, which the Lesaffre Baking Centre facilities proposes and offers its customers, is unique.

WHAT LESSONS TO BE LEARNED?

Making tasty bread is an art that can now be cultivated thanks to a wide range of resources. The use of physico-chemical analysis tools, a knowledge of fermentation flora and controlled cultivation of micro-organisms allow Lesaffre to offer bakers products that guarantee performance, ease-of-use, consistent results and safety when making high-quality tasty loaves, as well as good shelf-life, texture and appearance. It is the baker's job to give full rein to his creativity and it's up to the producer of fermentation agents to give the baker the tools required to do the job. It is in this spirit and environment that Lesaffre develops its many and varied products and techniques with the aim of "cultivating taste in breadmaking".

“We are able to create the sensory identity papers for any type of bread”

More than one and a half centuries after the group was founded, its expertise in manufacturing, fermentation and the transformation of yeast and sourdough continues to grow day by day. To this day, it draws on the talents of its employees and the excellent performance of its industrial facility. These fundamental principles gave rise to a unique technology common to all 50 industrial plants in the group.

Lesaffre boasts thorough skills, which allow it to satisfy the expectations of its consumers. Gérard Gazzarrini is one of the ingredients unit managers within the Lesaffre sales and marketing co-ordination department responsible for the new Livendo brand: "we set out to structure the range more visibly and create a strong global brand, thereby validating Lesaffre's 25 years or more experience in the sourdough field. For this reason, we are offering four sub-families under the

It sets out to assist them with a collaborative approach. The first stage is to define their needs, by helping them to clearly set out their expectations: the main task is to understand the product target. The next step is for them to jointly develop a 'custom' solutions approach, which responds specifically to their wishes and those of the end consumer. This is the "aromatic signature" sought by the customer. In this sense, our real strengths are our sensory expertise and our taste culture: this gives us a genuine advantage in our dealings with industrial and craft bakery customers on all 5 continents and where all players in the industry are concerned. Backed by these strengths, we are able to create the sensory identity papers for any type of bread: crusty, flat, flaky, salty, sweet, rye, hard wheat or common wheat, both from an aromatic and textural point of view. Our sensory know-how is provided by around forty qualified and regularly trained expert panelists and the deployment of sensory methodologies adapted to each assignment. Our expert panelists are able to identify flavours (sour, salty, sweet or bitter), aromas (the butteriness of a brioche, the fruitiness of a sourdough cob, the crustiness of a baguette or the fresh, dairy aroma of a sandwich loaf, etc.), describe the texture of a crumb

Livendo umbrella brand: sourdough starters to seed the flour appropriately; liquid live sourdough to add an acidic taste, among other things, devitalised sourdough with a lifespan of 12 to 18 months; and sourdough-based preparations, with added malt and acetic acid. With these four sub-families, we address all the constraints facing bakers, even those seeking thorough control and therefore naturally experimenting with starters and liquid sourdough in the manufacture of their bread and pastries.”

Contrary to popular opinion, “there is no interference between sourdough and yeast”, emphasises Gérard Gazzarrini, “when a baker wants to produce a good loaf with a pronounced flavour, he must allow for a long fermentation time. In this respect, our new Livendo products do not compete with yeast. They are complementary. As well as clarifying our offer for our retailers by giving them better visibility, Livendo caters fully to the baker’s needs. For example, our liquid sourdough offers genuine creativity to professionals looking to bring a personalised top-quality offering.”

Lesaffre’s yeast and sourdough offering helps to strengthen its industrial policy aimed at producing better tasting, top-quality bread. The sheer extent of the ranges on offer clearly satisfies the needs of all its partners, craft or industrial bakers and retailers alike.

and rate it accordingly. All the sensory properties of a loaf are thus acknowledged, described and quantified in a repeatable manner: the individual is used as a sensory measurement tool. While taste is one of the major criteria influencing the consumer’s assessment and selection of a loaf, softness and shelf-life are also key concerns during development. Lesaffre has devised various sensory tools to help our customers with their innovations, such as the “aroma palette”, which is structured around 7 families (dairy, fermented, spicy, roasted, cereals and basic tastes), and the “Pain mot à mot” bread glossary, developed jointly with LEMPA –the French testing laboratory for food industry professionals- for crusty loaves, which sets forth equivalences between the terms used by experts and consumers. The knowledge is thus shared to help create tomorrow’s products!

THE AROMA PALETTE



The Lesaffre Sensory Analysis laboratory identified 7 families of aromas and flavours, which are used to describe bakery goods incorporated into the “aroma palette”. This tool aids a better understanding of the customer’s expectations and is a vital asset for speeding up progress quickly and efficiently in numerous joint aromatic development projects.



137, rue Gabriel Péri - 59700 Marcq-en-Barœul - FRANCE
www.lesaffre.com