INGREDIENT GUIDE

for Better School Food Purchasing

Last updated July 2021

Acknowledgements:

This document is a science-based tool created primarily by school nutrition professionals, for school nutrition professionals, in partnership with Center for Science in the Public Interest. The original *Ingredient Guide for Better School Food Purchasing* was developed in 2014 by school nutrition leaders from seven districts in the upper Midwest region, the nonprofit School Food FOCUS, and Lisa Lefferts, Senior Scientist at Center for Science in the Public Interest. In 2019, updating the Ingredient Guide became a project of FoodCorps' supply chain engagement work group which was facilitated by Jillian Dy, Director of Supply Chain Engagement.

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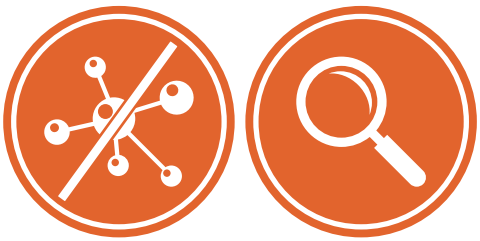
Ingredient Guide Introduction



This guide is a resource for school food leaders and manufacturers alike who are committed to improving the overall quality, nutritional value, and safety of food provided to all students in every school. It highlights unwanted ingredients to eliminate, and those to watch out for as new food products are developed and others are modified.

How To Use:

School districts should decide what works best for their school food programs according to the unique needs of their community. This guide is a tool that can be used by school districts of any size or geographic location to:

- Share with industry partners, manufacturers, food entrepreneurs, brokers, and anyone wanting to enter the school nutrition space to guide their decision-making process in the development of new products and alteration of current products intended for schools; It can be used to help clarify expectations and understand market demand.
- Guide purchasing decisions and recipe development; It can be used directly in food bids or RFPs (Requests for Proposal).
- Communicate food philosophy to students and families via school nutrition websites or social media platforms.
- Steer overall menu direction and program vision.
- Overall, if school nutrition operators using this guide have questions about whether or how an ingredient is used, we encourage them to reach out to the manufacturer or vendor.

"Better School Food Purchasing" Definition

A food product should include only whole foods like whole grains, fruits, vegetables, meats or dairy that are minimally processed or in their purest form; simply food made from food. A food product should not include unnecessary ingredients.

Nutrition Statement

The school nutrition leaders who contributed to creating this tool are committed to providing students with healthy, minimally processed, whole foods through school meal programs. In an effort to lead the nation in changing school food for the better, school districts are encouraged to develop menus that align with the age-appropriate recommendations in the 2020-2025 Dietary Guidelines for Americans, and then when needed, exceed federal nutrition requirements for Child Nutrition programs. Healthy eating patterns are essential for students to achieve their full academic, physical and mental growth potential, and to support long term health and well-being. Additionally, school districts are encouraged to provide nutrition education through the school food environment so that students will become healthy lifelong consumers.

Environmental and Public Health Impact

The term "healthy" refers not only to what is healthy for the individual, but also what is healthy for the environment, and the public.* Food purchases impact, and are impacted by, environmental and public health issues such as antibiotic resistance, climate change, and chemical contaminants in food, food packaging, water, air, soil, crops, and animals. While the focus of this guide is ingredients added to food and their safety or healthfulness to children, districts are also encouraged to:

- Prioritize purchasing foods produced more sustainably (1) and locally sourced, using a definition of local appropriate for their school district.
- Increase offerings of plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds (2).
- Choose products that have 3rd party verified claims of responsible use of medically important antibiotics (e.g., Certified Organic, Certified Responsible Antibiotic Use).
- Minimize or phase-out single-use packaging and packaging that contains chemicals of concern including bisphenols, ortho-phthalates, and per- and polyfluoroalkyl substances (PFAS) (3-5).

Some districts may also wish to consider other third-party verified claims when purchasing commercial products (e.g., American Grassfed, Certified Humane, Animal Welfare Approved, or American Humane Certified).

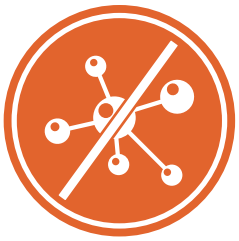
In these ways, school districts can also help support the regional economy and our surrounding communities, and provide our students opportunities to understand the benefits and importance of healthy food systems.

*For example, certified organic foods and seafood that is identified as a "best choice" or "good alternative" on the Monterey Bay Aquarium Seafood Watch list, or similarly certified by other equivalent program.

Why is this guide needed?

The system for overseeing the safety of substances added to the food supply has been widely criticized (6-10). For example, most additives have not been tested for safety according to FDA's testing recommendations, and FDA does not have a policy of using an additional safety factor to better protect children, as do some agencies. FDA also lacks a system for routinely re-assessing the safety of substances added to food in order to take into account new scientific information. These are some of the reasons behind the development of this Guide.

Unwanted List



Ingredients that are not acceptable at any level in newly developed products, and should be eliminated over time from existing products.

① ARTIFICIAL COLORS

Synthetic Food Dyes (Blue 1, Blue 2, Green 3, Red 3, Red 40, Yellow 5, Yellow 6)

Description: Synthetic food dyes are colorings added to processed foods to make them look more appealing.

Concern: The scientific literature indicates that synthetic food dyes can impact neurobehavior in some children, according to the State of California and other independent reviews and studies (11-24). Some dyes are also known to cause allergic or hypersensitivity reactions (25). In Europe, foods containing certain dyes (including Red 40, Yellow 5, and Yellow 6) are required to carry a warning label that the dyes, "may have an adverse effect on activity and attention in children." In 1990, FDA concluded that Red 3 is a carcinogen, based on studies in animals, and banned some uses of Red 3 (in cosmetics and externally applied drugs), but never finished banning all uses, including in food (26). Animal studies show that certain food dyes or contaminants in food dyes may pose a risk of cancer (11). Synthetic food dyes also often substitute for actual fruit or other "real" ingredients.

Caramel Color CL 3-4

Description: Caramel color is made by heat treatment of sugar compounds. Class III and IV are made with ammonium compounds as well. These ingredients are commonly found in processed foods such as soy and Worcestershire sauces, chocolate-flavored products, baked goods and pre-cooked meats, but the most significant sources in the diet are colas and caramel-colored beverages.

