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Division of Dockets Management (HFA-305)
Food and Drug Administration
5630 Fishers Lane, Rm. 1061
Rockville, MD 20852

Re: Docket No. FDA-2014-D-0055-0403 for “Voluntary Sodium Reduction Goals: Target Mean and Upper Bound Concentrations for Sodium in Commercially Processed, Packaged, and Prepared Foods; Draft Guidance for Industry”

Dear Sir or Madam:

The Institute of Food Technologists (IFT) appreciates the opportunity to provide comments on the “Voluntary Sodium Reduction Goals: Target Mean and Upper Bound Concentrations for Sodium in Commercially Processed, Packaged, and Prepared Foods; Draft Guidance for Industry.” Founded in 1939, the Institute of Food Technologists is committed to advancing the science of food. Our non-profit scientific society—more than 17,000 members from more than 95 countries—brings together food scientists, technologists and related professionals from academia, government, and industry.

The *Dietary Guidelines for Americans* recommend reducing sodium intake to reduce elevated blood pressure, which is associated with an increased risk of cardiovascular disease, particularly in regards to individuals who are predisposed to hypertension. However, it is also important to recognize that sodium is not a standalone nutrient in affecting blood pressure. Another critical nutrient is potassium (DHHS/USDA 2015).

Sodium chloride, commonly known as table salt, is the primary source of dietary sodium. This substance is a critical food component that contributes to one or more important attributes, such as food safety, shelf-life, and sensory qualities (e.g., savory flavor and food texture). In addition to sodium chloride, other sodium-containing ingredients (e.g., monosodium glutamate, sodium bicarbonate, and sodium benzoate) have functional role(s) in foods and contribute, although in lesser amounts, to the total amount of sodium in the diet. In an effort to maintain these attributes in reduced-sodium foods, food scientists use a variety of technologies, and as suitable, may incorporate potassium in formulations.

Food scientists and technologists have developed several innovative technologies that may allow sodium reduction in a variety of products, while maintaining critical product attributes such as safety, shelf-life, texture, and taste, as well as regulatory compliance. The technologies include sodium chloride and potassium chloride

blends with and without spice components, peptides from a variety of hydrolyzed proteins, and sweeteners such as trehalose and thaumatin. Physical modification, such as creation of microspheres or micro-encapsulates, can maximize perceived and real taste with less salt, e.g., in dry food matrices. A similar “surface area” concept can be achieved by using flake or crystal growth technologies instead of standard granulation in products that are amenable to surface applications (e.g., chips, crackers) (Doyle and Glass 2010; Buttriss 2013; Despain 2014). Non-thermal high pressure processing (HPP) technologies may be used to help preserve foods and maintain the desired sensory qualities with a concomitant reduction in sodium. For example, research shows that with HPP, meat products that are often preserved or prepared through salting or brining, may exhibit desirable sensory attributes such as, color and texture at lower salt and polyphosphates concentrations (Rodrigues and others 2015). Nevertheless, there are regulatory hurdles, such as standards of identity, regulatory approval of new ingredients, which must be addressed before foods produced with such ingredients and technologies can be commercialized.

Although food scientists have been able to achieve sodium reductions in a variety of food products through innovations, sodium reduction continues to be a challenging endeavor. In 2012, IFT submitted detailed response to FDA's call for comments (Approaches to reducing sodium consumption [Docket No. FDA-2011-N-0400 and FSIS-2011-0014]) on innovations thus far and challenges in sodium reduction efforts. These challenges remain, and include:

- Potassium imparts saltiness, however, above certain levels, it also has a bitter aftertaste. Some salt substitutes, such as calcium and potassium, have a metallic or bitter flavor that requires addition of other compounds to mask the flavor profile. However, growing interest in clean labels impacts the use of these salts and masking agents, thereby requiring alternative approaches to using salt substitutes.
- Standards of identity may limit reformulation of some food products, such as, natural cheeses.
- Extensive testing, which is time consuming, is required to ensure microbiological safety and minimize microbial spoilage.
- Palatability of reduced-sodium foods and consumer acceptance continues to be a challenge. Extensive reformulation and consumer sensory testing is required to ensure consumer acceptance.

In addition to addressing the challenges related to the functional roles of sodium in food, food scientists and technologists are also faced with the challenge of simultaneously lowering salty taste preferences while developing acceptable salt substitutes, thereby keeping salty taste at current levels. Both approaches are needed as there is a wide range of product categories and preferences to be considered. Although advances for reducing sodium in food products continue, more

research in the areas mentioned below will enhance the ability of food scientists and technologists to provide further solutions for sodium reduction. IFT offers member insights on the first part of Question #7 posed by the agency.

What specific research needs or technological advances (if any) could enhance the food industry's ability to meet these goals?

Understanding the role of salt taste receptor(s) and taste development and preference, through new or additional research into:

- Understanding of salt taste receptor(s), mechanism of salty perception, and how to stimulate and/or block the receptors
 - Although research into receptor biology has been underway for decades, with good success for revealing a mechanistic understanding for sweet, bitter and umami taste, a greater understanding of the sodium receptor(s) responsible for salty taste perception in humans is needed.
- Understanding why humans tend to acquire a high preference to salty taste.
- Understanding why children tend to have a higher preference for salt than adults, how early experiences shape sensory responses, and how these can be modified.

