

SALT: NOT A SWEET STORY

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Part 2

Salt and Junk Addiction

Prominent world societies like those in the UK, US, and China are consuming dangerous levels of sodium. In China, most of the salt is added while preparing and cooking their own meals. Eating lots of processed foods and “compulsive-eating snacks” -also classified as junk foods- can become addictive. Salt and fat are especially pleasing to the mouthfeel. With the addition of crunch and sugar, it becomes hard to control compulsive eating. There is a clear correlation between marketing of products high in fat, sugar, and salt and the dietary habits of (young) people. Curbing exposure to junk food advertisements on TV and streaming platforms can be an effective tool to help people make healthy diet choices.

Going Forward

There are two distinct approaches to accomplish sodium reduction:

- A gradual reduction in the consumer’s perception of saltiness by selecting a stealth approach.
- Maintain the salt perception but reduce the sodium and substitute with potassium and small amounts of magnesium.

Stealth or Sea Salt

Part of the problem is that salt provides important benefits for

processed-food manufacturers and meat processors. Salt is a cheap ingredient that is ideally suitable to extend shelf life. It also enhances flavor, improves texture, and serves as an ideal masking agent for bitterness. An added issue is that many people would say no when asked if sodium reduction means switching to an alternative synthetic or chemical additive. Aside from the fact that consumers are accustomed to a certain flavor profile, many technical hurdles in removing salt from food formulations are still unsolved.

Salt might have a negative perception, but if the phrase “sea salt” appears on a label, consumers will have a very favorable opinion. Clearly, consumers have a negative perception of “salt”, while they have a positive impression of “sea salt”. Sea salt is naturally rich in potassium chloride and other minerals. According to the Innova Database, more consumers are using sea salt at home and new products containing sea salt are routinely being introduced.

Bring It On

Although most consumers believe that low-sodium products are inferior in taste, it is true that taste preferences may change as the amount of salt is gradually changed over time.

There are a few solutions to decrease sodium content without notably changing salt perception:

- Using smaller salt microspheres can make more sodium available in the mouth for tasting. Only some 30 percent of salt is perceived when food is eaten while the balance is simply swallowed. When smaller microspheres are used, the surface area increases substantially while it dissolves faster and improves the interaction with the tongue, thus, obtaining a greater salt perception.
- Combining sodium chloride with aromas like vanilla extracts may boost the salt perception. This is also true when typical umami compounds like soy sauce, green tea, and Parmesan are used to simulate salt enhancement.
- A sodium-and-potassium combination can be used in the same crystal or grain. Such a combination performs just like regular salt with little or no bitterness.

The typical retail-driven food supply in the Western world makes it difficult for consumers to choose low sodium foods. Of the average daily intake of 3,600mg per day, about 70-80 percent comes from industry-processed and prepared foods.

Sodium Intoxication: the Medical View of Prehypertension

Hypertension -known as high blood pressure- affects more than one in three adults aged 25 and over worldwide. This equals about one

billion adults. Pre-hypertension is the grey area between normal (under 120/80mm/Hg) and high (over 139/89mgHg), which is also a reason for concern. The condition especially affects an increasing number of young people.

preventable death. There is a genetic disposition to develop hypertension. High salt intake, high-calorie foods, lack of physical activity, and alcohol consumption all play an important and decisive role in the increase

hormonal stress response and perceived corticosterone stress levels. While stress hormone levels can be favorable in the short term, long term elevated stress levels can cause immunosuppression, obesity, insulin resistance



There is a strong correlation between salt intake and blood pressure. In nearly all cases, a low sodium diet shows an almost immediate decline in blood pressure. Salt is a contributor to high blood pressure, which has been linked to higher risk of heart attack, brain hemorrhages or stroke -the leading causes of

in hypertension. Associated with hypertension are increased risks of developing kidney failure and blindness.

High levels of dietary salt intake are not only associated with high blood pressure, increased incidences of stroke, and heart attacks but also increasing

(diabetes Type 2), as well as impact mood and sleep patterns.

Renaissance Potassium

“Potassium is an important mineral that keeps the heart pumping and the brain working.” If insufficient potassium intake occurs, several body functions may become unbalanced.

The importance of minerals in the daily diet is enjoying a renaissance. There is more than just anecdotal evidence on the important dietary role of potassium. People in the last few decennia have not only over-consumed sodium but also under-consumed potassium. Potassium is naturally found in vegetables and fruits and is helpful in reducing blood pressure and cardiovascular mortality. The scientific data supported by EFSA and FDA recommends this mineral to maintain normal blood pressure, muscular, and neurological functions in the body.

