

# Reducing Sodium in Pepperoni



A key consideration of reducing sodium in pepperoni is the impact on product shelf life.

A customer recently asked Cargill's Research and Development (R&D) team to reduce the sodium in pepperoni, America's favorite pizza topping.<sup>1</sup> One of the challenges for a food manufacturer who is working to change a pepperoni formula is the iconic taste of pepperoni. Each individual ingredient in pepperoni can carry a significant flavor impact, especially since there are so many seasonings and spices in the formulation.

Reducing the amount of salt in pepperoni will not only impact flavor, but also texture, shelf life, mouthfeel and other important elements. Sodium is not simply added through salt in pepperoni; there are several sources of sodium. Trying to compensate for a reduction or elimination of salt can throw an entire formula off as, truly, salt and pepperoni go hand in hand.

Cargill's Food Science R&D team is focused on customer support and meeting customer requests, like reducing sodium in various products. Cargill's R&D team's areas of expertise include the following:

- Product matching – tasting and chemical analysis
- Pilot plant testing
- Formal sensory analysis
- Sample creation
- Specification and labeling
- Shelf life testing
- Plant implementation

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<sup>1</sup> Bratskeir, K. (21 Jul 2015). This Map Shows Every State's Favorite Pizza Topping. Retrieved from [http://www.huffingtonpost.com/entry/this-map-shows-every-states-favorite-pizza-topping\\_55ad4447e4b065dfe89ef7ed](http://www.huffingtonpost.com/entry/this-map-shows-every-states-favorite-pizza-topping_55ad4447e4b065dfe89ef7ed)

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Often, Cargill's R&D team might receive a customer's initial request in the form of a few bullet points outlining their need. For example,

- Target lower sodium content so product is in line with general industry and regulatory initiatives on reducing dietary sodium intake
- No impact on flavor
- Minimal changes to the label (ingredient deck)
- No change in shelf life – e.g., 105 days for pepperoni

For this project, the Cargill R&D team compared the shelf-life of a control, 30% reduced sodium, and 50% reduced sodium pepperoni samples. Shelf life, or the length of time for which an item remains usable and fit for consumption, is very important to pepperoni producers. Pepperoni, like hard salami, generally lasts longer than other meats that would be classified with regular packaged lunch meat.

The team documented all of the customer's needed storage requirements, such as yield, number of days and storage temperature. The team presented organoleptic analyses, including odor, color and headspace.

## Results

Reducing the sodium by 50% seemed to bring out or enhance some of the other spice flavors, which can be a positive. However, if this customer wanted to sell this pepperoni product into a school lunch setting, it might not work well as this version enhanced the heat from the red pepper.

With regards to odor, scores remained acceptable for all samples for the duration of the study; however, the control sustained the strongest seasoning aroma. The color of all products remained acceptable for the duration of the study.

## Cargill's Innovative FlakeSelect® Product Options

Cargill's FlakeSelect® products are ideal for pepperoni or dry sausage products. It can perform well from a dissolution rate perspective. With pepperoni, or dry sausage there isn't the luxury of having added water to help with dissolving or distribution of the salts. FlakeSelect®, a compacted flake product, has been demonstrated to dissolve well in these applications.

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Cargill's R&D team used FlakeSelect® Potassium Chloride salt-replacement product to reduce the sodium in the pepperoni test samples. FlakeSelect® Potassium Chloride is a compacted flake particle that is roughly 50 percent sodium chloride and 50 percent potassium chloride. It is produced through a patent-pending technology that combines and agglomerates the two ingredients. The resulting particles are homogeneous, low in bulk density, highly soluble and provide superior adherence for topical applications as compared to dry, blended or granulated products.

The FlakeSelect® functional system physically modifies the crystal structure to increase functionality of single or multiple ingredients. The FlakeSelect® process creates ingredient(s) that have:

- Greater surface area that contributes to better blendability, solubility, and adherence
- Optimal granulation with four precise screen cuts that allows performance in a wide variety of food applications
- Agglomerated particles that offer even distribution of base components joined in a single crystal

Cargill's FlakeSelect® products add even more functionality than dry blends including granulated potassium chloride. FlakeSelect® is available in four particle sizes: Extra Coarse, Coarse, Fine & Flour.