Concern: When produced with ammonia, caramel coloring contains contaminants (i.e., 2-methylimidazole, 4-methylimidazole), which have been found to cause cancer in animal studies conducted by the National Toxicology Program (NTP) (27). The International Agency for Research on Cancer (IARC), a division of the World Health Organization, has concluded that 2-methylimidazole and 4-methylimidazole are "possibly carcinogenic to humans" (28,29). Furthermore, under Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, the state of California classifies 2-methylimidazole and 4-methylimidazole as carcinogenic (30).

② ARTIFICIAL & UNSPECIFIED NATURAL FLAVORS, AND FLAVOR ENHANCERS

Description: The term artificial flavor or artificial flavoring is defined by the Food and Drug Administration (FDA) as "any substance, the function of which is to impart flavor, which is not derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, fish, poultry, eggs, dairy products, or fermentation products thereof" (31). The term natural flavor or natural flavoring is defined by the FDA as "the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional" (31) These types of flavors are commonly found in processed foods such as breakfast cereals, desserts, soft drinks, and many other foods.

Concern: The use of artificial and natural flavors indicates the absence of whole ingredients, most often fruits. A standing expert panel sponsored by the Flavor and Extract Manufacturers Association, not the FDA, decides whether flavorings are safe and can be added to food (32). Some people may be sensitive to certain flavoring ingredients (33). The FDA allows manufacturers to put flavor on ingredient lists without any specifics of what flavors are used. School food service departments are requesting that when natural flavors are used they include specific details explaining from which ingredients the natural flavors are derived. Many districts have students that are allergic or sensitive to certain ingredients, or who do not want to consume flavors that are derived from animals.

Monosodium Glutamate (MSG)

Description: MSG is the sodium salt of an amino acid that is used to enhance the meaty (i.e., umami) flavor of foods. It is commonly found in processed foods.

Concern: MSG is commonly used to substitute for flavor, allowing food manufacturers to reduce the use of nutritionally superior ingredients (e.g.,using MSG to reduce the amount of chicken needed in chicken soup). For certain sensitive individuals, large amounts of MSG have been linked to adverse reactions including but not limited to headache, nausea, weakness, and a burning sensation on the back of the neck, forearms and chest. Some people report difficulty breathing, changes in heart rate or blood pressure, and chest pain (33,34). However, additional studies with better designs are needed to establish whether such effects occur in sensitive individuals at lower levels normally consumed in foods (33,35).

③ ARTIFICIAL PRESERVATIVES

Butylated Hydroxyanisole (BHA)

Description: BHA is an antioxidant preservative that retards rancidity in fats and oils; commonly found in processed products, particularly meats, cereals, potato chips and vegetable oils.

Concern: In the U.S. Report on Carcinogens, the National Toxicology Program within the Department of Health and Human Services lists BHA as "reasonably anticipated to be a human carcinogen" (36).

Butylated Hydroxytoluene (BHT)

Description: BHT is an antioxidant preservative that retards rancidity in oil. It is commonly found in processed foods, particularly cereals, meats, and oils.

Concern: Some animal studies of carcinogenicity and chronic toxicity of BHT have shown contradictory results (33,37). The Center for Science in the Public Interest recommends that BHT be replaced by safer substitutes or left out of foods altogether (33).

Propyl Gallate

Description: Propyl gallate is an antioxidant used to protect fats, oils, and fat containing foods from going rancid, and is commonly found in meat products, soup bases and potato sticks. It is commonly used in conjunction with BHA and BHT (33).

Concern: Safety studies published by the US government have shown concerning results. In one study propyl gallate appeared to cause cancers in rats treated with a low dose of propyl gallate as opposed to those treated with a zero dose or high dose (38). The Center for Science in the Public Interest explains that this finding indicates this food additive could be an endocrine disruptor, as well as a carcinogen, and test-tube studies also find endocrine disrupting effects, but more research is recommended to better understand how this additive impacts human health (33,39).

Tert-Butylhydroquinone (TBHQ)

Description: TBHQ is an antioxidant preservative that is used to prevent rancidity. Sometimes it is used in conjunction with BHA, BHT and propyl gallate. It is commonly found in vegetable oil, snack foods, cereals and other fat-containing foods (33).

Concern: A government animal study showed TBHQ increased the incidence of tumors (33,40).

④ ARTIFICIAL SWEETENERS & OTHER SUGAR-FREE (Non-Nutritive, Low Calorie, and Reduced-Calorie) SWEETENERS

Description: Artificial and other sugar-free sweeteners include a wide range of sugar substitutes including but not limited to: Acesulfame potassium, Advantame, Aspartame, Monk Fruit Extract, Neotame, Saccharin, Stevia Leaf Extract (Rebiana), Sucralose, various Sugar Alcohols (Erythritol, Hydrogenated Starch Hydrolysate, Isomalt, Lactitol, Maltitol, Mannitol, Sorbitol, Xylitol), and Thaumatin. (Cyclamate has been banned in the United States, and Brazzein and Monatin are not yet used/permitted. Low and reduced calorie sugars metabolized differently than traditional sugars are discussed below.) These sweeteners are used to improve sweetness in foods or beverages with fewer calories than those produced with caloric sweeteners (e.g., cane sugar, high fructose corn syrup). These ingredients can be found in a range of products such as diet beverages, baked goods, yogurts and cereals, and are not limited to products labeled as diet or low-sugar.

Concern: Evidence on the safety of these sweeteners for children is lacking. The American Academy of Pediatrics found that "the long-term safety of non-nutritive sweeteners in childhood has not been assessed in humans." A 2018 American Heart Association Scientific Advisory advises against prolonged consumption of low-calorie sweetened beverages by children. A 2019 Consensus Statement on Healthy Beverage Consumption in Early Childhood (ages five and under) by four national health and nutrition organizations finds beverages sweetened with caloric or low calorie sweeteners "not recommended." A few artificial sweeteners, especially aspartame, but also acesulfame potassium, saccharin, and sucralose may pose a risk of cancer (33,41-48). Sugar alcohols can cause diarrhea or other gastrointestinal distress in sufficient quantities, although this is much less likely with erythritol.

⑤ EMULSIFIERS

Brominated Vegetable Oil (BVO)

Description: BVO is an emulsifier and acts as a clouding agent, primarily in soft drinks, by keeping flavor oils in suspension.

