



Acid Sensory Enhancement:

Creating  
New  
Opportunities  
for  
Flavor



acid  
sensory  
enhancement

Low pH is necessary for preservation and stability in acidified foods and beverages, but sour taste can often overpower the intended flavor of the formula. The acid release profile of pHase® on the palate gives a soft, round flavor, offering a more natural overall flavor characteristic with a bright, clean aftertaste. pHase® creates new opportunities in flavor manipulation, new product development and product improvement.

Taste the true flavor of vanilla, coffee, tea, chocolate and other brown flavors in your acidified food and beverage formulas. Bring out the ripe, juicy notes of non-citrus flavors like peach, strawberry, banana, cherry, pineapple and apple with pHase®.

## Acid Strength

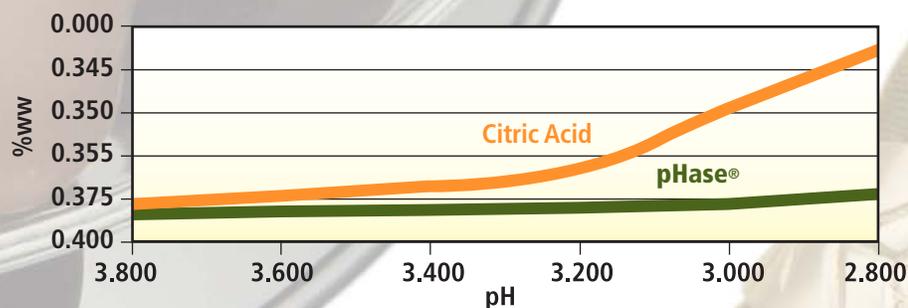
Acid strength is denoted by pKa value. The lower the pKa value, the more hydrogen ions the acid will deliver. A one molar solution of pHase® delivers more hydrogen ions in solution than most common food acidulants.

Acidulants in order of Strength		pKa Value
	Sodium Acid Sulfate	1.99
	SAPP	2.10
	Phosphoric Acid	2.16
	Tartaric Acid	2.98
	Lactic Acid	3.08
	Citric Acid	3.14
	Malic Acid	3.40
	Acetic Acid	4.75

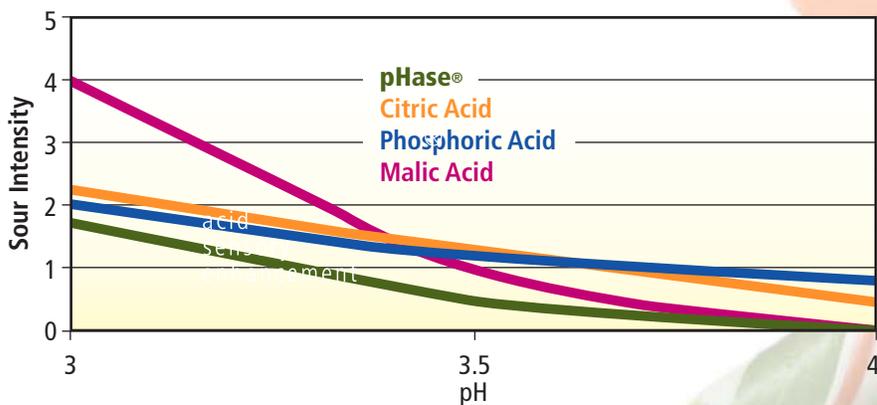
## Acid Concentration and pH Reduction

pH is another method of representing hydrogen ion concentration. The lower the pH, the more hydrogen ions in solution. Due to its acid strength, pHase® can deliver more hydrogen ions by weight than many other common acidulants, like citric acid. Since pHase® delivers more hydrogen ions, less is needed to achieve an equivalent pH. pHase® makes it possible to lower your acid usage and thereby your acidulant costs.