Developing innovative technologies to reduce sodium levels while maintaining attributes, such as safety, shelf-life, palatability, and physical properties, through new or additional research into:

- Understanding the mechanism of how salt masks bitterness, and identifying other compounds that can do the same.
- Foods and compounds with umami properties that can replace sodium without impacting flavor.
- Identifying foods and levels for different foods in which potassium could be added without imparting bitterness
 - Partial replacement of sodium with potassium in food categories high in sodium will not only help decrease dietary sodium intake, but also have the benefit of increasing potassium intake, a short-fall nutrient in the American diet.
- Technology-based solutions (e.g., nonthermal high pressure technologies)
 - For example, empirical observations suggest that HPP can be used to formulate meat products with reduced salt and fat levels. Application of pressure modifies the structure and functionality of protein and other constituents potentially allowing salt reduction. Thus, applications-based research will help understand how different HPP parameters (e.g., pressure, temperature, and holding time) can be

manipulated to create a variety of formulated products with reduced salt or fat content. However, technologies like HPP require financial investment and a significant amount of time to ensure success.

- Technologies through which the location of sodium in foods can be changed to allow it to be released in the mouth and available to the taste buds before swallowing. Much of the sodium in foods is swallowed before it is tasted because it has diffused into the center of the food where it cannot be reached by the taste buds.
 - This could decrease the need for high levels of sodium in products such as canned sauces and soups.
- Better understanding of how sodium interacts with other food ingredients, such as fat and spices, to provide a desirable eating experience.
- Understanding the association between the functional roles of sodium on food structure and desired sensory outcomes. There is a need to identify alternative non- or lower-sodium ingredients or operating conditions to provide desired texture and flavor.
- Identification of new salt substitutes and their potential uses in various foods.
- Sodium reduction solutions that can provide similar salty tastes as sodium chloride, and are label friendly.
 - Very few consumers are willing to sacrifice flavor for reduced-sodium content, and most consumers are unwilling to pay for expensive reduced-sodium products.
- Technologies that provide the same characteristics as sodium, such as texture and leavening in bakery products, without imparting off-flavors; binding of meat proteins; and retarding spoilage of refrigerated (e.g., deli meats) and non-refrigerated products (e.g., dips) without negatively affecting flavor profiles
- Technologies to modify the microstructure of foods to help release sodium during mastication look promising and need further investigation. Such technologies will help in reducing the amount of sodium added to foods (Kuo and Lee 2014).
- Technologies to isolate natural aromatic molecules that may allow formulations with less salt, sugar, or fat content without sacrificing taste, aroma, or texture.
 - Food example, preliminary research shows that aromatic molecules can be used to trick the brain into believing that desserts and other foods contain more fat, sugar, or salt than they actually do (Science Daily 2016).

Understanding consumer behavior and dietary intake, through:

- Enhancing our understanding of the benefits of reducing sodium intake in children.

- More research is needed to address the controversy regarding the health risk associated with low sodium intake.
- Understanding how salty taste preferences and behaviors develop and might be modified
 - Increasing our understanding of whether the preference for lower-sodium foods developed through continued exposure to such foods in a controlled setting is affected by subsequent exposure to foods of varied sodium content in a free-living setting and to identify ways to make these behaviors (consuming low-sodium foods) permanent.
- Enhancing our understanding of the impact of reduced-sodium packaged foods on dietary sodium intake.
- Increasing our understanding of the extent that sodium plays a role among other factors in influencing consumer choices and behavior.
- Understanding the level(s) at which consumers with varying taste sensitivities can detect changes in sodium content.
- Understanding factors such as genetics and culture that may influence preferences for reduced-sodium foods.
- Continuously monitoring and updating food consumption databases to accurately reflect changes in sodium content in the food supply and consumption.
- Understanding whether gradual reduction of sodium across the board, if the FDA guidance were implemented, would actually reduce sodium intake or consumers simply would alter food selection or add salt at the table to satisfy their sodium appetite and maintain baseline intake levels.

Both public and private investment is needed to address these research gaps and to advance innovation to reduce sodium in food products. Public investment in research to understand and develop evidence-based approaches for sodium reduction is minimal. Few government programs fund basic research in food science, food technology, and emerging technologies, compared to the investments in basic research focused on developing new pharmacological approaches to reduce the incidence and consequences of diet-related chronic diseases. Diminishing federal funding for research inhibits innovation. The public health significance of advanced food manufacturing technologies is often overlooked by federal funding agencies. With the diminished public funding for research in food science and technology, the burden of conducting and advancing research is left to the industry. Further, educational efforts by government agencies and other organizations to increase consumer awareness and understanding of processing and technological advancements related to sodium reduction are needed. For example, “clean” labeling is important to many consumers, and salt substitutes such as potassium chloride are considered “unfriendly.” Consumer education on the safety and benefits of these types of ingredients is needed to help achieve successful sodium reduction solutions.

Overall, sodium reduction may need to be achieved through small changes in numerous products rather than with technologies that are applicable to only a few products. However, the extremely low level of funding in National Institute of Food and Agriculture and other agencies, and lack of public – private funding opportunities make it virtually impossible to conduct the large amount of research needed to solve these complex problems. Public funding must increase to provide more research initiatives or incentives to industry to stimulate, support, or sustain research and development of reduced-sodium foods and beverages, and to educate consumers about processing and technological advancements related to sodium reduction.

IFT appreciates the opportunity to provide comments on this important topic. We thank you in advance for your consideration of our comments on the draft voluntary guidance on sodium reduction. Please contact Farida Mohamedshah, Director, Food Health & Nutrition, (fmohamedshah@ift.org; 202-330-4986) if IFT may provide further assistance.

Sincerely,



John Coupland, Ph.D., CFS
President, IFT



Christie Tarantino-Dean, FASAE, CAE
Executive Vice President & CEO

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