
**PROCEDURE FOR ADJUSTING pH OF A PRODUCT RECIPE
TO A DESIRED TARGET USING pHRESH ACIDULATES**

Background:

There are two requirements to make an existing high water activity product, shelf stable.

- Lower the pH of food product using pHresh acidulates
- Add one or more mold inhibiting ingredients.

For complete shelf stability (up to one year) without modified atmosphere packaging, the pH of the final food product must be less than 4.6 pH, (4.3 pH is recommended) and include the addition of one or more mold inhibitors. If the desired time frame for a shelf stable food product is shorter, (example; 60 days) and if stored at low temperature conditions (example 2 – 6 °C) pH levels may be increased up to 5.0 to 5.2 pH (less acidulates required).

The purpose for pHresh acidulates are two fold;

- Lowers the pH for food product to increase inhibition of microbials, pathogens, yeast, and bacteria.
- Improves the functionality of, and lowers the quantity of mold inhibitor required in the final product.

The amount of pHresh Acidulate required is dependent on the buffering capacity of the ingredients used in the recipe to make the final product. The purpose of this document is to assist in the determination of amounts of pHresh acidulates required to meet a target pH.

Procedure for determining the buffering capacity of target food product:

Step 1

Weigh or measure out all components of the complete recipe for the food or product you are making (this includes mold inhibitors and any leavening agents expected to be in the final product). This may be done with a smaller batch size, and then scaled up to production batch size.

Step 2

Combine the complete recipe and mix thoroughly.

For pies, combine either the crust portion or the filling portion depending on which portion of the pie is to be acidulated.

Step 3

Calculate the approximate number of grams or lbs equal to 0.2% of the total weight mixed:

Example:

Flour	100.0 grams
Sugar	50.0 grams
Baking Powder	3.0 grams
Mold Inhibitor (RX-1)	<u>0.4 grams</u>
TOTAL WEIGHT	153.4 grams

Calculation: 153.4 grams X 0.002 = 0.3068 grams (or approximately 0.3 grams)

Step 4

Make a slurry by adding distilled water to the mixed ingredients. If the combined ingredients are already liquid and existing mixture is a slurry, proceed to Step 5.

Using either a 50%, 75%, or 90% water solution (this will depend on the ingredients, and how much water is required to make a titratable slurry or solution), combine the water and combined ingredient mixture and mix thoroughly.

Calculation for 75% water solution:

$[153.4 \text{ grams} / (1 - 0.75)] - 153.4 \text{ grams} = 460.2 \text{ grams}$ of water to add to the ingredient mixture

Step 5

Using a pH meter, determine and record the pH of the water/ingredient mixture.

An example of tabulating:

Total grams of acidulate added	pH of the water / ingredient mixture
0	6.4
0.3	6.0
$0.3 + 0.3 = 0.6$	5.7

Step 6

Using the amount of acidulate calculated in Step 3, add (in this example 0.3 grams) acidulate to the water/ingredient slurry and mix thoroughly. Using a pH meter, determine and record the pH of the water/ingredient mixture.

Total grams of acidulate added	pH of the water / ingredient mixture
0	6.4
0.3	6.0
$0.3 + 0.3 = 0.6$	5.7

