Crackers - Bicarbonate Applications

Snack crackers encompass a broad spectrum of products ranging from semi-sweet, machine-cut, chemically leavened cookie-like crackers to non-sweet, fermented, laminated crackers. In general, crackers contain little or no sugar, moderate levels of fat, and relatively low levels of water. Crackers can be divided into two basic categories: soda crackers (saltines) and snack crackers (sprayed and savory). A third group consists of graham crackers which are made with higher levels of sugar. Leavening can be accomplished either by yeast fermentation or by chemical leavening. Most yeast leavened crackers (saltines) are processed using a sponge and dough fermentation process. The bicarbonates serve to neutralize the acids formed from the fermentation reaction. Chemically leavened crackers are processed utilizing the carbon dioxide produced from the reaction of the bicarbonate with an acidic salt.

Sodium, potassium and ammonium bicarbonate function as leaveners to provide gas release which results in the rise of the cracker. Cracker height and texture are dependent on the use of bicarbonates for proper leavening. Bicarbonates also function to control the pH of the system which impacts the flavor and color of the cracker.

FORMULA EXAMPLE: SODA CRACKERS	
Ingredient	**% FWB**
Sponge	
Soft Wheat Flour	**60**
Water	**30**
Instant Yeast	**0.1**
Dough	**7.5 - 25**
Soft Wheat Flour	**40**
Cracker Meal	**4**
Shortening	**12**
Diastatic Malt Syrup	**1.5**
Salt	**1.5**
Sodium Bicarbonate*	**1**

***Potassium bicarbonate may be used at appropriate substitution ratio.**

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Bicarbonate Recommendation

Sodium Bicarbonate Grade 1 Powdered:
Dissolves rapidly to assure quick, complete availability for reaction with the acid ingredients.

Sodium Bicarbonate Grade 1 TFF:
Treated with tricalcium phosphate to improve flow quality. Dissolves rapidly to assure quick, complete availability for reaction with the acid ingredients.

Sodium Bicarbonate Grade 2 Fine Granular:
The narrow particle size distribution facilitates rapid, uniform blending. This grade is recommended for those products where minimal leavening during mixing and holding is desired.

FLOW K™ Potassium Bicarbonate:
Potassium bicarbonate performs exceptionally well as a replacement for sodium bicarbonate in most chemically leavened products. For equivalent CO_2 release, 20% more potassium bicarbonate must be used.

Ammonium Bicarbonate:
ABC reacts rapidly in the presence of moisture and/or heat to release CO_2 and NH_3 gases which contribute to leavening. Use of ABC without a leavening acid is limited to products whose final moisture is less than 5% so the ammonia gas can bake out.

FORMULA EXAMPLE: CHEMICALLY LEAVENED CRACKERS

Ingredient	% FWB
Flour	100.0
Water	30
Shortening	12
Sugar	7
High Fructose Corn Syrup	3
Ammonium Bicarbonate	1.5
Barley Malt Flour	1.4
Sodium Bicarbonate*	1.3
Monocalcium Phosphate	1.2
Salt	0.75

***Potassium bicarbonate may be used at appropriate substitution ratio.**

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