Granulated yeast

BAKER'S YEAST IS ONE OF THE MOST TRADITIONAL RAW MATERIALS IN A BAKERY. WITH THE ADVENT OF THE INDUSTRIAL PRODUCTION OF BAKER'S YEAST, THE SEARCH FOR THE RIGHT FORM STARTED THAT WOULD ALLOW PROLONGED TRANSPORTATION TIMES AND EASY HANDLING IN THE BAKERY

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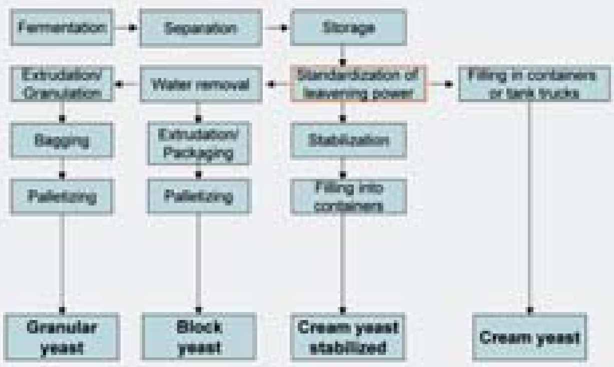
++ figure 1



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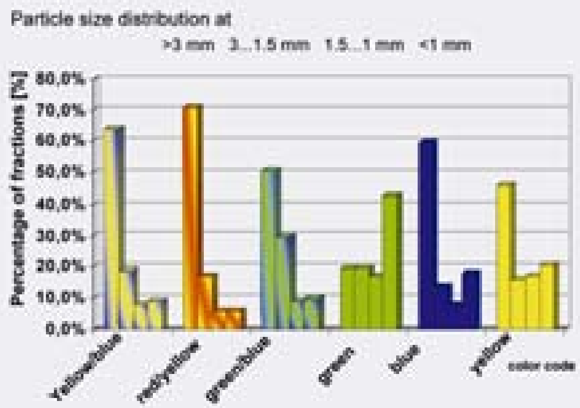


++ figure 1
Production of baker's yeast

++ figure 2
Particle size distribution of different granular baker's yeasts

++ figures 3–6
Different commercially available particle sizes/granulates

The traditional and still widely used form is block yeast in pound size. However, growth within companies has triggered a shift over the past years, with the result that granulated and liquid yeast are gaining importance. The dissolving, or to be more precise the suspension of granulated yeast to yield cream yeast may be beneficial for handling in larger companies.

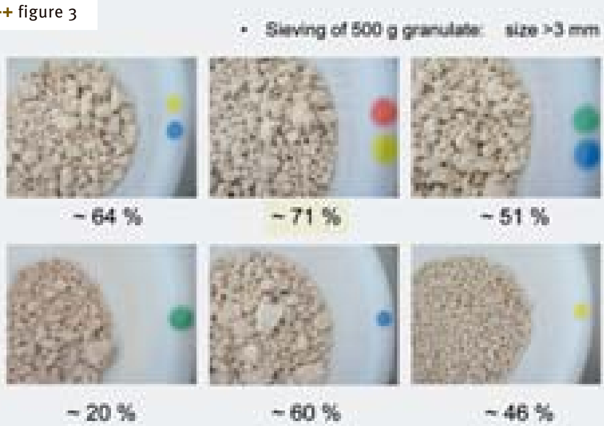
The production

The production of granulated yeast starts with selecting the right yeast strain and the respective fermentation conditions needed to achieve the desired final product quality. Block yeast, granulated yeast and liquid yeast differ, after fermentation, in the way that they are packaged. After standardization of the leavening power, the water is removed from block and granulated yeast in a vacuum rotary filter while liquid yeast, also called cream yeast, is ready for shipment after standardization of the leavening power (figure 1).

Dissolution and settling characteristics

The process used for the removal of water and, in particular, the way the yeast has been granulated will result in different behavior when dissolved at a later time. The settling behavior of re-hydrated granular yeast may re-

++ figure 3



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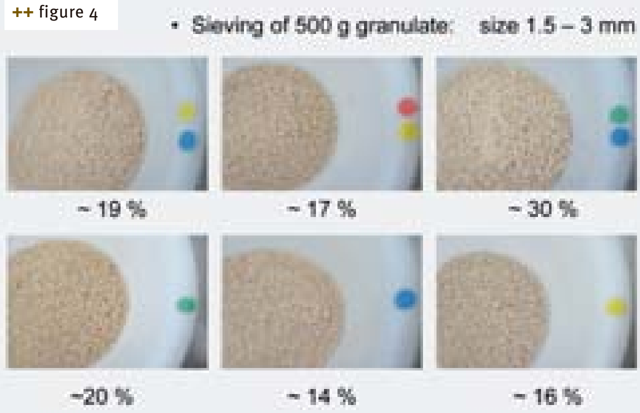

