



TASTING SUCCESS with CUTTING SALT

*A Culinary Institute of America
Healthy Menus R&D Collaborative
Success Story*

Summary

The Culinary Institute of America (CIA) formed the Healthy Menus R&D Collaborative (HMC) in January 2010 to help the volume foodservice industry increase the availability of healthy menu options. Founding members selected sodium reduction as their first priority area for collaboration. There were potential federal mandates to reduce sodium in the food system, and members were eager to seek cost neutral solutions to this challenge that wouldn't have a negative impact on taste, flavor, or consumer acceptance. Members have had collective success in reducing sodium through several strategies and tactics. Between 2011 and 2014, HMC operator companies reported reducing sodium levels across all foods and beverages on their menus by 12%.

Background

In 2009, the New York City Health Department launched the [National Salt Reduction Initiative](#) (NSRI), a voluntary sodium reduction program aimed at food manufacturers as well as restaurant operators with a goal of cutting the sodium in packaged and restaurant foods by 25% over five years. (Beginning December 1, 2015, New York City began requiring a "[Sodium Warning](#)" for any menu item or combo meal in chain restaurants that contains 2,300 milligrams of sodium or more.)



Meanwhile, the Institute of Medicine (IOM) was scheduled to release a [Strategies to Reduce Sodium Intake](#) report in April 2010. The IOM formed the committee to write the report and recommendations based on a request from Congress in 2008 to determine how to reduce sodium intake to levels recommended in the [Dietary Guidelines for Americans](#).

When the IOM report was released, many in the foodservice community—including HMC members—applauded the recommendation to *slowly* reduce the sodium content of the food supply so consumers could adjust to lower levels without adverse effects on their enjoyment of food. HMC members were focused on discovering and developing strategies for reducing sodium in menu items that did not adversely impact flavor.

This case study shares information on the research, ingredients, and culinary strategies HMC members discovered, discussed, debated, and developed from 2010 to 2015.



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Sodium Intake in the U.S.

National dietary intake studies have shown that Americans consume sodium at levels far beyond recommended intake. [According to the Center for Disease Control and Prevention \(CDC\)](#) about 90% of Americans 2 years and older consume too much sodium. The 2015-2020 Dietary Guidelines for Americans recommend consuming less than 2,300 milligrams of sodium per day while the average daily intake for Americans 2 years and older exceeds 3,400 milligrams per day.

[Research published in Circulation](#) in 2017 showed that more than 70% of sodium consumed by adults in the U.S. comes from foods prepared away from home. This research supports earlier studies showing most of the sodium comes from processed and restaurant foods versus what is added during cooking at home or while eating.

Salt vs. Sodium

- While there are many sources of sodium in our food system (e.g., sodium bicarbonate, sodium nitrate, sodium citrate, monosodium glutamate, etc.), more than 90% of the sodium Americans consume comes from sodium chloride.
- Sodium chloride is 40% sodium and 60% chloride by weight.
- 1 teaspoon of **fine grain** table or kosher salt weighs ~5,800 mg.
- 1 teaspoon of **fine grain** table or kosher salt contains ~2,400 mg sodium.
- Table and kosher salt are ~99% pure sodium chloride
- Sea salt is *at least* 97.5% sodium chloride, plus other minerals.
- The mineral composition of sea salt varies depending on where the salt is harvested and how it is processed.
- Most commercially available forms of sea salt are 99% pure sodium chloride.

Sodium Content of Various Salts

The sodium content of salts can vary depending on the crystal shape and density as well as the mineral composition.

Type of Salt	Weight of 1 teaspoon	Sodium Content of 1 teaspoon
Fine Grain Iodized Table Salt	6 grams	2360 milligrams
DIAMOND CRYSTAL® Fine Sea Salt	5.6 grams	2160 milligrams
MORTON Salt Balance (<i>contains potassium</i>)	6 grams	1760 milligrams
DIAMOND CRYSTAL® Kosher Salt (<i>large, hollow, multifaceted crystals</i>)	2.8 grams	1120 milligrams

Unique Challenges When Reducing Sodium

In addition to contributing flavor, sodium plays other roles in our food system. HMC members had to consider sodium’s role in food safety and shelf-life as well as functionality (e.g., slicing of deli meats, strengthens gluten formation and controls fermentation by inhibiting yeast activity in yeast breads). Sodium is also ubiquitous in our supply. Some foods naturally contain sodium (e.g., dairy milk) while most processed foods contain added sodium to promote food safety, extend the shelf-life, or provide a functional or flavor benefit. Finally, reducing sodium may increase perception of other flavors, especially bitter flavors.

Member Insights: Initial HMC Strategy

When HMC members started this work, they agreed on the following strategy for their collaborative efforts:

1. Engage in a cross-industry dialogue to share ideas, discuss barriers and identify opportunities, and creative strategies to reduce sodium in menu items *without compromising flavor and guest experience*.
2. Identify current inhibiting factors in the industry and across manufacturing to include demand, lower sodium product R&D, availability, product knowledge and cost.



