

Reducing Global Sodium Intake: An Innovative Ingredient Solution



**Innovating to Meet Nutrition,
Health, and Wellness Needs Every Day**

SODA-LO® Salt Microspheres

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Excess Sodium Intake: A Global Health Concern

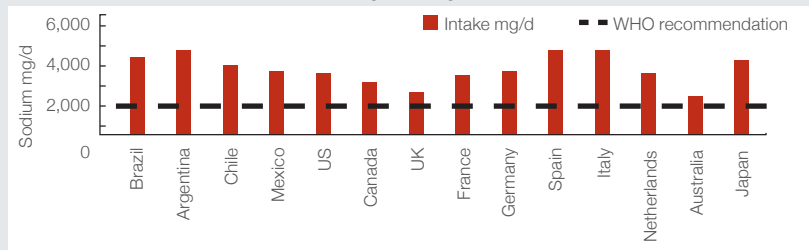
- Several studies have shown that a reduction in salt intake is one of the most cost-effective interventions to reduce cardiovascular disease risk in both developed and developing countries.
- Meeting consumers taste preferences by using safe and effective food ingredients to lower sodium content while maintaining the food's perceived salt intensity is one strategy that has been suggested for reducing global sodium intake.
- SODA-LO® Salt Microspheres is a salt-reduction ingredient that tastes, labels,* and functions like real salt, and it can reduce salt by 25-50% in certain applications.
- Dietary modeling using the United States (US) National Health and Nutrition Examination Survey (NHANES) has demonstrated that the SODA-LO® Salt Microspheres application could reduce sodium intake in the US population by 6-9% of current intake. Reduced sodium intake is associated with reduced risk of hypertension, which is a risk factor for cardiovascular disease and stroke.

In developed countries, almost 80% of sodium intake is from processed food¹. While reducing sodium levels in foods is a viable way to help meet public health goals, research suggests that simply cutting out salt is fraught with numerous obstacles such as perceived inferior taste and low consumer demand. Salt (sodium chloride) is a critical ingredient used not only as a flavor enhancer, but also as a preservative, binding agent, and texture modifier². Because of its versatility, salt is ubiquitous in the food supply and essential to common staples such as bread, cheese, and meat products. In the body, sodium plays an essential role in the biological function of cells and fluid balance; however, too much of it can cause increased stress on the body's vital organs, and ultimately long-term over-consumption can lead to the onset of chronic disease².

Public health authorities agree that chronic excess sodium intake can increase blood pressure levels and the risk for heart attack and stroke³. High blood pressure contributes to the development of cardiovascular disease, the leading cause of death across the globe according to the World Health Organization^{4,5}. High blood pressure is estimated to cause 7.5 million deaths, about 12.8% of all deaths globally⁵. Sodium intakes around the world are well in excess of physiological need (10-20 mmol/day or 230-460 mg/day of sodium)⁶. The World Health Organization (WHO) recommendations indicate that in order to prevent chronic diseases, an adult daily upper limit intake

Figure 1

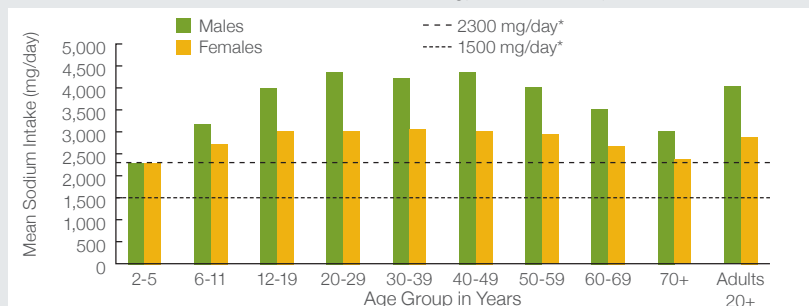
Sodium: Recommendation and intake by country



Sources: See references 7-14, 19-35

Figure 2

Mean sodium intake (excluding table salt), by age and sex, and recommended levels* — National Health and Nutrition Examination Survey, United States, 2007–2008



Sources: See references 36-38.

* Current dietary guidelines recommend reducing consumption of sodium to <2,300 mg/day, and that African Americans, persons aged ≥51 years, and persons of any age with hypertension, diabetes, or chronic kidney disease further reduce intake to 1,500 mg/day.

*Labelling and claims may vary by country.



of sodium should be less than 87 mmol/day (2,000 mg/day), or 5 g/day of salt (about one teaspoon)⁷.

The current sodium intake in many countries is greater than 3,500 mg/day^{7-14,19-35} (Figure 1). European sodium consumption, at 3,200-4,800 mg/day, is substantially higher than WHO recommendations⁸. Sodium intakes in Mexico (3,600 mg/day⁹), Brazil (4,400 mg/day¹⁰), Argentina (4,800 mg/day¹¹), and Chile (3,900 mg/day¹²) all exceed WHO recommendations. Japanese sodium intake also exceeds WHO recommendations at 4,100 mg/day¹³.

Americans consume significantly more sodium (>3,000 mg/day) and salt (8.7 g/day)¹⁴ than the 2010 Dietary Guidelines recommended maximum for sodium of 2,300 mg/day (Figure 2). For some individuals who are at high risk (i.e., anyone over the age of 51, all African Americans, and anyone who has high blood pressure, chronic kidney disease, or diabetes) the current average intake is more than two times the limit of 1,500 mg/day recommended by the 2010 Dietary Guidelines for Americans for these individuals. Health organizations like the Centers for Disease Control and Prevention (CDC) and the

American Heart Association (AHA)¹⁵ recommend daily intake be lowered to 1,500 mg/day for all consumers.

