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BETTER FOOD™

Reducing Sodium Without Compromise:

4 Critical Drivers of Successful Low-Sodium Formulations for Meat, Poultry, and Seafood Products

Successful meat, poultry, and seafood formulations must balance sodium reduction goals with the taste, texture, and overall quality consumers expect. Because salt plays a critical functional role beyond flavor, reducing sodium can affect yield, appearance, texture, and shelf life.

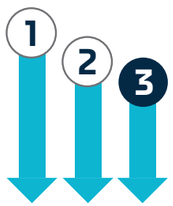
This resource outlines formulation strategies that help restore the functional properties lost during sodium reduction. By supporting protein functionality and moisture retention, manufacturers can achieve meaningful sodium reduction while maintaining the sensory quality and performance.

REDUCING SODIUM

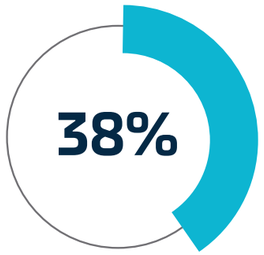
Low-Sodium **Momentum**

Consumers are increasingly proactive about their health, making intentional dietary choices focused on long-term wellness. Reduced-sodium products are widely perceived as a marker of healthier eating, with 52% of global consumers associating low-salt products with a healthy lifestyle.[1] However, expectations for taste and quality remain non-negotiable, shaping market dynamics and raising the bar for product performance.

The Low-Sodium Landscape



Top 3 Reduction Target: Salt ranks third among ingredients consumers actively try to reduce, following sugar and fat.[2]



of global consumers **check salt content** on packaging when deciding how healthy a product is.[3]

Consumers are prioritizing salt content on labels:[3]
Europe 33%
North America 42%
Central & South America 47%

Top Priorities for Low-Sodium Consumers

Beyond sodium reduction, manufacturers must meet a broader set of consumer expectations, including **taste, health and nutrition, quality, value, and convenience.**

TASTE AND SENSORY APPEAL

Taste remains the primary driver of meat, poultry, and seafood consumption, with 53% of global consumers citing it as a key factor.[4] Because consumers are unwilling to sacrifice enjoyment for improved nutrition, sodium reduction strategies must preserve the **full flavor profile and sensory experience** traditionally delivered by salt.

HEALTH BENEFITS

High sodium intake is widely associated with cardiovascular risk, making sodium reduction an important priority for health-conscious consumers. Manufacturers must therefore deliver **meaningful sodium reduction** while maintaining the taste, texture, and overall product quality consumers expect.

QUALITY AND VALUE

Quality and value are closely tied to a product's ability to **maintain freshness, stability, and flavor** throughout its shelf life. Achieving sodium reduction without compromising product stability supports consistent product quality while helping manufacturers **maintain processing efficiency and control production costs.**

CONVENIENCE

Consumers increasingly rely on convenient meat, poultry, and seafood formats, including **fully cooked, marinated, ready-to-cook, and frozen products,** to fit busy lifestyles. Delivering sodium reduction across these formats allows manufacturers to meet nutritional goals without sacrificing ease of preparation.

The Drive for **Low Sodium**

GLOBAL GUIDANCE

Beyond increased consumer awareness, the push toward sodium reduction is being driven by the need to address global health concerns. Hypertension is a key clinical indicator used by global health organizations to track population-level sodium intake, with an estimated 1.4 billion adults worldwide affected in 2024.[5] As a risk factor for cardiovascular disease, hypertension has shaped global guidance and regulatory initiatives aimed at reducing sodium intake across the food supply.

The World Health Organization recommends adults consume **less than 2,000 mg of sodium per day** (equivalent to < 5 g/day of salt or approximately one teaspoon).[6]

4,278 mg
per day

Average global sodium intake is more than double the recommended amount.[6]

Implementing sodium reduction policies could save an estimated 7 million lives globally by 2030.[7]

In response, sodium reduction has become a coordinated global initiative.

