Chemical leavening

Chemical leaveners provide volume, texture, color and eye appeal for baked goods. Chemical leavening is typically used in flour based systems that do not use yeast — this includes fresh and frozen cakes, waffles, pancakes, cookies, muffins, biscuits, tortillas, doughnuts, pizza crust and the mixes that are used to make them.

Univar represents an extensive portfolio of ingredients from the leading global suppliers, offering customers more options to achieve a successful reformulation. Our sales team and food specialists work directly with customers to share application experience that reduces the time necessary in developing new products.

Fresh Ideas Start Here.™

UNIVAR®

Questions? Contact us!
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UNIVAR® FOOD INGREDIENTS

Chemical leavening

When formulating with a chemical leavening system, first choose the level of bicarbonate, typically 1 - 2% of the formulation. Utilize this formula to calculate:

$$\text{Amount of leavening acid} = \frac{\text{Amount of Bicarbonate x 100}}{\text{Neutralizing value}}$$

Bicarbonates	Description			
Sodium Bicarbonate	Most common base for chemical leavening and the source of carbon dioxide (CO_2) for leavening. Particle sizes vary by grade. The larger particles react slower. Neutralizing values listed below are based on sodium bicarbonate.			
Potassium Bicarbonate	Common base for low sodium applications.			
Ammonium Bicarbonate	Common base for low moisture cracker applications.			
Leavening acids	**Reaction stage[1]**	**Reaction rate**	**NV[2]**	**Description**
Monocalcium phosphate monohydrate (MCPM)	Stage 1	Fastest	80	Grade varies by particle sizes — larger particles react slower; provides dough conditioning
Anhydrous monocalcium phosphate (AMCP)	Stage 1	Fast	80	Slight delay in reactivity compared to MCPM
Citric acid	Stage 1	Fastest	159	Limited applications due to flavor and acidity
Adipic acid	Stage 1	Fastest	115	Beneficial in egg white stability
Tartaric acid, cream of tartar	Stage 1	Fastest	45	Cream of Tartar, provides quick reaction in mixing
Fumaric acid	Stage 1	Moderate	145	Limited applications due to flavor; particle size influences reaction rate
Sodium aluminum phosphate (SALP)	Stage 2	Slow	100	Either 100% heat-activated in the oven or partial reaction during hydration
Dicalcium phosphate dihydrate (DCPD)	Stage 3	Slow	33	CO_2 released during last stage of baking for extra volume or cracked surface
Sodium aluminum sulfate (SAS)	Stage 1 & 2	Moderate	104	Reacts in mixing and baking; flavor concerns in some applications
Blend: MCPM and SALP	Stage 1 & 2	Moderate	100	Complimentary reactions in mixing and heat-activated during baking
Blend: AMCP and SALP	Stage 1 & 2	Moderate	93	Complimentary reactions in mixing and heat-activated baking with slower rate of reaction over time
Blend: SALP and SAS	Stage 1 & 2	Moderate	100	Broad range of reactivity
Sodium acid pyrophosphate (SAPP) Many grades available.	Stage 1 & 2	Moderate	72	The grade reflects the %CO_2 released during mixing; remaining CO_2 released during holding or baking
Glucono delta lactone (GDL)	Stage 1 & 2	Continuous	45	Continuous slow release beginning with mixing
Low sodium baking	**Description**			
Levona™ calcium phosphate	Can replace SAPP or SALP in many bakery products; use with potassium bicarbonate to further reduce sodium.			
CAL-RISE™ calcium phosphate	Can replace SAPP or SALP in many bakery products; use with potassium bicarbonate to further reduce sodium.			
INNOVAFREE™ baking powder	Another easy option in providing a complete sodium free or reduced leavening system.			
Baking powder	**Description**			
INNOVABAKE™	Encapsulated leavening systems by are new controlled release baking powder products. Improve your leavening systems for refrigerated and frozen bakery goods.			

[1] Stage 1 = Mixing, Stage 2 = Baking, Stage 3 = End of baking cycle
[2] Neutralizing value for sodium bicarbonate

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