

SODIUM REDUCTION: *Mining the Possibilities*

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Chocolate Sponge Custard

Egg products lend body, texture, mouthfeel and presence to show-stopping desserts while keeping sodium levels low.

Savior or goat? Hero or culprit? No one can deny the many benefits salt lends to food products, from flavor enhancement and microbial growth inhibition to various functional properties. Yet despite its historic contributions to food creation, preservation and enhancement, some experts say these white crystals have their dark side too. Excess salt intake is cited as a potential contributing factor to health concerns such as high blood pressure, heart attacks and strokes.

At FDA hearings held November of 2007, the

Center for Science in the Public Interest (CSPI) petitioned the agency to label salt as an additive, requesting a change from its current GRAS status. As debate on sodium reduction continues, food manufacturers are reenacting the trans fat scramble, examining products to determine where and how to reduce sodium. The problem lies in the fact that there is no magic bullet, no drop-in, single solution for this reduction. It requires product developers to examine the entire formula and perhaps experiment with a wide portfolio of ingredients, such as egg products. These ingredients can lend functional properties that help preserve the integrity and flavor of the original or reformulated product.

At Issue

More than one respected medical association is questioning the amount of salt in American diets. The National Heart, Lung and Blood Institute estimates that if Americans cut back on sodium levels in processed and restaurant foods, it could save 130,000 lives annually.

The current recommendation states Americans should limit sodium consumption to less than 2,300 mg daily. However, the American Heart Association (AHA) Dallas, Texas, is campaigning to reduce that figure to a recommendation of no more than 1,500 mg. This could prove a challenge to many Americans as the average consumer ingests between 6 to 10 grams of salt per day according to the AHA. Salt is roughly 40% sodium by weight so this translates into an average daily sodium intake of 2,900 to 4,300 mg daily. By lowering sodium intake experts say we could lower blood pressure rates, thus lowering the risk or likelihood of kidney disease, nonfatal strokes, heart attacks and other health problems.

However, it isn't an all or nothing proposition. A person cannot and should not eliminate salt entirely from the diet. Not only is salt one of the fundamental tastes, like sweet and sour, sodium is the primary electrolyte that regulates the extracellular fluid levels in the body. Some health experts say, however, that the minimum physiological requirement for sodium is far lower even than 1,500 mg. Unless you're an endurance athlete, the human body requires a bare 500 mg daily. (Northwestern University Nutrition site).



How It Stands Today

FDA's current sodium labeling guidelines are as follows:

- Sodium free: less than 5 mg of sodium per serving
- Very low sodium: 35 mg or less per serving
- Low sodium: 140 mg or less per serving
- Reduced sodium: usual sodium level is reduced by 25 percent

Citing research that shows the relationship between diets high in sodium and an increase in blood pressure, the FDA does allow packaging and label claims that link diets low in sodium with a reduced risk of high blood pressure. Manufacturers may use a label claim as long as the disclaimers "may" or "might" are included, i.e., "diets low in sodium may help reduce the risk of high blood pressure." To make this or any health claim on the label that discusses a nutrient and the disease or condition, the food must not contain any one of the four risk-increasing nutrients in an amount that exceeds the threshold. See sidebar for details.

Low-sodium/Hypertension Health Claims

A low-sodium/hypertension health claim cannot be made on a food product that contains risk-increasing nutrients at levels exceeding the threshold limit:

Individual food products cannot contain more than

13 g fat
4 g saturated fat
60 mg cholesterol
480 mg sodium

In addition, FDA and USDA state an individual food that has the claim 'healthy' must not exceed 480 mg sodium per serving. In addition to the threshold amounts for certain nutrients, meal products labeled as 'healthy' must not exceed 600 mg sodium per labeled serving, providing they don't contain excess amounts



Sweet & Crunchy Almond Bars

Egg products improve texture and crumb improvement in baked goods, a special consideration in a reduced-sodium formulation.

of risk-increasing nutrients, and in some cases must also contain additional nutrients at recommended levels.