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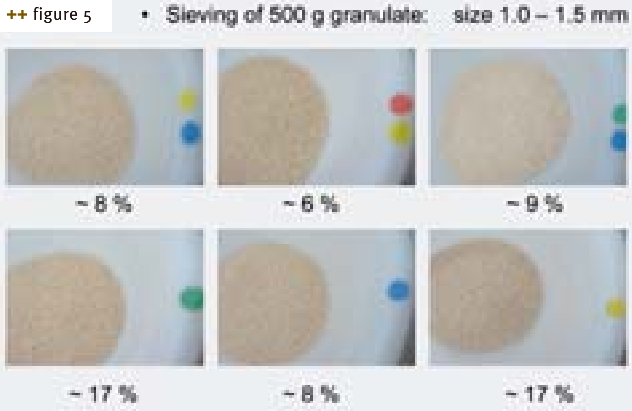
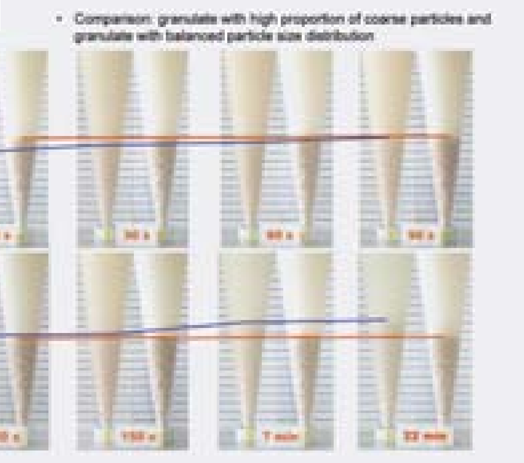


++ figure 6

sult in highly inaccurate usage amounts in the bakeries. Studies on different commercially available granular baker's yeasts have revealed astonishing results. For example, the particle sizes of the various granular baker's yeasts are very different (figure 2-6).

The sample coded red-yellow, for example, contained a large portion of coarse granular material which makes this baker's yeast harder to dissolve. The sample with the yellow coding, on the other hand, displayed a balanced granular size from coarse to fine resulting in facilitated and thus faster dissolution. The settling tendency is clearly reduced as is shown in figure 7. For this examination, two different granulates were stirred for about 60 seconds in a beaker and then transferred into a settling funnel. The left funnel was filled with the yellow sample; the red-yellow sample went into the right funnel. It is clearly recognizable that the settling process increases with time and that the granulate with the improved solubility (yellow) forms lesser sediment. Added to that, the tests also show that granulates such as the yellow sample can be more easily stirred after settling.
This sample is also more suitable for being metered as dry products via screw conveyors as is sometimes used in industrial bakeries. ▶

++ figure 7



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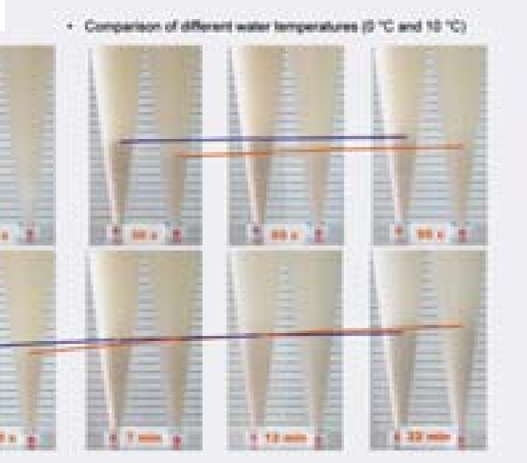


++ figure 7
Settling behavior of stirred granular yeast

++ figure 8
Influence of water temperature on granular yeast

++ figure 9
Intrinsic heating of granular yeast

++ figures 10 + 11
Leavening power of different types of baker's yeast

It is possible to optimize the dissolution behavior of granular yeasts by increasing the water temperature. This results in improved dissolution properties. However, it must be taken into consideration that baker's yeast should be stored at temperatures below 7 °C. In a test, samples of granular yeast, with a balanced amount of different fractions, were dissolved. The samples were stirred for 60 seconds in water with a temperature of 0 °C and 10 °C and then transferred into a settling funnel (figure 8).

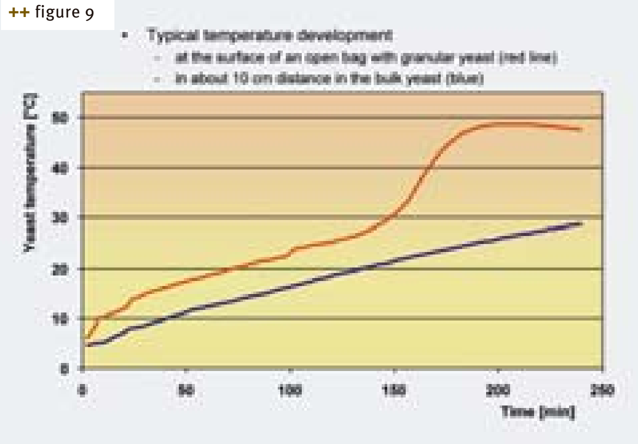
The different sedimentation volumes can be clearly seen. While yeast is harder to dissolve in water at a temperature of 0 °C (blue line), the lower initial sedimentation volume of the yeast dissolved in the warmer water shows a higher amount of individual yeast cells. Warmer water, in this case at a temperature of 10 °C (red line), promotes the dissolution speed of granular yeast.