pH	pHase®		Citric Acid	
	g/L	%ww	g/L	%ww
7.750	0.000	0.000	0.000	0.000
4.000	0.345	0.035	0.410	0.041
3.800	0.350	0.035	0.450	0.045
3.600	0.355	0.036	0.550	0.055
3.400	0.375	0.038	0.685	0.069
3.200	0.400	0.040	0.880	0.088
3.000	0.455	0.046	1.585	0.159
2.800	0.560	0.056	2.245	0.225



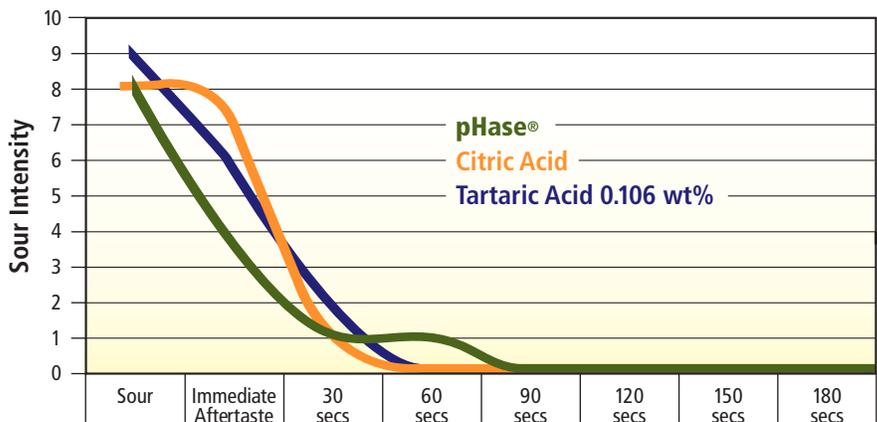
## Sour Intensity versus pH



## Sour Intensity

Sensory Spectrum<sup>1</sup> evaluated the sour intensity of pHase®, citric acid, malic acid and phosphoric acid in water at three different pH values. The taste panelists evaluated the samples to rate the perceived sour intensity of each acid at pH 3.0, 3.5 and 4.0. pHase® had the lowest sour impact at each pH level.

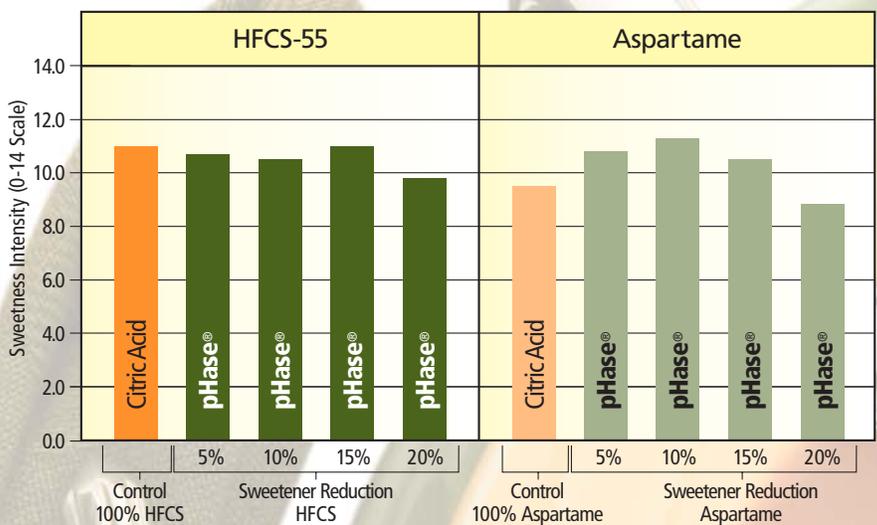
## Sour Intensity and Aftertaste



## Masking of Intense Sweeteners

A recent study determined that pHase® is capable of masking the unpleasant aftertaste often associated with intense sweeteners. The acid flavor release of pHase® is more delayed, creating a masking effect on the lingering notes of intense sweeteners.