Meal products cannot contain more than
26g fat
8 g saturated fat
120 mg cholesterol
960 mg sodium

Main dish products cannot contain more than
19.5 g fat
6g saturated fat
90 mg cholesterol
720 mg sodium

Visit fda.gov for complete regulations

The Trends

The market is ripe for innovation and reduced sodium foods and beverages. Packaged Facts, New York, NY, recently issued a report in February of this year, "Market Trend: Low, Reduced or No Sodium or Salt Foods and Beverages in

the U.S." The report shows that product category introductions with one or more SKUs bearing either a low-salt or low-sodium claim increased 105% from 102 claims in 2002 to 209 for 2007. Current forerunners in the race to reduce sodium content – canned soups and vegetables – will continue to see healthy growth; however, these are predicted to lose share to other categories, notably grains/snacks and meat/fish/entrees.

Other countries already are taking action to reduce the sodium content in prepared foods, working cooperatively with industry to achieve these goals. In Finland, government and industry have collaborated to bring about a 40% decrease in sodium consumption since the late 1970s, according to the AMA. In the United Kingdom, government regulators set voluntary sodium reduction targets for about 70 kinds of processed foods.

Recently 120 international experts convened in Amsterdam, the Netherlands, at the first "Salt and Sugar Reduction Symposium." Various topics covered global trends and the industry's

response to the growing demand for healthier foods. A Mintel presentation that focused on the European market reported that all food categories have seen growth in introductions labeled 'reduced salt/sodium.' The leading categories in Europe for sodium reduction are baked goods, baby foods, prepared meals and processed meats. And in Europe, as in the U.S., consumers seek more natural, chemical- and additive-free labels. "Sugar and salt reduction is becoming increasingly mainstream," said presenter David Jago for Mintel.

One mainstream manufacturer, ConAgra Foods Inc., Omaha, Nebraska, released news in December of 2007 announcing a successful company-wide initiative to reduce sodium in its food products. ConAgra so far has removed approximately 2.8 million pounds of salt from the American diet by reducing sodium in some of their more popular



Hollandaise sauce

The right sauce selection can help add a rich and creamy mouthfeel to prepared entrees or side dishes while keeping sodium content to a minimum.

food products, notably entrees in the Banquet®, Chef Boyardee®, Marie Callender's® and Kid Cuisine® lines.

Egg Products Play a Role

Egg products can play an important role in reducing sodium in certain food applications. Egg products are naturally low in sodium and possess multifunctional components for foaming, binding and emulsifying, among others. Egg yolk contains lipoprotein complexes that act as natural emulsifiers. For example, egg yolk may be added to sauces to act as an emulsifier rather than adding stabilizers and emulsifiers containing significant amounts of sodium.

Egg white protein is an excellent binder that can be added to meat systems to improve water holding and binding properties. This can be accomplished without adding additional salt and sodium polyphosphates to the meat formulation. Egg white also functions well as a binder in batter formulations for fried chicken without adding extra sodium.

Deana Jones, USDA-ARS, has identified another possible role for eggs when reducing sodium. Some chemical leaveners contain sodium, and eggs' ability to foam may be able to reduce the amount of chemical leaveners used.

Said Glenn Froning, Ph.D., food technology advisor for the American Egg Board and professor emeritus in the University of Nebraska's food science department, "When looking to reduce sodium in formulation, this is an area where in particular real egg products will provide a better solution than egg substitutes, which may be higher in sodium than regular egg products and certainly might have additives that will make the ingredient label longer and more confusing to the consumer."

In addition, egg products possess a neutral, clean flavor that won't conflict with the primary flavors in formulation. Viscosity, another important attribute of egg products, can assist with a formulation's mouthfeel.

"There is no single most important role egg products can play in a reduced sodium formulation," said Froning, "there are twenty. That's the number of functions eggs can provide to food formulators. When you have to reformulate or examine an entire formulation to adjust sodium levels, a multi-functional ingredient always plays an important role, even if it is in the background."

Not So Fast

It isn't easy to reduce sodium in formulation. According to Craig "Skip" Julius, product development for Gordon Food Service, Grand Rapids, MI, "Americans love their salt and sugar. In the U.S., salt and sugar sell."

Up until two years ago, formulators had few options. Reducing sodium meant the food had no flavor, or "you used one of the terrible salt replacers that leave a metallic burn on consumer's tongues – not very palatable," says Julius.

"New salt replacers recently introduced to market still base their structure on potassium, but the molecular structure is altered to reduce the metallic reaction on the tongue," says Julius.

The easiest formula to change, says Julius, "is a new one." "It would be wonderful if someone could come up with a one to one replacement system, but that really doesn't exist."

