Reaching Sodium Reduction Targets with Smart Salt®

To achieve sodium reduction from Smart Salt® technology it is possible to use (1) Smart Salt blends which are designed as 1:1 replacement for salt in a formulation or (2) Smart Salt Concentrate and to blend in-house.

*Smart Salt® Patented Technology Provides Great Flexibility in Use for Sodium and Salt Reduction*

**Option 1.**
Smart Salt Blends
Co-crystallisation and Taste enhancement technology

- Blends have been optimised so that they can be used as a direct 1:1 replacement for salt
- Blends are available with 20–60% sodium reduction
- Product name: Smart Salt 20 - 60

**Option 2.**
Smart Salt Concentrate
Co-crystallisation and Taste enhancement technology

- Powerful taste enhancer
- Non-hygroscopic form of MgCl₂
- In-house opportunities to blend with mineral salts including sea salt and umami ingredients and flavours as well as other ingredients for taste optimisation
- Flexibility with sodium reduction levels
- Economic cost in use
- Product name: Smart Salt Concentrate

**Formulating with Option 1.**
Taste characteristics have been optimized for a 1:1 replacement for salt. This allows easy handling for rapid formulation evaluation and development. The optimized blends are available with 20 – 60% sodium reduction levels.

**Formulating with Option 2.**
Smart Salt Concentrate can be used to make in-house blends with other salts such as sodium chloride, sea salt and other ingredients such as umami - based flavors. This allows perfect optimization of taste and sodium reduction levels with economic cost in use.
Practical Advice

<table>
<thead>
<tr>
<th>Note the sodium content of all ingredients in the formulation—seasoning, raw materials and additives may contain sodium</th>
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</thead>
<tbody>
<tr>
<td>Initially, aim to reduce added sodium by 40% with Smart Salt® and experiment to find appropriate level around this value—the optimized salt taste and intensity will typically fall within 30-50% sodium reduction levels</td>
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<tr>
<td>As Smart Salt® is a taste enhancer, reduce initial monosodium glutamate, yeast extract and spice seasoning by 50% - add back to formulation as required</td>
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<tr>
<td>Add spices such as curcumin, turmeric and nutmeg to taste</td>
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<tr>
<td>Smart Salt® has taste synergy with other mineral salts and flavor modulators/enhancers – allowing the optimum level of sodium reduction with a balanced flavor profile</td>
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<tr>
<td>Smart Salt® contains 10% water of crystallization – this may need to be considered in the final formulation to achieve the optimal salt intensity</td>
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</table>

Making In-house Blends

Using Smart Salt Concentrate, Smart Salt Concentrate LA

<table>
<thead>
<tr>
<th>Smart Salt Concentrate</th>
<th>Smart Salt Concentrate LA</th>
<th>40% sodium/salt reduction % w/w</th>
<th>45% sodium/salt reduction % w/w</th>
<th>50% sodium/salt reduction % w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Salt Concentrate</td>
<td>20</td>
<td>22.5</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Smart Salt Concentrate LA</td>
<td>22.5</td>
<td>25</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Sodium Chloride or Sea Salt</td>
<td>60</td>
<td>55</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Potassium Chloride (optional)</td>
<td>20</td>
<td>22.5</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Smart Salt Concentrate can be manufactured in different particle sizes</td>
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When making your own salt blends with Smart Salt Concentrate:
- It is important to ensure a homogeneous, stable combination by mixing vigorously in a closed container for 20 minutes using pyramid shaped mineral crystals where possible.
- Use additive–free mineral salts with a clean flavor profile. Ensure that your mineral salt is FCC grade.

A New Age for Sodium Reduction
What is Smart Salt®?

Smart Salt® is the brand name given to a sodium reduction system based on a patented taste enhancement technology from Finland. Smart Salt Concentrates are mineral salts, high in magnesium. Smart Salt® has the following attributes:

- Reduces blood pressure - clinical evidence of efficacy
- Provides a salty taste with no bitter or metallic aftertastes – with up to 60% less sodium
- Provides a broad range of application opportunities due to proven taste, preservation and technological functionality
- Reduces the use of other costly seasonings
- Reduces or eliminates the use of monosodium glutamate or yeast extracts
- Flexibility with its compositional components to correspond with your reformulating needs
- Perfect taste optimization of formulations – allowing controlled cost in use
- Delivers the additional health benefits of magnesium
- Offers sodium or salt reduction claim opportunities
- Easy handling because of its 1:1 replacement for salt, crystalline structure and non-hygroscopic nature
- Highlighted in latest Leatherhead Food Research report on technological approaches to salt reduction