Figure 2 shows mean sodium intake (excluding table salt) by age and sex in the US during 2007-2008, according to the National Health and Nutrition Examination Survey, as well as current recommended levels of dietary sodium. Regardless of age or sex, sodium intake by most US residents considerably exceeds recommended levels.

Several studies have shown that a reduction in salt intake is one of the most cost-effective interventions to reduce cardiovascular disease risk in both developed and developing countries^{16,17}. A US study showed that even a very modest reduction in salt intake of only 10% would prevent hundreds of thousands of strokes and heart attacks over the lifetimes of adults aged 40-85 years who are alive today and could save more than \$32 billion in medical expenses in the US alone¹⁷. It is thus recommended that dietary sodium reduction be a first step to reducing hypertension before medications are started¹⁸.



Continuing to find new technologies and innovations that address the issue of global sodium reduction without sacrificing safety, stability, or taste should, and currently is, being considered by the food industry.

New Salt Technology for Sodium Reduction in Foods

Adapting consumer preferences for saltiness by gradually reducing sodium in food products is one way to achieve sodium reduction across the globe.

Alternately, continuing to find new technologies and innovations that address the issue without sacrificing safety, stability, or taste should, and currently is, being considered by the food industry.

Meeting consumer taste preferences by using safe and effective food ingredients to lower sodium content while maintaining the food's perceived salt intensity is one strategy that has been suggested for reducing global sodium intake. Tate & Lyle is committed to developing ingredients that provide nutrition, health, and wellness solutions, and SODA-LO® Salt Microspheres is one example of this commitment.

Sodium reduction innovation - SODA-LO® Salt Microspheres

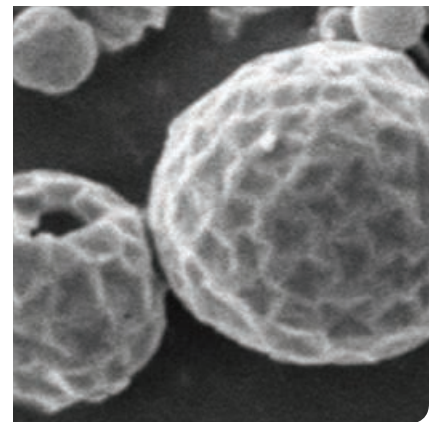
SODA-LO® Salt Microspheres is a salt-reduction ingredient that tastes, labels*, and functions like real salt because it is real salt. Offered by Tate & Lyle, SODA-LO® Salt Microspheres can reduce salt by 25-50% in certain applications through its patented and patent-pending technology that turns standard salt crystals into free-flowing, hollow salt microspheres that increase the perception of saltiness on the tongue. Tate & Lyle's sensory research shows that consumers perceived

the flavor of products made with SODA-LO® Salt Microspheres to be on par with products made with regular salt. This product uniquely addresses sodium reduction needs without compromising taste. On a product's ingredient listing, SODA-LO® Salt Microspheres is normally listed simply as salt.

SODA-LO® Salt Microspheres can be used in a variety of products and is being evaluated in:

- Breads
- Breadings, coatings
- Salty snacks
- Sauces, condiments
- Cheeses, meats
- Cookies, doughs

Dietary modeling using US NHANES 2007-2010 data has demonstrated that potential usage of SODA-LO® Salt Microspheres with sodium reductions ranging from 20-30% in 953 targeted foods could reduce dietary sodium intake by 6-9% depending on age, gender, and ethnic group^{39,40}. Based upon these modeled reductions, an additional 5-9% of the US population would be expected to meet the current dietary recommendations for the general population at 2,300 mg/day⁴⁰. Reducing chronic excess of sodium intake could help reduce the risk of hypertension, which is a risk factor for cardiovascular disease and stroke³.



SODA-LO® Salt Microspheres is a salt-reduction ingredient that tastes, labels, and functions like real salt because it is real salt.*

*Labelling and claims may vary by country.

Innovating to Meet Nutrition, Health, and Wellness Needs Every Day

A commitment to innovation

Tate & Lyle, a global leader in wellness innovation, is committed to delivering innovative ingredients that can be incorporated into great-tasting foods to help consumers meet their nutrition, health, and wellness needs every day. That is because Tate & Lyle invests heavily in innovation and research and in developing ingredients that can be incorporated into a wide variety of great-tasting food and beverage solutions. Teams of food and nutrition scientists are continuously innovating, researching, and testing ingredients that will meet current and future health and nutrition needs.

At the same time, Tate & Lyle has a robust market research program designed to provide the necessary insights on consumer preferences around the world. The research program allows Tate & Lyle to customize its offerings and provide tailor-made solutions in local and regional markets.

Better-for-you ingredients for health and wellness

In response to global public health efforts calling for people to reduce calories and sodium and increase fibre intakes, Tate & Lyle offers a number of innovative ingredient solutions that meet these needs.



Tate & Lyle's global Commercial and Food Innovation Center, Hoffman Estates, Illinois, USA

To learn more about Tate & Lyle ingredients and innovation as well as health benefits and relevant research, please visit www.foodnutritionknowledge.info and www.tateandlyle.com.

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