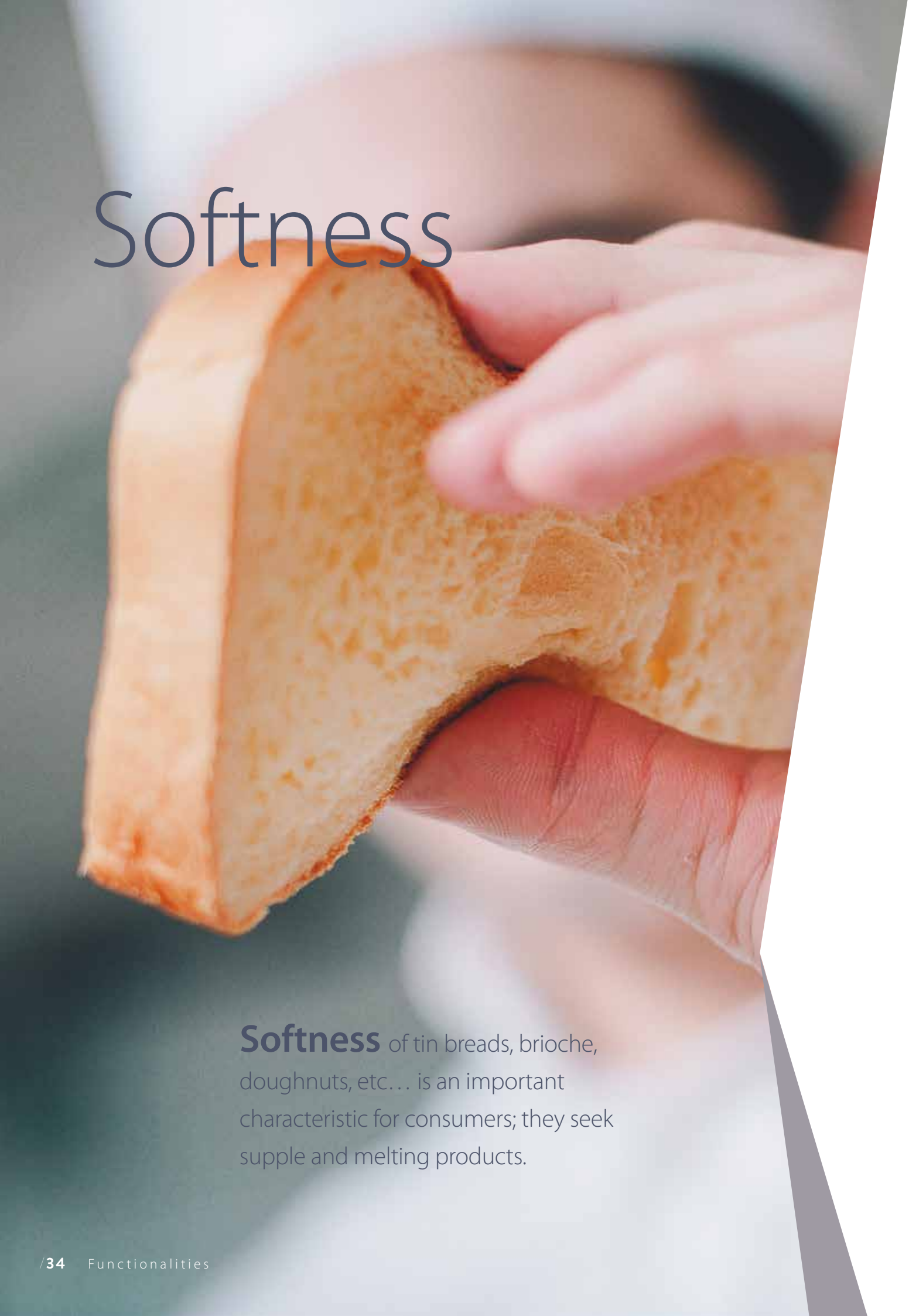
Softness



Softness of tin breads, brioche, doughnuts, etc… is an important characteristic for consumers; they seek supple and melting products.

Brioche and tin breads are characterised by a relatively long shelf-life (> 3 days), and softness is perceived as a guarantee of freshness, expected to lastupto the final slice.

HOW TO QUALIFY THE TERM "SOFTNESS"?

The term "softness" does not have the same meaning for everyone: it depends on the type of product and also the consumer's expectations, which vary from one region of the world to another. There is no single definition, but there are nevertheless certain texture components that can be used to describe softness:

Low resistance to deformation without being irreversible

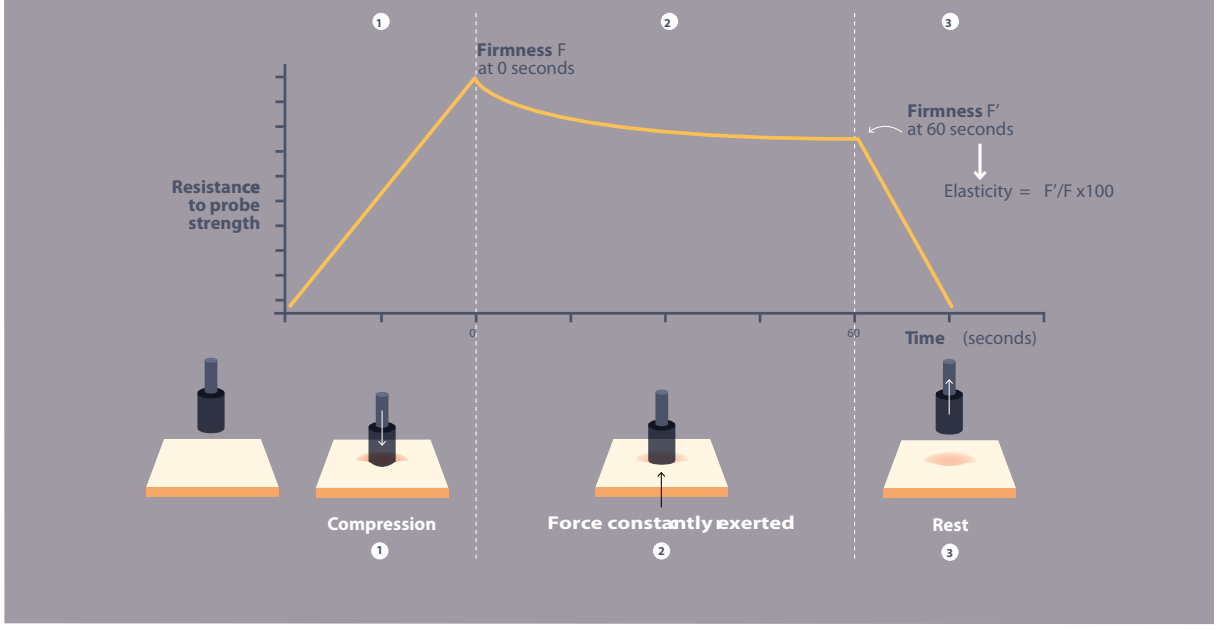
Suppleness

Gumminess

Tenderness

Elasticity

The compression test, during which a set force is applied for a certain time (phase 2), is used to measure crumb texture, especially its firmness F and elasticity (F/F').



INSTRUMENTAL MEASUREMENT OF RESISTANCE TO CRUMB DEFORMATION (TEXTUROMETER)

HOW TO GUARANTEE A PRODUCT'S SOFTNESS?

The guarantee of a product's softness is based on different factors relating to texture:

- **quality and quantity of its components** (flour, fat, egg, sugar, yeast, sourdough, etc.),
- **nature and proportion of improvers,**
- **manufacturing processes** (pre-fermentation, fermentation, baking),
- **preservation methods** (packaging, temperature, etc.).

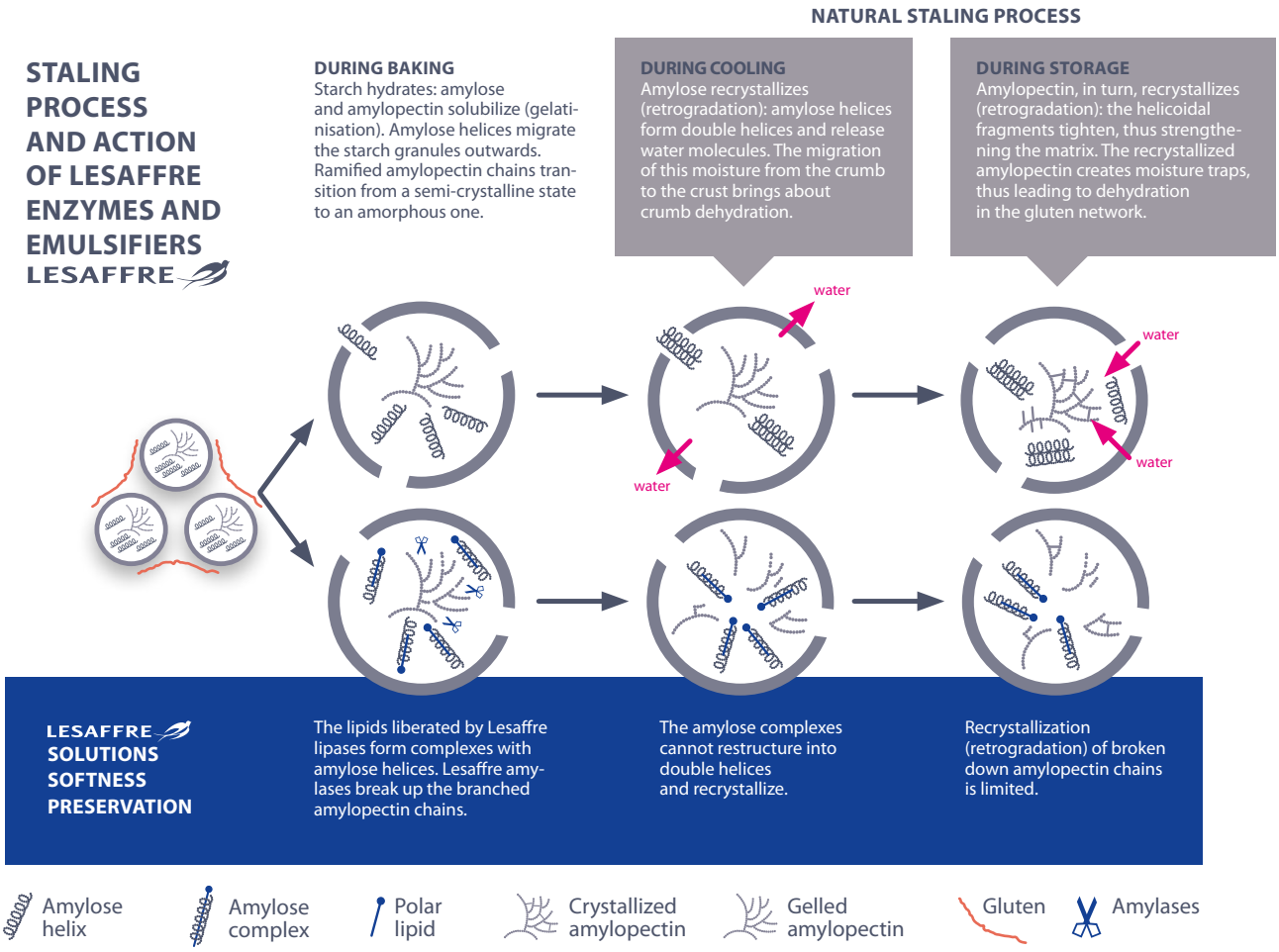
It is possible to measure certain "softness" factors using compression tests such as th presented below.