Concern: BVO is poorly tested and has been on an interim list from FDA for decades, after being removed from the FDA's list of ingredients "Generally Recognized as Safe" in 1970 (26,33). BVO is not permitted in Europe. Consuming BVO leaves residues in body fat as well as fat in the brain, liver, and other organs. Animal studies indicate that BVO can cause heart lesions, changes in the liver, impaired growth and behavioral development (33). Some people who consumed extremely large amounts of soft drinks containing BVO have experienced symptoms of bromine toxicity, including headache, fatigue, and serious neurological symptoms (49). More studies are needed to fully understand the risk, especially for lower levels typically consumed by children (33,49).

Carboxymethylcellulose (CMC) and Polysorbates

Description: CMC, also called cellulose gum, is an emulsifier and thickening agent used to improve texture, bind water, and prevent sugar from crystallizing. It is used in ice cream, pie fillings, jellies, cake icings, and diet foods. Polysorbates (polysorbate 60, 65, and 80), also emulsifiers, keep baked goods from going stale and prevent oil from separating out of artificial whipped cream. They are also used in frozen desserts.

Concern: A 2015 study funded by the National Institutes of Health found that both CMC and Polysorbate 80 affected gut bacteria and triggered inflammatory bowel disease symptoms, as well as obesity and metabolic syndrome. They also promoted colitis in mice prone to the disease (50). It is possible that polysorbates, CMC, and other emulsifiers act like detergents to disrupt the mucous layer that lines the gut. Research is needed to determine long-term effects of these and other emulsifiers (33). CMC is not absorbed or digested, so the FDA allows it to be included with "dietary fiber" on food labels. CMC isn't as healthful as fiber that comes from natural foods (33).

⑥ FLOUR TREATMENT AGENTS

Bromated Flour/Potassium Bromate

Description: Bromated flours are those that contain the additives potassium bromate or calcium bromate. These additives are flour "improvers" used to strengthen dough allowing for greater oven spring and higher rising. This type of flour is used in white breads, rolls, crackers, and pizza crusts.

Concern: The majority of bromate breaks down in the baking process. However, the main concern is that various animal studies demonstrate an association of potassium bromate with cancer (33). The International Agency for Research on Cancer considers potassium bromate to be possibly carcinogenic to humans, and the US Environmental Protection Agency considers it to be a probable human carcinogen (51,52). California's Proposition 65 also lists potassium bromate as a carcinogen (29). Many countries with the exception of the US and Japan have banned bromates (33).

Azodicarbonamide (ADA)

Description: Azodicarbonamide (ADA) is a chemical substance used by commercial bakers as a dough conditioner for bread baking and as a whitening agent in cereal flour (53). ADA is used in baked products such as breads, rolls and pizza crusts.

Concern: During bread making, ADA completely breaks down to form other chemicals, one of which is semicarbazide (SEM). At high levels, animal studies have shown SEM has increased the incidence of tumors when fed to female mice (53). Another chemical that is a result of ADA's breakdown is urethane, a recognized carcinogen (33, 53). The FDA explains that ADA is not necessary for bread making and there are alternative ingredients approved for use available (54).

Potassium Iodate

Description: Potassium iodate is sometimes used as a dough strengthener in bread and rolls. Potassium iodate is a source of iodine, an essential trace element necessary for the body to make thyroid hormones. But too little or too much iodine can be harmful.

Concern: A committee of the World Health Organization concluded that use of potassium iodate as a flour treatment agent was unacceptable because it could result in an excessive intake of iodine (55). Some people, such as those with thyroid disease, are especially sensitive to iodine intake and should make a special effort to avoid potassium iodate in bread and rolls (33,56). One other possible concern is that iodate breaks down in dough and in the body to form iodide. In a study conducted by Japanese government scientists, high doses of potassium iodide caused cancer in rats, suggesting it may be a weak carcinogen. The same research found that it also increased the potency of a known carcinogen (33,57).

⑦ MYCOPROTEIN

Description: Mycoprotein is protein made from processed mold. The only mycoprotein currently in widespread use is made from a mold called Fusarium venenatum, which is grown in liquid tanks. While the chunks of imitation meat are nutritious, the prepared foods in which they are used may be high in fat or salt (33,58,59).

Concern: One controlled clinical study and many reports indicate that this type of mycoprotein can cause adverse effects, including gastrointestinal reactions (nausea, diarrhea, vomiting, abdominal cramps) and allergic reactions (hives, itchy skin, swelling of the throat or mouth, difficulty breathing), sometimes severe enough to warrant medical attention. Two deaths have been linked to it. Because of an objection filed by the Center for Science in the Public Interest (CSPI) in response to a proposed settlement of a class action case, labels for products containing this mycoprotein sold in the U.S. now must state, "Mycoprotein is a mold [member of the fungi family]. There have been rare cases of allergic reactions to products that contain mycoprotein" (33,58,59).

Watch List

Ingredients that have the potential to be overused.

These ingredients can be a red flag as they are frequently overused, common in foods of lower nutritional quality, and/or tend to indicate a highly processed food. As a result, school districts and food manufacturers are encouraged to watch out for and limit ingredients like these, and demand transparency and accountability in their use. Items in the Watch List should be scrutinized by buyers, and their function and the amount used must be understood and justified through dialogue between districts and food manufacturers.

Biggest concern: Too much added sodium and sugars. The science is clear that added sodium and all added sugars are the food ingredients that pose the greatest dietary threat to human health in the US. These two ingredients are included in a vast array of foods and beverages, and consequently consumed in excessive amounts leading to poor health outcomes and serious chronic diseases.

① ADDED SODIUM

Description: Sodium and sodium chloride are added to foods, often during processing, for preservative or flavor purposes. In the average American diet almost half of all dietary sodium comes from these 10 foods: breads and rolls, pizza, sandwiches, cold cuts and cured meats, soups, burritos and tacos, savory snacks (chips, popcorn, pretzels, snack mixes, crackers), chicken, cheese, eggs and omelets (60).