96 Countries
implementing national salt reduction strategies.[8]

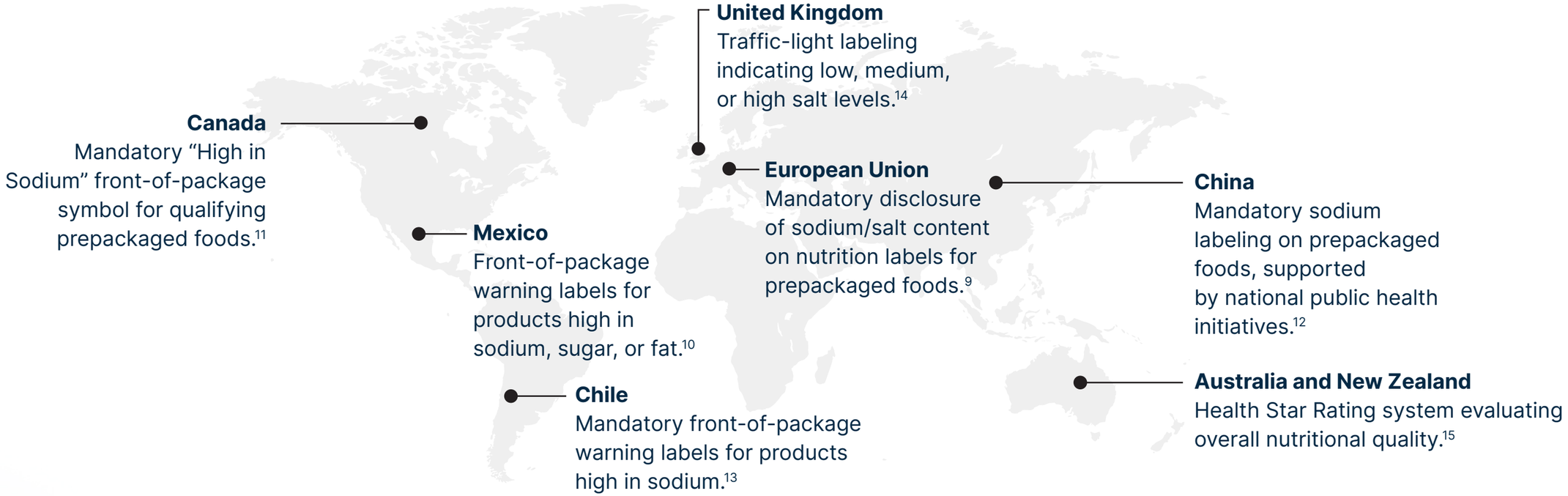
62 Countries
adopting reformulation-focused approaches to reduce sodium in packaged foods.[8]

Reducing sodium intake is one of the most cost-effective measures to improve health and reduce the burden of non-communicable diseases.[6]

The Drive for **Low Sodium**

REGIONAL REGULATORY AND LABELING INITIATIVES

Sodium reduction is increasingly reinforced through region-specific regulatory measures that directly influence product formulation and labeling requirements. While approaches vary by market, the following examples highlight how sodium reduction guidance is being implemented through regulation and labeling requirements in select regions.



Together, global and regional measures have elevated sodium reduction from a nutritional consideration to a practical formulation constraint for meat, poultry, and seafood manufacturers.

4 Critical Drivers in Low-Sodium Product Development

Reducing sodium in meat, poultry, and seafood products is not a simple ingredient substitution. Salt plays a critical functional role beyond flavor, influencing **water activity, protein extraction, and overall product stability.** When sodium levels are reduced, the balance of the formulation is disrupted, affecting **product yield, appearance, texture, and microbial safety.** This creates performance gaps that compromise quality, consistency, and commercial viability.

As a result, sodium reduction introduces challenges across four critical areas in meat, poultry, and seafood formulations:

#1: Yield Optimization

#2: Visual Appearance

#3: Microbial Safety and Shelf Life

#4: Textural Integrity

#1: Yield Optimization

Yield is a key driver of operational efficiency and profitability in meat, poultry, and seafood processing, directly influenced by a product's ability to bind and retain moisture.