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Operator Member Insights: Collective Successes & Challenges

In January 2011, founding HMC member Chris Gatto (then Vice President of Food and Beverage for Uno Chicago Grill) reported on successes to date and challenges identified through an HMC Operator Member Survey, as follows:

Success-to-Date

- Use a stealth approach: Don't tell your customers you're reducing sodium; just do it.
- Use a step-wise approach: Don't reduce sodium levels too quickly. Reduce gradually over time.
- Focus on new product development versus reformulation of current menu items: Your customers may recognize changes in their favorite menu items. You may have more impact if you focus on creating new menu items with less sodium.
- Use different techniques for flavor development: What can you do with a culinary focus? Can you adapt new cooking techniques or use low/no sodium ingredients that develop delicious, craveable flavors?

Top Challenges

- Cost: Alternative ingredients may drive up food costs.
- Unintended consequences: Operators attempting to reduce sodium in bread products reported needing longer fermentation time, which creates operational issues and drives up cost.
- Strategic challenges: Some operators reported having difficulty getting internal leaders to agree on sodium targets. Do we cut sodium by X% across the menu, or should we focus on categorical targets?
- Legislation: New York City is one example of a local market putting pressure on the industry. Do we create menu items for that market, or do we roll-out new/revised items across all markets we serve? What if a new target or mandate appears in another market? One member referred to this as the "whack-a-mole" approach to addressing regulatory pressure.
- Suppliers: HMC operators may know what they want, but if they can't find suppliers who can offer the ingredient or processing technology, that creates new challenges.
- Consumer acceptance: When diners don't like new or reformulated menu items, check averages or restaurant sales may decrease.



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Operator Member Insights: Reducing Sodium in Bread

In January 2011, then HMC member Thomas John (then Senior Vice President of Food and Beverage at Au Bon Pain) presented data and led a tasting of baguettes with 16% and 58% less sodium than their standard baguette at the time. The tasting showed that a baguette with 58% less sodium tasted good, had appealing texture, and when used as the base for a sandwich, would likely be positively received by the guests.

Thomas shared the following observations from Au Bon Pain's sodium reduction work. When sodium is decreased from the standard 2.25%, the following happens:

- Increase in jump or oven spring, the final burst of rising just after a loaf is put in the **oven** and before the crust hardens
- Faster proof at same yeast level
- Loss of fermentation flavor
- Open crumb structure
- White appearance
- Softer crust

John went on to explain how Au Bon Pain overcame these challenges.

- Increase floor time (fermentation) to preserve flavor, which masks the reduced salt levels.
- Increase mixing time by 20%.
- Add an inactive yeast extract.
- Reduce yeast to get the similar proof time to adjust the moulding (shaping) process.

Technical Advice on Sodium Reduction

HMC members have used an iterative process for tackling health menu R&D challenges. They identify a challenge or priority area, gather data and insights from experts, experiment in CIA kitchens, and then work independently in their own R&D facilities or with vendor partners and suppliers to create proprietary solutions. Some members may share insights while others keep their success stories to themselves.

When members started exploring options for reducing sodium, they invited experts with food science and technology insights to present at meetings. A presentation by Marianne Gillette,

then Vice President of Applied Research for McCormick and a past-president of the Institute of Food Technologists, focused on the following ingredient strategies:

- **Use sea salt.** This will have minimal impact on sodium reduction, but it's label-friendly. The presence of other minerals, depending on where it's harvested, may have a positive impact on flavor. However, this strategy may drive up cost, and there may be limited supply.
- **Use a modified density, shape, or size of sodium chloride crystal** (e.g., Alberger Fine Flake Salt or Dendritic Salt, both from Cargill). The density, shape, and size can affect the salt's adherence, blending, number of particles, and solubility, as well as sodium content. The technology used to develop the crystals can affect cost.
- **Use a potassium chloride blend.** When sodium is replaced with potassium, sodium content is reduced, but potassium contributes bitter flavors.
- **Use a potassium chloride masker.** Additional ingredients can mask or cover the bitterness imparted by the potassium, but these maskers may not be label-friendly, and they may increase cost.
- **Use a sodium chloride enhancer.** Many of these products have proprietary formulas and modes of action. Some stimulate taste receptors on the tongue to create the perception of salt. They are typically application specific and they increase cost.
- **Use yeasts.** They are natural ingredients and widely available. While they do not contribute salty flavor, they do contribute savory flavors that may enhance perception of sodium.
- **Use other ingredients to enhance flavor** (e.g., sugar, acids, natural flavorings, spices, herbs)
- **Use 10-20% less sodium chloride.** Sensory research with consumers shows most people can't detect a 10-20% reduction in sodium in familiar foods, comparing the standard with the reduced sodium version.



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Exploring Culinary Strategies to Reduce Sodium in Restaurant Food

When the HMC was formed, founding members agreed that while they should explore all options for reducing sodium, the emphasis should be on culinary strategies that reduce sodium while maintaining or enhancing flavor. Suppliers and vendor partners could explore ingredient solutions while menu R&D leaders could explore culinary strategies.