Concern: Salt, at levels present in the diets of most people, is one of the single most harmful substances in the food supply. While the body needs small amounts of sodium to function properly, most Americans are consuming far too much of it, leading to high blood pressure, which in turn is associated with an increased risk of heart disease and stroke (60). While these health problems typically manifest in adult populations, their precursors start in early childhood (61). Children ages 2 to 19 consume more than 3,100 mg of sodium a day, which is over twice the daily recommendation of the American Heart Association (AHA). The AHA recommends that Americans of all ages consume no more than 1,500 mg of sodium a day (62). Sodium levels in school meals are already regulated by the USDA. Sodium limits and tiered reductions are currently in place (63). The inclusion of added sodium on this list is intended to support planned reductions in sodium limits by removing excess added sodium from highly processed food products.

② ADDED SUGARS

Description: Added sugars are now listed on the Nutrition Facts label (64). Added sugars are caloric sweeteners added to processed and prepared foods and include but are not limited to: agave, anhydrous dextrose, brown sugar, cane juice,

cane sugar, confectioner's powdered sugar, corn syrup, corn syrup solids, crystal dextrose, date sugar, dextrose, evaporated cane juice, fructose, fruit juice concentrate, high-fructose corn syrup, high-maltose corn syrup, honey, invert sugar, isomaltulose, lactose, malt syrup, maltose, maple syrup, molasses, nectars (e.g., peach nectar, pear nectar), pancake syrup, raw sugar, sucrose, sugar, sugar cane juice, trehalose, and white granulated sugar. These types of sweeteners are commonly found in most types of foods and beverages but the major source of these are in sugar-sweetened beverages (e.g., soft drinks, energy drinks, sports drinks, fruit drinks) and desserts/sweet snacks (e.g., cakes, cookies, pies, cobblers, sweet rolls, pastries, donuts, ice cream) (65). Added sugars do not include naturally occuring sugars found in milk, fruits, and vegetables.

Concern: Added sugars contribute calories to your diet but no essential nutrients, and make it difficult to eat healthfully without taking in too many calories (66). Excess daily consumption of added sugars, especially in beverages, has been linked to poor nutrient intake, tooth decay, overweight, obesity, diabetes, as well as the development of cardiovascular disease and its associated risk factors (66-71). Since 1999, Americans' consumption of added sugars has decreased but still remains higher than recommended levels (33, 72-75). While most everyone enjoys a sweet, the majority of Americans of all ages consume too much of it (75). While it is understood that certain foods and beverages require some level of added sugars, the quantities of these ingredients need to be within reason, and other foods and beverages do not require them. School food professionals may need to be mindful of total grams of added sugar and total calories from such sweeteners to ensure that their menus meet USDA Meal Pattern Guidelines as well as contribute to healthful diets for students throughout the year.

Sugary Syrups (e.g., high fructose corn syrup, high maltose corn syrup, high dextrose corn syrup, corn syrup, tapioca syrup)

Description: These are a subset of added sugars. High fructose corn syrup (HFCS) and other corn syrups are sweeteners derived from cornstarch and broken down using enzymes or acids into its glucose (also called dextrose) subunits. HFCS is further enzymatically altered to change the natural fructose to glucose ratio. HFCS is an inexpensive caloric sweetener commonly found in processed foods and beverages, and not limited to sweets. Companies are increasingly using substitutes for HFCS that are no healthier.

Concern: Between 1970 and the late 1990's Americans' annual consumption of high fructose corn syrup (HFCS) increased from 3.6 pounds per capita to 62.4 pounds, primarily as a result of cheap HFCS available on the market (76). HFCS consumption declined by about 32 percent between 1999 and 2013. It is important to note that all added sugars—not just HFCS—contribute empty calories linked to numerous health problems, including weight gain, type 2 diabetes, metabolic syndrome and high triglyceride levels, which increase the risk of heart disease. All added sugars must be carefully watched and eliminated from food served in schools when not serving a

vital functional or culinary purpose. However, the proliferation of HFCS as a cheap caloric sweetener in the food supply deserves special mention. It is ubiquitous in overly processed, low quality foods that districts seek to eliminate from their menus.

③ ARTIFICIAL PRESERVATIVES

Benzoates and Benzoic Acid

Description: Benzoates (e.g., sodium benzoate, potassium benzoate, calcium benzoate) and its close relative benzoic acid are used as preservatives to prevent the growth of microorganisms in acidic foods, and are commonly used in fruit juices, carbonated beverages, pickles and processed foods.

Concern: There is some evidence that benzoates such as sodium benzoate may cause hives, asthma, or other hypersensitivity reactions in sensitive individuals (77). Benzoates can also react in beverages that contain ascorbic acid (i.e., vitamin C) or erythorbic acid, a chemical cousin of vitamin C, to form small amounts of benzene, a chemical that can cause cancer in humans (33). In 2006, the FDA's Center for Food Safety and Applied Nutrition shared findings on their survey of benzene in beverages in which 4 out of 100 beverages with added benzoates had elevated levels of benzene (78). In addition, one cranberry juice beverage product with added ascorbic acid and natural levels of benzoic acid (no added benzoates) had elevated levels of benzene. According to FDA, all five samples were reformulated and re-tested, with levels below FDA's level of concern. FDA notes that its testing covered a limited number of products, brands, and geographic regions, and that levels of benzene are highly variable due to factors such as temperature and light exposure during shipping, handling, and storage (78). School districts plan to keep an eye on products containing these types of preservatives.

Sulfites

Description: Sulfites are used as a preservative to prevent discoloration in foods such as dried fruits and processed potatoes (e.g., dried, fried or frozen potatoes).

Concern: This preservative destroys vitamin B1 in foods, thus, reducing the foods' nutritional profile. For some sensitive individuals, in particular asthmatics, sulfites can cause severe reactions (33,79). The US FDA requires that foods that use sulfites as an ingredient or during processing declare its presence on food labels. Sulfites are prohibited from use with certain foods such as raw fruits and vegetables. However, they are still allowed with minimally processed potatoes and dried fruits (80).

④ CAFFEINE (Especially Added Caffeine)

Description: Caffeine is a stimulant that can be found naturally in some plant-based foods and drinks, such as chocolate, coffee, and tea, and it is also added to many manufactured products. Common sources of added caffeine consumed by

children include soda, coffee, tea, and energy drinks, and it can also be found in chocolate and some coffee flavored foods (e.g. ice cream), other beverages (water, juices) and snack foods (mints, gummy candy, chewing gum, peanut butter, energy bars) with added caffeine, lip balms and some skincare products, some over the counter medications, and supplements (81).