He likes to use a combination of ingredients to help reduce sodium, generally selecting one or a variety of autolyzed yeasts along with some type of umami contributor. "There are a lot of natural products that contain the glutamate molecule. I try to develop one or two of those in a savory situation and they go a long way. Basically you want to keep the

label clean while knocking salt content down considerably.”

One Possible Answer

Clean labels are dependent upon the ingredients. Egg products offer a clean label option and can help maintain product integrity and stability in a reduced sodium formulation. Egg products are capable of binding other ingredients, providing structure and stability and assisting with moisture migration while not conflicting with flavors of other ingredients. In fact, eggs have functional properties that do the job of many additives, yet naturally. Today’s consumers, better educated and more label savvy, are avoiding additives and seeking more natural food alternatives.

Eggs’ ability to foam, leaven, bind, thicken, coat, color, emulsify, and control crystallization and moisture make many food formulas possible. Custom blended egg products that include carbohydrates, gum, starches, sugar, and low levels of salt are available to meet manufacturers’ specifications and improve functional performance.

This is especially significant because of salt’s functional contributions to foods such as processed meats and doughs. Packaged Facts predicts that those two categories will see the strongest emphasis on reduced sodium in the coming years. Salt helps proteins

bind water, acting indispensably in developing the firm, smooth texture typical of processed meats, and holding or binding water in these products so it doesn’t weep off during cooking. Salt helps form stable emulsions with dispersed fat particles in sausages and formed meat. A lot of times these binders need salt to activate. However, by utilizing naturally formulated egg products, not only can you help reduce the sodium needed to activate the emulsifier, the egg products provide the potential for natural labeling of the food product.

In dough, salt helps with crumb structure and as a textural aid to strengthen the gluten. In commercial bread formulations, eggs keep starch molecules moist and fresh. Eggs tend to firm up the texture of food products and provide crumb improvement.

Viscosity in food formulation is a vital characteristic as well and egg products used to help enhance emulsification can also help adjust product viscosity and mouthfeel. “Eggs are not just making a rigid gel or making the batter stick, they help enhance the subtlety of the product feel on the tongue,” said Deana Jones, Ph.D., research food technologist in the Egg Safety and Quality Research Unit for the USDA-ARS, Athens, GA.

Egg products help add a clean or neutral flavor, “something the palate

Zesty Snack Puffs
Innovative snack offerings with reduced sodium are predicted to have great consumer appeal.

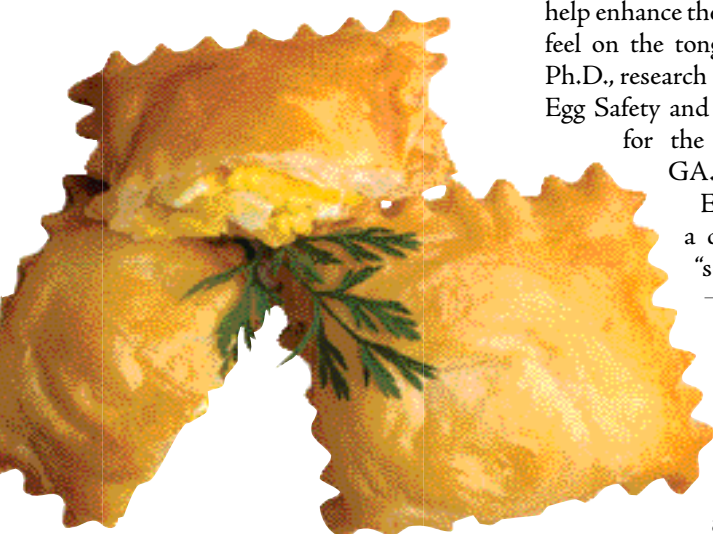


Mediterranean Empadas

Flavor reigns in any dish and egg products provide a natural canvas of structure and functionality that allows creativity and practicality to work in harmony.

recognizes or already knows,” says Jones. Flavor is critical in reduced sodium formulation, as according to Skip Julius, “up until two years ago if you reduced sodium, your food had no flavor. You won’t get repeat purchases on any product if it’s not at least good flavor. And the ultimate goal is to make it great.”

Egg products make so many food formulations great or better. The functional profile egg products provide is worth investigating to mine the possibilities for all the value they can provide to sodium reduced and other formulations. ●



The incredible edible egg™
American Egg Board

To obtain formulas and/or technical assistance, visit [EGGSolutions at](http://EGGSolutions.at) www.aeb.org or call toll-free 1-877-488-6143.