The initial culinary strategies fell into five categories:

1. Using umami-rich foods and ingredients to enhance flavor and perception of sodium
2. Using healthy fats & oils to carry or contribute flavor
3. Using cooking techniques that intensify flavor
4. Using sodium-free seasonings to contribute flavor
5. Using produce to contribute flavor

Use Umami-Rich Foods and Ingredients

In December 2011, a small group of HMC leaders met with CIA faculty and staff to discuss research on using umami-rich mushrooms as a strategy for reducing sodium in savory dishes with meat. This discussion led to a research project conducted by sensory scientists at the University of California, Davis and nutrition and culinary leaders from the CIA.

Peer-reviewed, published [results from this study](#) show that when mushrooms replace 80% of the beef in a taco blend in which sodium has been reduced by 25% compared to the standard recipe, consumers could not detect a flavor difference. At the highest level of meat replacement, the umami properties of white button mushrooms contributed to enhanced perception of the sodium in the taco blend. However, at lower levels of meat replacement, flavor and liking dropped, showing a 25% sodium reduction is too ambitious.

Results from this research have led many volume foodservice companies and brands to offer beef-mushroom blended patties, including Sodexo in their K-12 school nutrition programs, Compass Group North America in their business and industry accounts, and Sonic Drive-In with their [Sonic Slinger burgers](#).

Operator Member Insight: Consider Relationship Between Portion Size and Sodium Content



At one of the first HMC meetings, founding co-chair **Deanne Brandstetter**, MBA, RD, CDN, Vice President of Nutrition and Wellness for Compass Group, North America, reminded the group of an important principle.

“Our first strategy for reducing sodium in our menu offerings should be reducing some of our portion size. Research shows the more calories you consume, the more sodium you consume. Many of our portions offer too many calories as well as too much sodium. If we are going to implement menu labeling across the nation, we need to focus on the calorie and sodium content of our menu items.” Heads nodded in agreement as members considered this insight.

Operator Member Insight: Beware of the Build

Another early “aha” moment happened with **Dan Coudreaut**, a 1995 graduate of the CIA, founding member of HMC, and then Executive Chef and Vice President of Culinary Innovation for McDonald’s USA, talked about how he and his team assessed flavor for new menu items. “We taste each ingredient individually to evaluate flavor, but we haven’t been thinking about the impact that has on the sodium content. Do the hamburger, cheese, pickles, and sauce as well as the bun all have to taste great on their own, or is the flavor of the final menu item most important?”

This was an important insight considering that processed meat, cheese, and yeast bread products are the top contributors of sodium in the American diet. Any HMC member selling burgers, sandwiches, or pizza paid attention to the impact “the build” may be having on sodium content.

Operator Member Insight: Sometimes the Simplest Option is the Best

One of the funniest moments in HMC history happened when former member **Rick Wolff** (then Director of Culinary Innovation for HMS Host) talked about how he and his team decided to reduce sodium in their Pugliese rolls for airport operations across the country. “We’d been struggling to figure out the right approach when one day it finally hit me. What if we simply pull out 20 percent or so of the bread in the top of each roll and fill that space with extra vegetables? We’d hit two priorities—sodium reduction and increasing use of produce—with one simple solution.” Members in the room were speechless as they appreciated the elegance of this solution...and then they broke out into exuberant applause.

Operator Member Insight: Use Multiple Strategies

Harvard University Dining Services (HUDS) looked at sodium levels across their menu and decided to take a three-step approach. First, they conducted dining staff training on taste and seasoning.



“We wanted to assess how our team members perceived the saltiness of our foods,” says HMC founding member **Martin Breslin**, Director for Culinary Operations. Staff were offered samples of the same HUDS dish made with four different measures of salt: 100% of the amount called for in the recipe, 75%, 50%, and no added salt. “Staff couldn’t tell a difference in taste between the original and 75% version. This helped convince them that reducing sodium in our recipes wouldn’t have a negative impact on student liking.”

Then they made an ingredient change that had significant impact. They switched from using a standard iodized table salt to DIAMOND CRYSTAL® Kosher Salt in all their entrée, soup, and sauce recipes, and they committed to using 25% less salt in these recipes. Finally, they worked with vendors to reduce sodium in their formulations for products like bacon, marinara sauce, and deli meats. “We were very proud of the impact of this initiative. We were able to reduce sodium levels by 30% with no change in student dining satisfaction,” says Breslin.



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The Journey Continues

While all operator member companies have made progress on this front, the work is not complete. Sodium reduction is still a priority area for HMC. Members of the Process & Ingredient Purity Working Group include sodium reduction in their scope of work. Many companies that are creating and re-engineering dishes for clean label are doing so with guardrails in place for sodium while also keeping a focus on taste and overall nutrition quality.



“Our operator members have found success with a holistic approach to lower sodium menu item development and re-engineering: a focus on what to put in instead on what to leave out. We have the best success with cutting sodium levels when we focus not only on taste but also on textures, craveable flavors, and umami promoting ingredients,” asserts HMC Co-chair **Pam Smith** of Shaping America’s Plate. Smith was also the long-time Sodium Reduction Working Group chair and today she serves as the Process and Ingredient Purity Working Group Co-Chair.