Moisture Retention and Yield

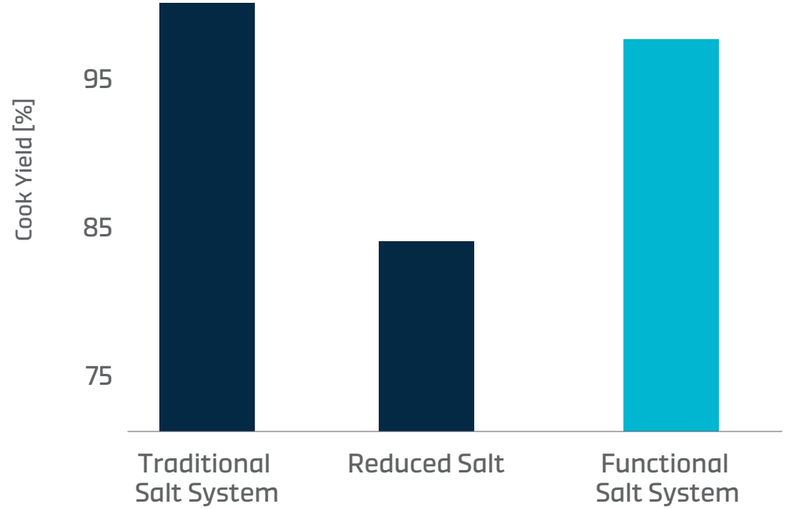
- Salt enhances the extraction of proteins, enabling protein solubilization and binding that improve water-holding capacity.
- By modifying the protein structure, salt allows the system to retain moisture, which optimizes cook yield and reduces purge and syneresis during storage.

In reduced-sodium formulations, lowering sodium chloride levels can reduce cook yield by 2–5 percentage points, depending on product type and processing conditions. Restoring protein extraction and water-holding capacity is therefore critical to maintaining production efficiency.

Yield Disruption

When sodium levels are reduced, protein extraction becomes less efficient, limiting the system's ability to bind and retain water.

Cook Yield Comparison in Reduced-Sodium Ham Formulation



Sodium reduction can significantly disrupt protein extraction and water-holding capacity, leading to measurable yield loss. By combining mineral salt systems with functional phosphates, formulators can restore water-binding functionality and maintain cook yields comparable to traditional salt systems.

Source: ICL Food Specialties Internal Study, 2026

#2: Visual Appearance

Visual appearance is a critical quality attribute in meat, poultry, and seafood products, closely linked to moisture retention and curing chemistry.

Visual inconsistencies can quickly undermine consumer confidence, making functional stability essential in reduced-sodium applications.

Traditional Salt	Reduced Salt	SALONA® Mineral Salt
		

The Visual Science of Salt

Salt supports color development and stability by facilitating curing reactions and maintaining protein functionality. By improving water-holding capacity, it also minimizes purge, helping preserve a fresh, appealing appearance during storage.

Achieving Visual Excellence

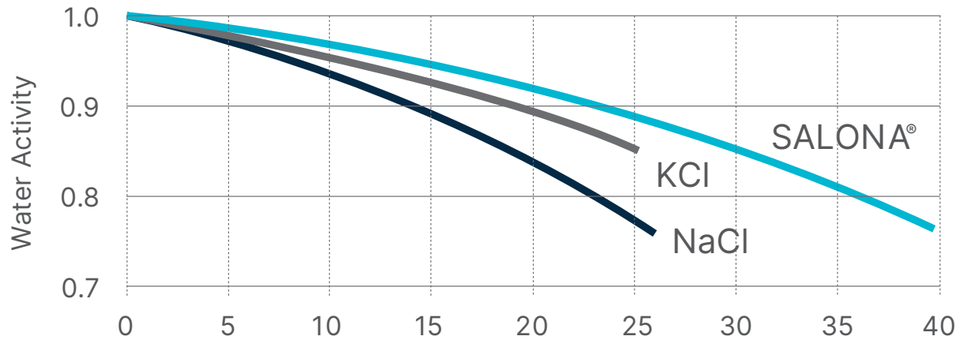
Visual consistency is essential for sliced or packaged products. To prevent uneven color development, increased purge, and a pale or dull appearance, a customized combination of a mineral salt system and low-sodium phosphate systems provides a comprehensive solution for low-sodium formulations:

- **Mineral Salt System:** Supports curing performance comparable to sodium chloride.
- **Low-Sodium Phosphate Systems:** Enhance moisture retention and color stability.