Concern: Caffeine is one of the few drugs present naturally and added to widely consumed foods. Caffeine can disrupt sleep, cause jitteriness, anxiousness, nausea, and headache (81,82). Caffeine can also affect calcium metabolism, and caffeinated beverages can displace calcium-rich beverages (83). Caffeine has some benefits, but several authorities recommend against caffeine for children. Caffeine is consumed regularly by children, and some caffeinated products are marketed specifically to children (84). There is currently no proven safe dose for children and the American Academy of Pediatrics advises against caffeine for children under 12, against any use of energy drinks for children and teens, and limiting caffeine to at most 100 mg daily for those 12-18 years (81). Further research is needed to better understand the long term consequences of children's caffeine consumption (84).

⑤ COLORINGS (Naturally Derived)

Annatto

Description: Annatto is a widely used food coloring obtained from the seeds of a tropical shrub. Its hue is yellow to orange.

Concern: Allergic reactions to annatto (e.g., hives) appear to be more common than allergic reactions to synthetic food dyes. As food manufacturers shift away from synthetic food dyes to naturally-derived colorings like these, it will be important to watch for these ingredients as they appear on food labels.

Cochineal extract/carmine

Description: Cochineal extract is coloring obtained from the cochineal insect and carmine is a more purified coloring made from cochineal, which creates a stable pink, red, or purple hue in food products.

Concern: While cochineal extract and carmine appear to be safe for most people, a small percentage of individuals can suffer from allergic reactions ranging from hives to life-threatening anaphylactic shock (85). As food manufacturers shift away from synthetic food dyes to naturally-derived colorings like these, it will be important to watch for these ingredients as they appear on food labels.

⑥ HYDROLYZED VEGETABLE PROTEIN (HVP)

Description: Hydrolyzed vegetable protein (HVP) is vegetable (often soybean) protein that has been chemically broken down to the amino acids of which it is composed, and used as a flavor enhancer in a wide variety of foods including

soups, frankfurters, sauce mixes and beef stew (33). It should not be confused with isolated vegetable protein (IVP) or textured vegetable protein (TVP), both of which appear to be safe. (IVP is protein that is typically extracted from soybeans but can also be derived from other foods such as peas), and TVP is soy protein that has been combined with chemical additives and processed into granules, chunks, or strips that can function as a meat analog).

Concern: HVP is often made through the process of acidic hydrolysis of a vegetable protein; and when using hydrochloric acid during the acid hydrolysis process, carcinogenic compounds can be produced, and the resulting product is high in salt (86,87). HVP also contains monosodium glutamate, which some individuals are sensitive to (88).

⑦ NATURAL FLAVORS (Specified)

Description: The term natural flavor or natural flavoring is defined by the FDA as "the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional" (31).

Concern: These flavors serve no nutritional function and they are commonly found in many kinds of foods of low nutritional value. The use of natural or artificial flavors indicates that the real ingredient has been left out. School districts report that some of their children may have allergic or hypersensitivity reactions to certain ingredients. School food service departments are requesting that when natural flavors are used they include specific details about from which natural ingredients the natural flavors are derived. For example, an ingredient list should include details such as "natural flavors (banana extract)".

⑧ PHOSPHORIC ACID & PHOSPHATES

Description: Different phosphorus compounds are used for myriad purposes, including to inhibit discoloration, keep oil and water mixed together, make foods more acidic, retain moisture, act as mineral supplements, and trap trace amounts of metals that cause food to discolor or go rancid, to name a few (33, 89-92).

Concern: Most people consume far more phosphorus than they need, which may have adverse effects on kidney, bone, and cardiovascular health, especially for people suffering from kidney disease. Phosphate food additives are inorganic phosphorus, which is more readily absorbed than organic forms of phosphorus that are naturally occurring in food (33, 89-92).

⑨ PROCESSED MEAT

Description: Processed meat is meat that has been transformed through salting, curing, fermentation, smoking, or other processes to enhance flavor or improve preservation. Examples of processed meat include hot dogs (frankfurters), ham, sausage, corned beef, beef jerky, and canned meat.

Concern: In 2015, the International Agency for Research on Cancer (IARC) at the World Health Organization classified processed meat as "carcinogenic to humans" (93). IARC found that there was "sufficient" evidence of carcinogenicity in humans, meaning, there is convincing evidence that processed meat causes cancer, in this case, colorectal cancer. If processed meats are served, they should be served infrequently, to reduce risk. There is no reason to think that "natural" cured meats or meats labeled "no nitrites/nitrates" are any safer. They use natural sources of nitrates to cure the meat and can have as much or more nitrite as conventional products.

⑩ REFINED OR WHITE (including Bleached) FLOUR

Description: Refined or white flour has the germ and bran removed, the parts that contain much of the nutrients and vitamins. Bleached flour is flour that has been treated with an oxidizing agent, most commonly benzoyl peroxide, but azodicarbonamide, chlorine dioxide, or other agents may be used to accelerate the natural aging process that results in a whiter color and improves its baking properties (94). USDA regulations specify that at least half of all grain must come from whole grain, the remainder of which must come from enriched grain that has had nutrients added back after refining.

Concern: Refined and bleached flour tends to be used in highly processed foods and have less nutrients and fiber than whole wheat flour or whole grain flour. Rarely, benzoyl peroxide may cause reactions in those handling the flour (95).

⑪ SUGARS METABOLIZED DIFFERENTLY THAN TRADITIONAL SUGARS: ALLULOSE & TAGATOSE

Description: Allulose is a naturally occurring sugar that has 70% of the sweetness of table sugar yet only 10% of the calories since it is poorly digested. It also causes only negligible increases in blood sugar and insulin levels. For these reasons, FDA permits allulose to be excluded from the amount of "Total Sugars" and "Added Sugars" listed on Nutrition Facts labels (96). It is being added to a growing number of foods such as ice cream, cereal, and protein bars. Similarly, tagatose is a naturally occurring sugar that has 92% of the sweetness of table sugar and is the mirror image of fructose, but is also poorly digested and yields only about one-third as many calories (33).

Concern: While allulose and tagatose may be perfectly safe replacements for added sugars, too much, like with other poorly digested carbohydrates, can cause gastrointestinal effects such as nausea, diarrhea, and abdominal pain. The effects

have not been well-studied, and not studied at all in children, who are estimated to consume the highest amounts per pound of body weight, nor in those with digestive disorders like irritable bowel syndrome (97).