Contrary to sodium consumption, potassium intake via dietary intake needs boosting. Dietary potassium can lower blood pressure by blunting the adverse effects of sodium on blood pressure. Besides these important functions, potassium nutrients are also associated with reducing bone loss and preventing the development of kidney stones. Hence, it is likely that the nutraceutical food industry will develop special fortification foods containing dipotassium citrate and potassium gluconate to boost diet absorption of this important natural mineral.

Several factors are correlated with the reduction of blood pressure following increased potassium supplementation. Preferably, increased potassium fortification intake should be done via whole food coupled with a salt (sodium chloride) reduction to achieve

the benefits of an optimum sodium/potassium balance. Increasing potassium intake can be obtained by selecting foods like vegetables, pulses, fruits (bananas, kiwi, pineapple), and nuts.

Dietary potassium intake will not only delay elevated blood pressure levels but also delay or defer the need for antihypertensive prescription medication. A healthy adult should aim to consume 3,500-4,700mg of potassium daily from foods. The minimum recommended intake is 2,300mg for women and 3,000mg for men.

To put the discussion into perspective: There are physiological consequences to consider when consuming too little sodium. At decreased levels of intake, triglyceride levels increase, as well as insulin resistance and the activity of the sympathetic nervous system. All these factors can also increase the risk of heart disease. It may be concluded that sodium reduction is an issue of potential harm for subgroup populations. General advice for dietary sodium intake is incredibly difficult since there are quite a few variables to consider which can influence the health of the individual person.

The Yeast Alternative

Yeast is a microorganism which belongs to the fungus family. Yeast is known for its superb fermentation properties for

traditional products like bread, beer, wine, miso, and "sauerkraut". However, yeast also plays a critical role in modern age biotechnology such as animal-free dairy proteins, egg-free albumen, and plant-based meat alternatives. Yeast plays an incredible role in the flavor and taste development in processed foods and (plant) meat products. The latter is especially important to support sodium reduction, which allows about 30 percent less salt without compromising on taste.

The Phosphate Angle

Phosphates in processed food and processed meat are frequently used for technological reasons - as acidifying agents, acidity buffers, emulsifying agents, and for intensifying flavor. Phosphate is present in many processed foods like spreadable cheese, meat products, beverages, canned and frozen vegetables, and soups, as well as baked goods. Natural phosphate esters are also typically present in protein-rich foods like lean meat and are broken down slowly in the gut before being reabsorbed into the body.

The huge increase in processed food consumption has triggered the use of added phosphate, which is estimated to have doubled from 1980 to 2020 from below 500mg per day to 1000mg per day. Most food legislation rules do not require quantification but

simply identify the presence of phosphate or its E-number on the food label.

Some population groups -particularly infants, children, and adolescents- have too high dietary phosphate intake. Too much phosphate is a special concern to people who already have kidney damage or chronic renal disease. Typically, the most significant increase in blood phosphate levels occurs in people who eat dairy foods and cereal/ grain-based foods that contain artificially added (inorganic) phosphate. Recent research indicates that elevated phosphate intake is possibly correlated with mortality in people and may cause organ calcification in renal (kidney) patients -a correlation between high blood phosphate and cardiovascular disease in healthy people.

The main role of phosphates in processed food, meat, and beverages is to loosen the structure of a protein, as well as to serve as a "melting salt" in fat-filled cheese spreads and prevent separation in beverages. The EFSA Panel is recommending maximum permitted levels of phosphate as a processing aid. It should be noted that when used as an anti-caking agent, there is no real maximum permitted level for phosphate.

It is expected that phosphate additives used for meat and food manufacturing will regain new discussions. In Germany, the use

of phosphates in processed meat products is strictly regulated and even forbidden in most meat products. In most countries, the use of phosphates is (vaguely) regulated to maximum inclusion levels of 0.5 percent.

In the processed meat industry worldwide, salt and phosphate are probably the most frequently used additives in nearly all categories: emulsified, coarse, enhanced, and whole-muscle meat products.

It is necessary to distinguish between natural (organic) phosphates and chemically derived phosphates. Natural or organic phosphates are mainly found in protein-rich foods like meat, fish, eggs, and dairy. These naturally occurring phosphates are slowly broken down in the gastrointestinal

tract and gradually re-absorbed into the bloodstream from the intestines. While phosphates occur naturally particularly in high protein foods, these organic phosphates are absorbed by the body at a level of about 50 percent. Inorganic phosphate additives are more readily absorbed at levels between 90 and 100 percent.

In contrast to organic phosphate, industrially processed foods have much higher levels of added phosphate to obtain certain product modulations and cost advantages. For example, chemically derived phosphates are used as preservatives, yield-manipulating agents, acidity buffers, and emulsifying support, as well as for intensifying flavor and reducing warmed-over-flavor in cooked meat products, sodas, and many forms of frozen food. ●