#3: Microbial Safety and Shelf Life

Microbial safety is essential to product stability, shelf life, and food safety in meat, poultry, and seafood applications.

Water Activity, a_w Versus Weight Percent



Source: SALONA® Patent Application Study WO 2012/166854 A1

Water activity is a critical driver of shelf life and microbial stability across food systems. As shown in the adjacent chart, SALONA® Mineral Salt reduces water activity, based on comparative measurements of different salts at varying concentrations. Its performance is comparable to commonly used salts such as sodium chloride and potassium chloride.

Water Activity and Free Moisture

Controlling water activity and limiting free moisture are essential for microbial stability and extended shelf life in meat, poultry, and seafood products.

- Reducing sodium can alter water activity and moisture migration, disrupting the established preservation balance and increasing free moisture.
- Without careful formulation adjustments, these changes may shorten shelf life or increase variability in product stability.

Controlling Bound Moisture Levels

To restore bound moisture levels, a mineral salt and functional phosphate system maintains water activity levels and supports moisture control, resulting in:

- Optimized shelf life: Lower water activity ensures long-term microbial stability and product safety.
- Stability: Bound moisture prevents syneresis and degradation of product quality during storage.

This customized ingredient approach enables sodium reduction while maintaining microbial stability, shelf life, and product reliability.

#4: Textural Integrity

Textural integrity defines the structural cohesion, firmness, and sliceability of meat, poultry, and seafood products.

Protein Extraction

Salt promotes the extraction of proteins, enabling them to solubilize and form a cohesive network that binds meat particles together.

When sodium levels are reduced, diminished protein extraction weakens matrix formation, resulting in:

- Reduced cohesion
- Poor sliceability
- Perception of dryness

Texture influences eating quality and repeat purchase, making structural integrity essential in reduced-sodium formulations.

Sliceability Comparison

Controlling Structural Cohesion

To restore the firm bite and sliceability expected in low-sodium meat, poultry, and seafood products, conditions need to be maintained for:

- **Effective protein solubilization:** Allowing proteins to solubilize creates the cohesive bond necessary to prevent a dry texture.
- **Protein matrix formation:** A well-developed protein network provides the cohesion and desired texture consumers expect.

A mineral salt helps maintain the conditions needed for protein solubilization and matrix formation while a low-sodium functional phosphate strengthens protein cohesion and firmness. Together, this approach maintains textural integrity.

Sodium Reduction **Solutions**

Restoring performance in reduced-sodium meat, poultry, and seafood formulations requires a coordinated functional system, not a single ingredient substitution.

By combining low-sodium mineral salts with functional phosphate systems, manufacturers can maintain the key attributes that drive product quality and processing performance.

While many sodium-reduction approaches rely on chemical salt substitutes, mineral-based functional systems offer a more robust solution by supporting protein functionality, water binding, and product structure.

ICL's mineral salt and phosphate portfolio enables application-specific sodium reduction strategies tailored to product type, processing conditions, and performance priorities.

Sodium Reduction **Solutions**

Through a coordinated mineral salt and phosphate approach, sodium reduction is achieved without compromising taste or functional performance, enabling manufacturers to meet evolving market expectations with confidence.

SALONA® is a natural mineral salt with a high content of potassium and low levels of sodium. It can replace more than 25% of sodium chloride with minimal impact on flavor.

Low- or no-sodium phosphates maintain critical functionality, including yield, texture, stability, shelf life, and safety.

Cooked Emulsions

Frankfurter, Bologna, Cooked Sausages, Cold Cuts

Mineral Salt Solutions

- SALONA® Mineral Salt

Low- or No-Sodium Phosphates

- TARI® Line
- BRIFISOL® Line

Minced Meat Products

Burger Patties, Meatballs, Sausage Patties, Cevapcici

Mineral Salt Solutions

- SALONA® Mineral Salt

Low- or No-Sodium Phosphates

- TARI® Line
- BRIFISOL® Line

Dry-Cured Meats

Raw Ham, Salami, Pepperoni

Mineral Salt Solutions

- SALONA® Mineral Salt

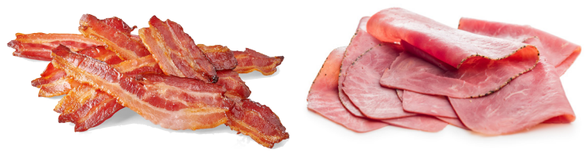
Sodium Reduction **Solutions**

Mineral salt solutions combined with low- or no-sodium phosphate systems restore water-holding capacity and protein functionality, resulting in low-sodium meat, poultry, and seafood products with excellent taste, texture, and performance.