⑫ THICKENING AGENTS

Carrageenan

Description: Carrageenans are large molecules called polysaccharides that are extracted from edible red seaweeds. They are used in foods as gelling, thickening and stabilizing agents, and are found in dairy products (e.g., chocolate milk, skim milk, evaporated milk, milkshakes and instant breakfast power, cottage and cream cheese products, yogurt) dairy alternatives (e.g., almond milk, soy milk), fruit drinks, desserts (i.e., flans and custards, pudding, pie fillings), salad dressings, sauces (i.e., relish, pizza, BBQ), and tofu (33,98).

Concern: There is not adequate data on carrageenan to firmly assess its safety, according to European food safety authorities (99). The composition of carrageenan can vary, with some types and components associated with potential adverse effects, yet there is often not adequate data characterizing the composition of carrageenan used in various studies, and of food-grade carrageenan. It is unclear whether these thickening and texturing agents might cause gastrointestinal problems in people with gastrointestinal diseases (33). In a very small randomized, double-blind, placebo-controlled clinical trial, carrageenan intake contributed to an earlier relapse in patients with ulcerative colitis in remission, compared to placebo. Small amounts of "degraded" carrageenan may contaminate food-grade carrageenan, and a bit more probably forms in the acidic conditions of the stomach (33). While undegraded carrageenan does not cause cancer, degraded carrageenan is considered to be "possibly carcinogenic in humans" by the International Agency for Research on Cancer, a branch of the World Health Organization (100).

The Ingredient Guide for Better School Food Purchasing is a living document, updated regularly to incorporate up-to-date research. This guide can be downloaded at the following websites:

- CSPI's Support Healthier School Food
- Facebook group Tips for School Meals that Rock
- Center for Ecoliteracy
- FoodCorps
- The Lunchbox at Chef Ann Foundation
- Life Time Foundation
- Healthy Schools Campaign

Works Cited

1. U.S. Office of Disease Prevention and Health Promotion. Healthy people 2020 topics and objectives: environmental health [Internet]. Washington, D.C: U.S. Dept. of Health and Human Services; 2020 [cited 9 Jun 2021]. Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/environmental-health

2. Leiserowitz A, Ballew M, Rosenthal S, Semaan J. Climate change and the American diet [Internet]. New Haven: Yale Program on Climate Change Communication; 2020. Available from: https://climatecommunication.yale.edu/publications/climate-change-and-the-american-diet/2/

3. Muncke J, Andersson AM, Backhaus T, Boucher JM, Almroth BC, Castillo AC, et al. Impacts of food contact chemicals on human health: a consensus statement. Environmental Health. 2020 Dec;19(1):1-2.

4. Environmental Defense Fund Supply Chain Solutions Center. Key chemicals of concern in food packaging and food handling equipment [Internet]. New York: Supply Chain Solutions Center; [date unknown] [cited 9 Jun 2021]. Available from: https://supplychain.edf.org/resources/key-chemicals-of-concern-in-food-packaging-and-food-handling-equipment/

5. Muncke J. Tackling the toxics in plastics packaging. PLoS Biology. 2021 Mar 30;19(3):e3000961.

6. Trasande L, Shaffer RM, Sathyanarayana S, American Academy of Pediatrics Council on Environmental Health. Food additives and child health. Pediatrics. 2018 Aug 1;142(2).

7. Government Accountability Office. Food safety: FDA should strengthen its oversight of food ingredients determined to be generally recognized as safe (GRAS) [Internet]. Washington, D.C.: Government Accountability Office; 2010 [cited 9 Jun 2021]. Available from: https://www.gao.gov/products/gao-10-246

8. Center for Science in the Public Interest. FDA food ingredient approval process violates law, says CSPI [Internet]. Washington, D.C.: Center for Science in the Public Interest; 2015 [cited 9 Jun 2021]. Available from: https://cspinet.org/new/201504151.html

9. Center for Science in the Public Interest. Groups sue FDA to protect food safety: Seek to ensure food Additives Are Found Safe Before Being Marketed to American Consumers [Internet]. Washington, D.C.: Center for Science in the Public Interest; 2017 [cited 9 Jun 2021]. Available from: https://cspinet.org/news/groups-sue-fda-protect-food-safety-20170522

10. Pew Charitable Trusts. Fixing the Oversight of Chemicals Added to Our Food [Internet]. Philadelphia: Pew Charitable Trusts; 2013. Available from: https://www.pewtrusts.org/en/research-and-analysis/reports/2013/11/07/fixing-the-oversight-of-chemicals-added-to-our-food

11. Lefferts LY, Jacobson MF, MacCleery L. Seeing Red: Time for Action in Food Dyes. [Internet] Washington D.C.: Center for Science in the Public Interest; 2016. Available from: http://cspinet.org/reports/seeing-red-report.pdf

12. Conners CK, Goyette CH, Southwick DA, Lees JM, Andrulonis PA. Food additives and hyperkinesis: a controlled double-blind experiment. Pediatrics. 1976 Aug 1;58(2):154-66.

13. California Office of Environmental Health Hazard Assessment. Health Effects Assessment: Potential Neurobehavioral Effects of Synthetic Food Dyes in Children [Internet]. Sacramento: California Office of Environmental Health Hazard Assessment; 2021. Available from: https://oehha.ca.gov/risk-assessment/report/health-effects-assessment-potential-neurobehavioral-effects-synthetic-food

14. Nigg JT, Lewis K, Edinger T, Falk M. Meta-analysis of attention-deficit/hyperactivity disorder or attention-deficit/hyperactivity disorder symptoms, restriction diet, and synthetic food color additives. Journal of the American Academy of Child & Adolescent Psychiatry. 2012 Jan 1;51(1):86-97.

15. Sonuga-Barke EJ, Brandeis D, Cortese S, Daley D, Ferrin M, Holtmann M, et al. Nonpharmacological interventions for ADHD: systematic review and meta-analyses of randomized controlled trials of dietary and psychological treatments. American Journal of Psychiatry. 2013 Mar;170(3):275-89.

16. Schab DW, Trinh NH. Do artificial food colors promote hyperactivity in children with hyperactive syndromes? A meta-analysis of double-blind placebo-controlled trials. Journal of Developmental & Behavioral Pediatrics. 2004 Dec 1;25(6):423-34.