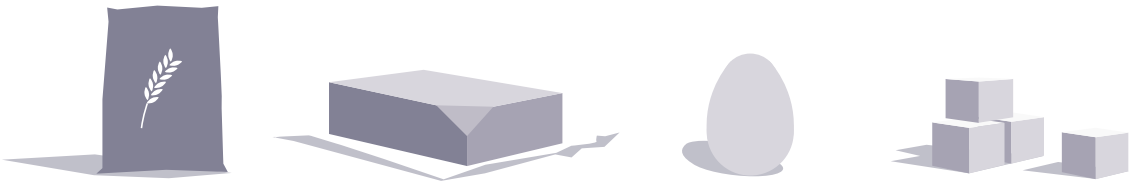
Initial softness depends largely on a product's moisture (dough hydration) and crumb structure.

These factors are influenced by the product's manufacturing process, as well as the recipe ingredients (presence or absence of fat and sugar).

For this reason, the Lesaffre teams have developed measurement methods for these different aspects of softness in the form of sensory and physical analyses in order to quantify the effect of the different Lesaffre solutions and ingredients.

Loss of softness in a product over time is mainly due to the recrystallization of starch retrogradation, especially that of the amylopectin with which it is composed.





- **Flour** can absorb varying amounts of water during mixing depending on the quantity and quality of gluten, thus modifying the gluten network This has a direct impact on the end volume of the product and therefore the mouth-feel, an essential factor in the appreciation of softness.
- **Fats** act as texturizing agents, helping to soften the dough and obtain a fine and even crumb. Fats are also binding agents, helping to keep moisture.
- **Eggs** contain lecithin and cholesterol, two amphiphilic molecules that bring stability to the hydrophilic (starch, proteins) and hydrophobic ingredients (lipids) in the recipe. Lecithin thus shows to be an excellent emulsifier.
- **Sugar** not only helps refine crumb texture, but also lowers the free water portion (measured by Aw).Water loss to the ambient environment is reduced and the product's shelf life is increased.

LESAFFRE SOLUTIONS

To reduce starch retrogradation and dehydration phenomena, several active principles can be used individually. Nevertheless, it is usually the combination of several products that can provide the desired solution.

ENZYMES

- **Amylases** weaken and break down amylopectin, thus limiting its crystallisation. Furthermore, the short-chain dextrins that form during starch hydrolysis by amylases, lower water activity (Aw), in turn limiting the dehydration process. The type of amylases and their inactivation temperature profile are essential.
- **Proteases** act on gluten by breaking the peptide bonds responsible for dough softening (see precautions for use on page 31).
- **Lipases** when hydrolysing triglycerides, release mono and diglycerides. These lipids limit starch retrogradation by forming complexes with amylose.

EMULSIFIERS:

- **Some emulsifiers,** especially saturated monoglycerides, bind to amylose molecules, preventing their recrystallization.

HYDROCOLLOIDS AND HUMECTANTS

- **The use of hydrocolloids and humectants (glycerol, sorbitol** modifies dough rheology by trapping large amounts of water and therefore increases dough hydration, reduces water migration (by lowering the Aw) and minimises starch retrogradation.

To prevent the risk of inadequate combinations or overdosages, Lesaffre provides these solutions mainly in the form of improvers, pre-mixes, or mixes and blends.