Intrinsic heating

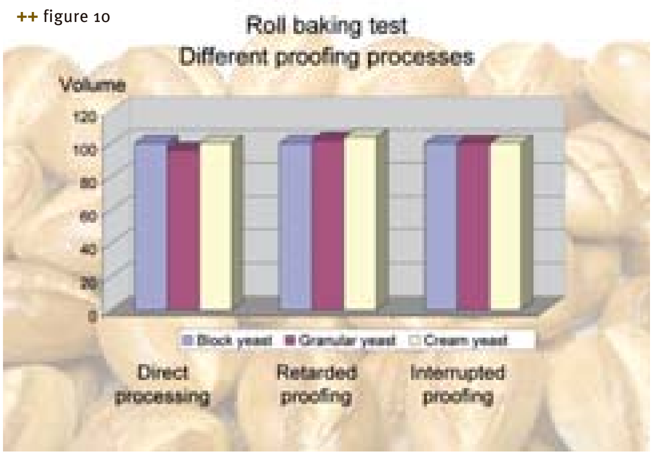
A bag of granular baker's yeast left open will soon develop some heat at the surface. What does this "intrinsic heating" mean? It is different from pressed or block yeast, in that the yeast cells in the granular yeast are present in smaller clusters and therefore have a much larger surface. The oxygen from the air will activate the yeast cells; they give up the dormant stage that they assume at lower temperatures. The starting aerobic metabolism leads to an increase of the temperature at the boundary layer which will then spread through the entire granulate over time.

Figure 9 shows the high heating speed of granular yeast subjected to air in the opened bag. After about one hour, the surface temperature is 20 °C with a dramatic temperature increase after 150 minutes. At that time, the storage carbohydrates of the yeast are used up and the autolysis, which is a self-destruction mechanism of the cells, starts. The temperature rises to almost 50 °C. After approximately 180 minutes, the heating process ends. The yeast appears as a large, melted mass because the yeast cells have then partly destroyed themselves and released cell liquid. Of course, the leavening power will also be drastically reduced at that time.

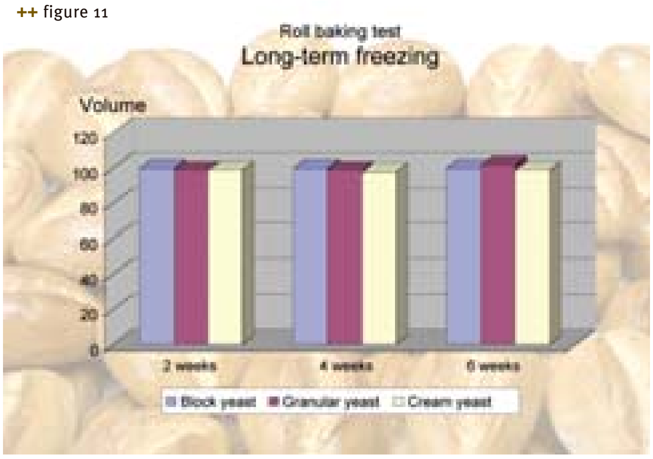
++ figure 9



++ figure 10



++ figure 11



All these processes are dependent on the type of granulate, the initial temperature, the age of the yeast and the environmental temperature.

Shelf life of dissolved granular baker's yeast

At the end of the production there is commonly some dissolved baker‘s yeast left in the slurry tank. How can the optimum leavening power of this residual yeast be contained? Trials have shown that stirring of the dissolved yeast during storage at low and ambient temperatures leads to significant losses in leavening power. Another decisive factor is the freshness of the yeast. In general, the fresher the yeast the less leavening power gets lost during storage. The hygiene in the plant is another decisive factor. The daily cleaning of all containers and pipe work coming into contact with the baker's yeast is mandatory to exclude external infection. This way, the dissolved yeast is suitable for any type of production.

Granular baker's yeast is top in proofing time control

For years, there have been doubts about the performance of granular yeast in processes with proofing time control. Tests with leavening power and baking trials have made these doubts superfluous.

Tests have been conducted using block yeast, granular yeast and cream yeast in different processes for the production of bread and rolls. The amount of usage was dependent on the dry matter content with the amount of water added being correspondingly adjusted. The results are clear.
It was found that independent of the form of the yeast used for the processing of doughs for rolls, with different production methods, all yielded a uniform volume (figures 10 + 11). There were no differences found in bloom, pore pattern or crispness. Similar tests with bread and fine bakery wares gave the same results. +++