17. Faraone SV, Antshel KM. Towards an evidence-based taxonomy of nonpharmacologic treatments for ADHD. Child and Adolescent Psychiatric Clinics. 2014 Oct 1;23(4):965-72.

18. Nigg JT, Holton K. Restriction and elimination diets in ADHD treatment. Child and Adolescent Psychiatric Clinics. 2014 Oct 1;23(4):937-53.

19. Arnold LE, Hurt E, Lofthouse N. Attention-deficit/hyperactivity disorder: dietary and nutritional treatments. Child and Adolescent Psychiatric Clinics. 2013 Jul 1;22(3):381-402.

20. Arnold LE, Lofthouse N, Hurt E. Artificial food colors and attention-deficit/hyperactivity symptoms: conclusions to dye for. Neurotherapeutics. 2012 Jul;9(3):599-609.

21. Stevens LJ, Kuczek T, Burgess JR, Hurt E, Arnold LE. Dietary sensitivities and ADHD symptoms: thirty-five years of research. Clinical Pediatrics. 2011 Apr;50(4):279-93.

22. Stevenson J, Buitelaar J, Cortese S, Ferrin M, Konofal E, Lecendreux M, et al. Research Review: The role of diet in the treatment of attention–deficit/hyperactivity disorder–an appraisal of the evidence on efficacy and recommendations on the design of future studies. Journal of Child Psychology and Psychiatry. 2014 May;55(5):416-27.

23. Bateman B, Warner JO, Hutchinson E, Dean T, Rowlandson P, Gant C, et al.The effects of a double blind, placebo controlled, artificial food colourings and benzoate preservative challenge on hyperactivity in a general population sample of preschool children. Archives of Disease in Childhood. 2004 Jun 1;89(6):506-11.

24. McCann D, Barrett A, Cooper A, Crumpler D, Dalen L, Grimshaw K, et al. Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial. Lancet. 2007 Nov 3;370(9598):1560-7.

25. Kobylewski S, Jacobson MF. Food Dyes: A Rainbow of Risks. [Internet] Washington D.C.: Center for Science in the Public Interest; 2010. Available from: https://cspinet.org/new/pdf/food-dyes-rainbow-of-risks.pdf

26. U.S. Food and Drug Administration. CFR - Code of Federal Regulations Title 21, Section 81.10. Silver Spring: U.S. Food and Drug Administration; 2020 [cited 9 Jun 2021]. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=81.10

27. U.S. Food and Drug Administration. Questions and Answers on Caramel Coloring and 4-MEI [Internet]. Silver Spring: U.S. Food and Drug Administration; 2014 [updated 27 Mar 2020, cited 9 Jun 2021]. Available from: http://www.fda.gov/food/ingredientspackaginglabeling/foodadditivesingredients/ucm364184.htm

28. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Some Chemicals Present in Industrial and Consumer Products, Food and Drinking-Water, IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 2-METHYLIMIDAZOLE [Internet]. Geneva: World Health Organization; 2013; 101:435-445. Available from: http://monographs.iarc.fr/ENG/Monographs/vol101/mono101-014.pdf

29. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Some Chemicals Present in Industrial and Consumer Products, Food and Drinking-Water, IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 4-METHYLIMIDAZOLE [Internet]. Geneva: World Health Organization; 2013; 101:447-459. Available from https://monographs.iarc.fr/ENG/Monographs/vol101/mono101.pdf

30. Office of Environmental Health Hazard Assessment CEPA. The Proposition 65 List [Internet]. California: Office of Environmental Health Hazard Assessment CEPA; 2016 [updated 2021, cited 2021 Jun 9]. Available from: http://oehha.ca.gov/proposition-65/proposition-65-list

31. Code of Federal Regulations, Specific Food Labeling Requirements [Internet]. Washington, D.C.: U.S. Government Publishing Office; 1993 [updated 2021, cited 2021 Jun 9]. Available from: http://www.ecfr.gov/cgi-bin/text-idx?SID=4387710052bb3232d013ff06256a40fe&mc=true&node=sp21.2.101.b&rgn=div6

32. Neltner TG, Alger HM, O'Reilly JT, Krimsky S, Bero LA, Maffini MV. Conflicts of interest in approvals of additives to food determined to be generally recognized as safe: out of balance. JAMA Internal Medicine. 2013 Dec 9;173(22):2032-6.

33. Center for Science in the Public Interest. Chemical Cuisine, [Internet] Washington, D.C.: Center for Science in the Public Interest; 2014 [cited 2021 Jun 9]. Available from: http://www.cspinet.org/reports/chemcuisine.htm

34. Raiten DJ, Talbot JM, Fisher KD, editors. Executive summary from the report: analysis of adverse reactions to monosodium glutamate (MSG). The Journal of Nutrition. 1995 Nov 1;125(11):2891S-906S.

35. Zanfirescu A, Ungurianu A, Tsatsakis AM, Nițulescu GM, Kouretas D, Veskoukis A, et al. A review of the alleged health hazards of monosodium glutamate. Comprehensive Reviews in Food Science and Food Safety. 2019 Jul;18(4):1111-34.

36. National Toxicology Program, US Dept of Health and Human Services. 13th Report on Carcinogens [Internet]. Research Triangle Park: National Toxicology Program; 2014 [updated 2016; cited 2021 Jun 9]. Available from: https://ntp.niehs.nih.gov/whatwestudy/assessments/cancer/roc/index.html

37. Nieva–Echevarría B, Manzanos MJ, Goicoechea E, Guillén MD. 2, 6–Di–tert–butyl–hydroxytoluene and its metabolites in foods. Comprehensive Reviews in Food Science and Food Safety. 2015 Jan;14(1):67-80.

38. National Toxicology Program, US Dept. of Health and Human Services. Carcinogenesis Bioassay of Propyl Gallate in F344 Rats and B6C3F1 Mice [Internet]. Bethesda: National Toxicology Program; 1982 [cited 2021 Jun 9]. Available from: https://ntp.niehs.nih.gov/ntp/htdocs/lt_rpts/tr240.pdf

39. Pop A, Drugan T, Gutleb AC, Lupu D, Cherfan J, Loghin F, Kiss B. Estrogenic and anti–estrogenic activity of butylparaben, butylated hydroxyanisole, butylated hydroxytoluene and propyl gallate and their binary mixtures on two estrogen responsive cell lines (T47D–Kbluc, MCF–7). Journal of Applied Toxicology. 2018 Jul;38(7):944-57.

