



## Case Studies Demonstrating the Efficacy of Arise<sup>®</sup> 5000 and Arise<sup>®</sup> 6000 in Commercial Bakeries

### 1. Sourdough Bread

Case #1 demonstrates Arise<sup>®</sup> 6000's effects on extreme dough failure during production of one-pound sourdough loaves in a "no-time" system. The bread base contains acetic, lactic and fumaric acids to contribute to the sour flavor. The total weight of the dough in the production batch was 1200 pounds. The dough was mixed for 3 minutes on low speed and 13 minutes on high speed with proper development and typical gluten film.

The dough was divided into 19oz. pieces on a knife and ram divider with an inverted cone rounder. The pieces relaxed on an open belt for two minutes then went to a sheeter and a straight grain moulder where problems began to occur. At the halfway point buckiness developed causing misshapen loaves with rough, mottled surfaces.

The dough was proofed for one hour. The first half of the loaves was acceptable with average shape and appearance. Tearing appeared midway through the dough. The last third of the loaves had three one-inch-deep tears per loaf and discoloration after baking. Twenty-five percent of the run had to be discarded.

When 1.5% Arise<sup>®</sup> 6000 was added, the dough batch was increased from 1200 to 1800 pounds to demonstrate effectiveness. The formula remained the same as the control except for the addition of Arise<sup>®</sup> 6000. Mix time was reduced one minute and dough development and gluten film were optimized. During make-up, there were no problems with rough surfaces or dough pieces with poor symmetry.

At the end of a one-hour proof, all dough pieces were smooth and symmetrical. After baking, all loaves had improved volume with smooth crusts. The addition of Arise<sup>®</sup> 6000 improved dough line-tolerance, color and volume while reducing production waste.

### 2. Hamburger Buns

Case #2 demonstrates the benefit that Arise<sup>®</sup> 5000 delivers to automated high-speed bakery systems where optimized dough weight and rapid throughput meet unrelenting foodservice demands. An 1800-pound hamburger bun dough was pumped into separate rotary dividers that fed two bun lines. The dough became bucky and difficult to process during the last fourth of the run. 1.5% Arise<sup>®</sup> 5000 was added to the test dough along with 1.5% water. L-Cysteine was removed from the formula, and the mix time was reduced from nine minutes to eight minutes.

One divider broke down, leaving the other divider to process 1800 pounds of dough. Arise<sup>®</sup> 5000 stabilized the dough during the entire process. The test dough ran extremely well and showed no signs of gassiness or buckiness. The bakers commented that they would not

have been able to finish the entire dough or have met specifications as easily without the Arise® 5000.

Improvement in bun volume, smoother break and shred, and a whiter, tighter crumb with finer, more uniform cell structure was noted. Product exceeded specification.

### **3. Italian Bread**

Case #3 demonstrates Arise® 6000's ability to improve loaf quality. The problem in Italian hearth bread of shrinking and wrinkling became pronounced after cooling and freezing. Adjustments to formula, absorption, mix and bake time were unsuccessful.

After adding 1.5% Arise® 6000 and 1.5% water and following the same mix and proof procedure, the dough was slightly softer, pliable and extensible. After baking, less shrinkage or deformation was noted. After baking and freezing, the loaves were dramatically improved over the control.

### **4. Natural Sour Bread**

Case #4 demonstrates Arise® 6000's ability to enhance dough flow and freezer stability. The bakery had a two-pound sourdough square (pan bread) that required more pan flow to the corners and more volume to meet specification.

The simple formula used ascorbic acid and a percentage of natural sourdough starter. Standard procedure included mixing 1 minute at low speed, 12 minutes at high speed with rotary dividing and rounding on a long rounding board, hand panning and a four-hour proof.

The control showed signs of weakness out of the proof box, especially near the end of each batch, with severe gas bubbles on the dough surface and some settling at transfer. After a light brown partial bake, ventilated cooling and blast freezing, surfaces exhibited some cracking.

When 1.5% Arise® 6000 was added to the formula with 1.5% water, the mix time was reduced one minute and the dough development improved despite notions that it might be too slack to process. By the time the dough had been divided and rounded, all agreed that the test dough felt like the control. No additional tackiness or extensibility was noted.

After proofing, no loaves exhibited weakness through settling or gas bubbles as before. Dough flow to the corners also improved along with side definition. After baking, color and volume both improved and the crust did not crack during freezing. .

Arise® 6000 improved the machinability, dough strength, volume, pan flow and color, while preventing freezer damage.

### **5. English Muffins**

Case #5 demonstrates that Arise® 6000 improved dough porosity and flow for high-moisture formulas. In a high-speed dough system (where fluid dough is pumped to inline dividers),

mix times and ingredient composition are critical for proper dough piece flow and porosity. In this case, L-cysteine and SSL were removed from the regular formula, and 1.5% Arise<sup>®</sup> 6000 and 1.5% water were added. Mix time was reduced by one minute. Line efficiencies improved, and since the mixer was no longer the bottle neck for the dividers, the line ran more smoothly.

No off conditions were noted on the line. Less sticking on the rounding bars and fewer dough ball hang-ups on the zigzag boards improved line performance.

The finished product with Arise<sup>®</sup> 6000 showed improved characteristics with griddle flow, volume and porosity. Even though the SSL was removed, the English muffins with the Arise<sup>®</sup> 6000 had a less crumbly texture, and the crumb had a whiter appearance. The shelf life of the test product scored higher than the control.

## **6. Hot Dog Buns**

Case #6 demonstrates how Arise<sup>®</sup> 6000 can improve dough extensibility for small dough pieces over a longer time period. In running hot dog buns a baker faced time problems when the last fourth of a 1000-pound dough deteriorated and make up was poor through the divider. The dough became tight, gassy and bucky. As the dough aged, product quality fell. The made-up dough in the pan was rough, non-extensible and did not fill the pans. After baking, the final portion did not meet specification.

Quality improved when 1.5% Arise<sup>®</sup> 6000 was added and several other ingredients were removed. The formula changed provided cost savings and better quality. The control contained three different dough conditioners, a mono & diglyceride/enzyme blend and 3.0% wheat gluten. Mix time was reduced by two minutes, two dough conditioners were removed, the mono & diglyceride/enzyme blend was removed, the SSL was reduced from 0.5% to 0.25%, and 1.0% of the wheat gluten was removed.

The Arise<sup>®</sup> 6000 dough provided consistently good characteristics throughout the run and never became bucky, rough or non-extensible, like the control.

The final product was very comparable to the control but produced more consistent buns from the beginning to end. The buns with Arise<sup>®</sup> 6000 had similar volume but had a tighter, whiter crumb. The removal of half of the SSL did not compromise the shelf life. It is interesting to note that Arise<sup>®</sup> 6000 produced the same softness without expensive enzymes.