Applications

Smart Salt® has a very successful application record in a broad category of food products. Its success can be attributed to its technological functionality that often mirrors regular salt

<table>
<thead>
<tr>
<th>Applications</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Added-value meat and poultry</td>
<td>30-40% sodium reduction is possible with Smart Salt®. Phosphates designed for low sodium applications are recommended. Little difference in texture (cohesiveness or meat bind) or cooked meat color (pinking). Sensory, textural and microbiological quality is maintained in this application including frankfurters, dry sausage, chicken patties and meatballs.</td>
</tr>
<tr>
<td>Sodium reduction affects water binding capacity and yield loss during cooking</td>
<td>40-50% sodium reduction is achievable. In bread products an elastic structure is formed that tolerates rising well, with good volume and even pore structure.</td>
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<tr>
<td>Soaps</td>
<td>1:1 replacement of sodium chloride with Smart Salt® blends allow 30 – 45% sodium reduction. The overall taste intensity of the soup matches the original recipe. The taste enhancement qualities of Smart Salt® may enable cost savings of some herbs, spices or flavor enhancers such as monosodium glutamate or hydrolyzed yeast extract.</td>
</tr>
<tr>
<td>Salt reduction has an impact on the taste characteristics and overall taste profile</td>
<td>1:1 replacement of sodium chloride with Smart Salt® blends reduces sodium content to between 30-45%. Sensorial, textural and microbiological qualities are maintained</td>
</tr>
<tr>
<td>Ready to eat meals</td>
<td>1:1 replacement of sodium chloride with Smart Salt® blends reduces sodium content to between 30-45%. Sensorial, textural and microbiological qualities are maintained</td>
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<tr>
<td>Sodium reduction affects taste and shelf-life characteristics</td>
<td>In salted snacks such as popcorn, crisps, nuts and crackers a 60% sodium reduction is possible whilst providing the full salt impact in topical applications.</td>
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<tr>
<td>Snacks</td>
<td>In hard cheeses 25–30% sodium reduction has been achieved but in cottage cheese, processed cheese and cheese sauces 40–50% sodium reduction has been successful</td>
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<tr>
<td>Salt reduction has in these products can adversely affect flavor profile</td>
<td>In vegetable applications such as frozen prepared, vegetable juices and meals; consumer testing has indicated excellent consumer acceptability at 60% sodium reduction with Smart Salt®</td>
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<tr>
<td>Vegetables</td>
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<tr>
<td>Reducing salt impacts taste and consumer acceptability</td>
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A New Age for Sodium Reduction

The information and recommendations contained herein are offered in good faith but without guarantee. Smart Salt Inc does not accept any liability for loss, injury or damage which may arise from its use. It is recommended that a customer satisfies themselves completely of the suitability of the product for a particular application.
Smart Salt® Cost Effective In-use
To achieve sodium reduction from Smart Salt® technology it is possible to use either (1) Smart Salt products which are designed as 1:1 replacement for salt in a formulation or (2) Smart Salt Concentrate for optimal performance and cost savings.

References
3. National Food Laboratory Inc. (2008) Consumer acceptance test of hot dog, potato chips, green beans and chicken broth containing a salt substitute. NFL # ST9604
8. Evaluation of Smart Salt in Bread. Microbiological Challenge Test – Bacillus spp.. Leatherhead Food Research Confidential Project Report (June 2011).
10. Leatherhead Food Research (2012). Food and Drink Federation (FDF) and British Retail Consortium (BRC) Evaluation of Technological Approaches to Salt Reduction.

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Benefits of using Smart Salt®

*Provides 100% salt taste with up to 50% less sodium in many applications

*Perfect taste optimization. Consumer acceptability data indicates a high degree of acceptability at very low sodium levels

*Most governmental sodium reduction targets can be met and exceeded

*Preservation and shelf-life as good, if not better than regular salt at very low levels of sodium. May reduce the need for added-preservatives

*Cost effective in-use. Flexibility with its compositional components corresponds to reformulating and labelling needs.