Step 7

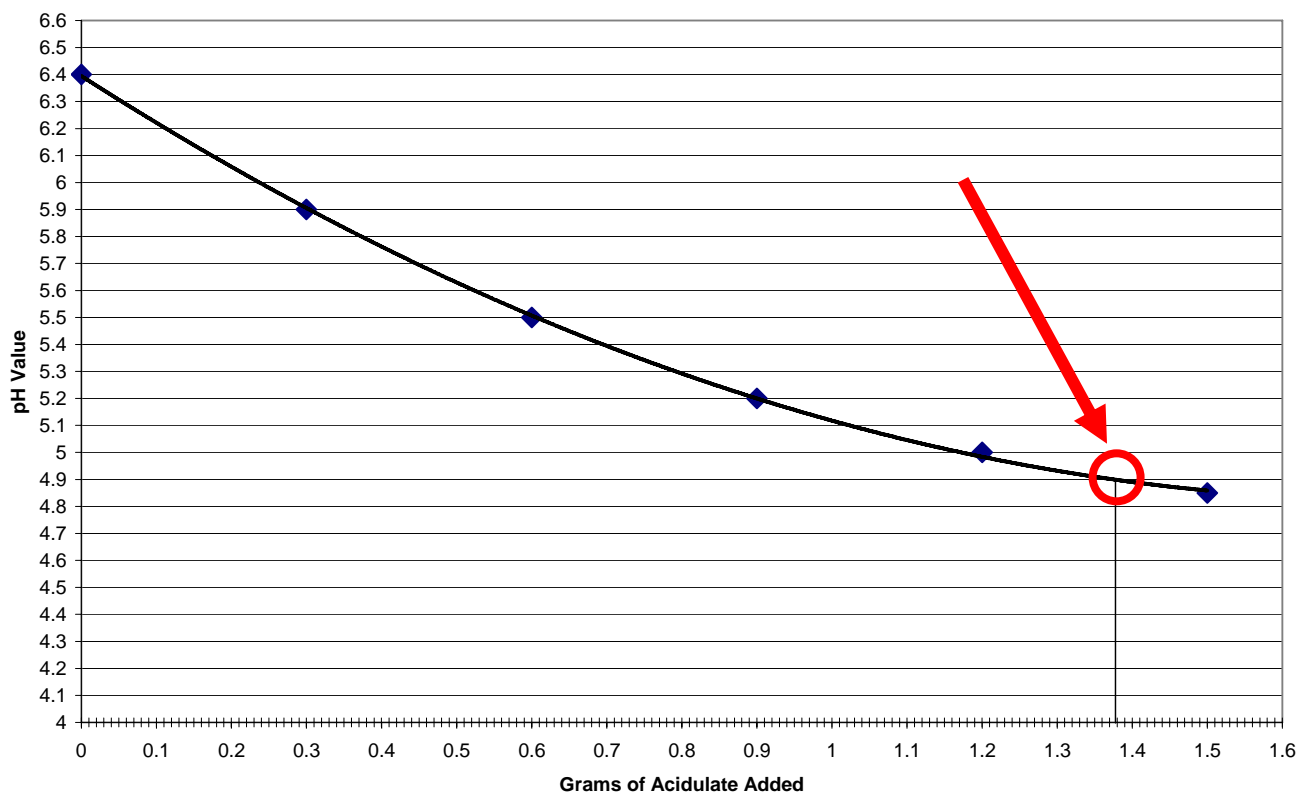
Repeat Step 6 until a pH lower than the desired pH for the final food product is achieved. (in this case the target pH is 4.9)

Total grams of acidulate added	pH of the water / ingredient mixture
0	6.40
0.3	5.90
$0.3 + 0.3 = 0.6$	5.50
$0.3 + 0.3 + 0.3 = 0.9$	5.20
$0.3 + 0.3 + 0.3 + 0.3 = 1.2$	5.00
$0.3 + 0.3 + 0.3 + 0.3 + 0.3 = 1.5$	4.85

Step 8

At this point a graph used to calculate the amount of pHresh acidulate to be added to the recipe should be made. Viewing the resulting graphed data (Example is on the next page) the amount of acidulate required to achieve a final product pH of 4.9 may be determined. In this example, 1.38 grams of pHresh acidulate needs to be added to 153.4 grams of combined recipe ingredients to lower the pH of the final product to 4.9.

pH of the water / ingredient mixture (153.4 grams)



Step 9

Now the proper information has been gathered to determine the amount of pHresh acidulate required for the production batch.

Calculation (Example):

Production Batch Size: 1000 lbs

$[1.38 \text{ grams} / (1.38 \text{ grams} + 153.4\text{grams})] \times 1000 \text{ lbs} = 8.92 \text{ lbs acidulate required for production batch}$

grh

Please contact **pHresh Technologies** with any questions related to this document.