TARI® SoLite is a mineral salt with reduced sodium content.

TARI® SoLite Plus is a blend of mineral salt and nitrite curing salt that has a lower sodium content than common salt and offers precise nitrite dosage.

Low- or no-sodium phosphates maintain critical functionality, including yield, texture, stability, shelf life, and safety.

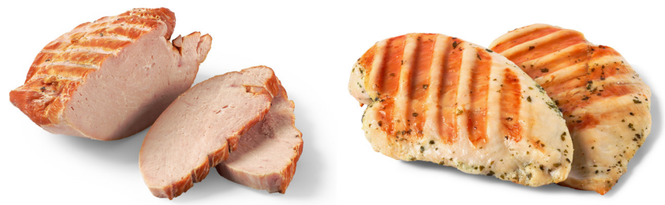


Cooked Cured Whole-Muscle Meats

Ham, Bacon, Pastrami

Mineral Salt Solutions
- TARI® SoLite Plus

Low- or No-Sodium Phosphates
- TARI® Line
- BRIFISOL® Line



Cooked Non-Cured Whole-Muscle Meats

Turkey Breast, Chicken Fillet

Mineral Salt Solutions
- TARI® SoLite

Low- or No-Sodium Phosphates
- TARI® Line
- BRIFISOL® Line

Seafood Products

Shrimp, Fish Fillets

Mineral Salt Solutions
- TARI® SoLite

Low- or No-Sodium Phosphates
- KATCH® Line
- BRIFISOL® Line

Choosing the Right Partner **Makes a Difference**

Partnership beyond our products means we help you improve efficiency, optimize your processes, and get to market faster. Our collaborative partnership is based on transparent communication and a focus on product quality, cost, and reliability.

You have direct access to our industry experts and innovators, along with personalized service and responsive technical, regulatory, application, and manufacturing support.

Team Up with ICL for Your Next **Low-Sodium Success**

ICL Food Specialties leverages the resources of a **global leader** and the passion of a **team of local experts** to deliver **customized ingredient solutions** that impact the future of food.

With over **80 years of experience** in the food and beverage industry, deep application knowledge, and science-backed innovation, we partner with formulators and manufacturers to create products with **exceptional taste, texture, and performance.**

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Let's make an impact, **together.**

Contact us to get your sodium reduction formulation evaluated.

REFERENCES

1 GlobalData. The 2025 Food Health Outlook: Beyond Calories
2 Innova Market Insights. Global Sodium Reduction Trends. August 2024
3 GlobalData. TrendSights Analysis 2025: Mega-Trend Overview—Health & Wellness
4 Innova Market Insights. Global Meat and Poultry Market Trends. 2024
5 World Health Organization, Global Report on Hypertension 2025: High Stakes: Turning Evidence Into Action
6 World Health Organization. https://www.who.int/news-room/fact-sheets/detail/sodium-reduction
7 World Health Organization. https://www.who.int/news/item/09-03-2023-massive-efforts-needed-to-reduce-salt-intake-and-protect-lives
8 Rosewarne, E., et al. 2022. "A Global Review of National Strategies to Reduce Sodium Concentrations in Packaged Foods, Advances in Nutrition. 13(5): 1820-1833. https://doi.org/10.1093/advances/nmac048.
9 Regulation (EU) 1169/2011 (FIC)
10 NOM-051-SCF/SSA1-2010
11 Health Canada. https://www.canada.ca/en/health-canada/news/2022/06/government-of-canada-unveils-new-front-of-package-nutrition-symbol.html
12 GB 28050-2011/2025
13 Labeling Law 20.606
14 Food Standards Agency. https://www.food.gov.uk/safety-hygiene/check-the-label
15 Health Star Rating System. An Australian and New Zealand front-of-pack nutrition labelling initiative. https://www.healthstarrating.gov.au/