## Sweetness Intensity Comparison (Water, Sweetener and Acid at pH 3.2)



## Sweetener Reduction

Sweet and sour flavors need to be balanced in food and beverage formulas to achieve the optimum flavor profile. Sensory analysis proves pHase® lowers pH with low sour intensity. Consequently, less sweetener is required to achieve this sweet and sour balance.

pHase® and citric acid were evaluated in both High Fructose Corn Syrup (HFCS) and Aspartame sweetened systems at a pH of 3.2. In the pHase® acidified samples, the sweetener concentration was reduced by 5–15%.

Reference: 1. Spectrum Descriptive Analysis of Acid Samples, Sensory Spectrum; Chatham, NJ, October 2002



## Benefits:

- Clean, smooth tartness
- Low sour intensity
- Low cost
- Low addition rate
- Reduction in sweetener usage
- Easily dissolves in water
- pH reduction to low levels
- Safe to store and handle
- Non-hazardous

## Certifications:

**GRAS** GRN000003 as a pH control agent, processing aid and leavening agent in foods.

**AIB:** Jones-Hamilton Co., Walbridge, OH passed the AIB, American Institute of Baking audit on July 15, 2003 with a superior rating.

**Meets** Food Chemicals Codex 4th edition Specs.

**Kosher** ⓈP

**NSF** Standard 60 Potable Drinking Water.

**ISO** 9001:2000

**Patents:** 5,958,491 & 6,132,792

**HALAL**



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## FREQUENTLY ASKED QUESTIONS

### **Q: Which countries have approved pHase® for use?**

**A:** **USA:** Designated GRAS on June 5, 1998, GRAS Notice No. GRN 000003. Approved as: pH control agent, leavening agent and processing aid in foods at levels that meet good manufacturing practices.

**Europe:** Sodium hydrogen sulphate is in schedule 1 of the Miscellaneous Food Additives Regulations 1995 No. 3187. E number 514ii. It is unrestricted within this category.

**Mexico:** Approved in food for human consumption.

**Canada:** Approved as a leavening agent. Unstandardized food approval in progress.

### **Q: What are its physical and chemical characteristics?**

**A:** pHase® is a dry granular acid that easily dissolves in water. It is heat stable up to 800° F. Its chemical formula is NaHSO<sub>4</sub>. In water it dissociates into sodium, hydrogen and sulfate ions—all of which are beneficial in food systems. Sodium is a known flavor enhancer, hydrogen ion lowers pH and sulfate has nutritional value.

### **Q: What is its flavor profile?**

**A:** The flavor profile for pHase® is a clean acid taste. It has no fruity or vinegar taste. This is of particular value when acidity regulation is required for process and microbiological safety, but a sour or vinegar taste is unwanted.

### **Q: Can you blend it with other acids?**

**A:** Blending pHase® with citric or acetic acids works well in formulas where a specific acid taste is desired but the required pH is not met before the formula becomes too sour or vinegar tasting.

### **Q: Does it chelate?**

**A:** pHase® does not chelate metal ions, therefore it will not provide protection from metal catalyzed degenerative reactions. Formulations that require chelation will need a blend of organic acid or the addition of a chelating agent like EDTA.

## pHase® Applications

### **Seasonings & Sauces**

### **Candy & Confectionary**

### **Fillings**

Fruit Fillings  
Chocolate Fillings  
Coconut Fillings

### **Cheese**

### **Dressings**

### **Syrups**

### **Acidified Foods**

### **Beverages**

Soft Drinks  
Fruit Drinks  
Slush Drinks  
Iced Teas & Coffees  
Soy Drinks  
Bar Mixes

### **Allergic Reactions**

pHase® contains no sulfites and should not produce allergic reactions.

### **Labeling Options**

Sodium Acid Sulfate  
Sodium Bisulfate  
Bisulfate of Soda

### **Nutritional Value**

Calories: 0/100g  
Sodium: 19.9g/100g