40. Abdo KM, Kari FW. The sensitivity of the NTP bioassay for carcinogen hazard evaluation can be modulated by dietary restriction. Experimental and Toxicologic Pathology. 1996 Feb 1;48(2-3):129-37.

41. Landrigan PJ, Straif K. Aspartame and cancer–new evidence for causation. Environmental Health. 2021 Dec;20(1):1-5.

42. Belpoggi F, Soffritti M, Padovani M, Esposti DD, Lauriola M, Minardi F. Results of long-term carcinogenicity bioassay on Sprague-Dawley rats exposed to aspartame administered in feed. Annals of the New York Academy of Sciences. 2006 Sep 1;1076(1):559-77.

43. Soffritti M, Belpoggi F, Tibaldi E, Esposti DD, Lauriola M. Life-span exposure to low doses of aspartame beginning during prenatal life increases cancer effects in rats. Environmental Health Perspectives. 2007 Sep;115(9):1293-7.

44. Soffritti M, Belpoggi F, Manservigi M, Tibaldi E, Lauriola M, Falcioni L, Bua L. Aspartame administered in feed, beginning prenatally through life span, induces cancers of the liver and lung in male Swiss mice. American Journal of Industrial Medicine. 2010 Dec;53(12):1197-206.

45. Soffritti M, Padovani M, Tibaldi E, Falcioni L, Manservisi F, Belpoggi F. The carcinogenic effects of aspartame: The urgent need for regulatory re–evaluation. American Journal of Industrial Medicine. 2014 Apr;57(4):383-97.

46. Tibaldi E, Gnudi F, Panzacchi S, Mandrioli D, Vornoli A, Manservigi M, Sgargi D, Falcioni L, Bua L, Belpoggi F. Identification of aspartame-induced haematopoietic and lymphoid tumours in rats after lifetime treatment. Acta Histochemica. 2020 Jul 1;122(5):151548.

47. Schernhammer ES, Bertrand KA, Birmann BM, Sampson L, Willett WC, Feskanich D. Consumption of artificial sweetener–and sugar-containing soda and risk of lymphoma and leukemia in men and women. American Journal of Clinical Nutrition. 2012 Dec 1;96(6):1419-28.

48. Soffritti M, Padovani M, Tibaldi E, Falcioni L, Manservisi F, Lauriola M, et al. Sucralose administered in feed, beginning prenatally through lifespan, induces hematopoietic neoplasias in male swiss mice. International Journal of Occupational and Environmental Health. 2016 Jan;22(1):7.

49. Horowitz BZ. Bromism from excessive cola consumption. Journal of Toxicology: Clinical Toxicology. 1997 Jan 1;35(3):315-20.

50. Chassaing B, Koren O, Goodrich JK, Poole AC, Srinivasan S, Ley RE, et al. Dietary emulsifiers impact the mouse gut microbiota promoting colitis and metabolic syndrome. Nature. 2015 Mar;519(7541):92-6.

51. International Agency for Research on Cancer (IARC). Summaries and Evaluations, Potassium Bromate (Group 2B) [Internet]. Lyon: IARC; 1999 [cited 2021 Jun 9]. Available from: http://www.inchem.org/documents/iarc/vol73/73-17.html

52. US EPA Integrated Risk Information System (IRIS). Bromate CASRN 15541-45-4, IRIS Assessments [Internet]. Washington, D.C.: US EPA; 2001 [cited 2021 Jun 9]. Available from: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=1002

53. Cañas BJ, Diachenko GW, Nyman PJ. Ethyl carbamate levels resulting from azodicarbonamide use in bread. Food Additives & Contaminants. 1997 Jan 1;14(1):89-94.

54. US Food and Drug Administration. Frequently Asked Questions on Azodicarbonamide (ADA) [Internet]. Silver Spring: US FDA; 2016 [updated 4 Jan 2018; cited 2021 Jun 9]. Available from: https://www.fda.gov/food/food-additives-petitions/azodicarbonamide-ada-frequently-asked-questions

55. Joint FAO/WHO Expert Committee on Food Additives, World Health Organization & Food and Agriculture Organization of the United States. Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation: Some Antimicrobials, Antioxidants, Emulsifiers, Stabilizers, Flour-Treatment Agents, Acids and Bases, Ninth report of the Joint FAO/WHO Expert Committee on Food Additives, [Internet]. Geneva: World Health Organization; 1965. Available from: https://apps.who.int/iris/handle/10665/39853

56. Leung AM, Braverman LE. Consequences of excess iodine. Nature Reviews Endocrinology. 2014 Mar;10(3):136-42.

57. Takegawa K, Mitsumori K, Onodera H, Shimo T, Kitaura K, Yasuhara K, Hirose M, Takahashi M. Studies on the carcinogenicity of potassium iodide in F344 rats. Food Chem Toxicol. 2000 Sep;38(9):773-81.

58. Center for Science in the Public Interest. Quorn [Internet]. Washington, D.C: Center for Science in the Public Interest; [no date] [cited 9 Jun 2021]. Available from: https://www.cspinet.org/eating-healthy/ingredients-concern/quorn

59. Jacobson MF, DePorter J. Self-reported adverse reactions associated with mycoprotein (Quorn-brand) containing foods. Annals of Allergy, Asthma & Immunology. 2018 Jun 1;120(6):626-30.

60. Center for Disease Control and Prevention. Top sources of sodium [Internet]. Atlanta: CDC; 2021 [cited 9 Jun 2021]. Available from: https://www.cdc.gov/salt/sources.htm

61. Appel LJ, Lichtenstein AH, Callahan EA, Sinaiko A, Van Horn L, Whitsel L. Reducing sodium intake in children: a public health investment. Journal of Clinical Hypertension. 2015 Sep;17(9):657-62.

62. American Heart Association. Sodium and Kids [Internet]. Dallas: American Heart Association; 2018 [cited 9 Jun 2021]. Available from: https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/sodium/sodium-and-kids#:~:text=How%20much%20sodium%20are%20children,sodium%20they%20tend%20to%20eat.

63. US Department of Agriculture, Food and Nutrition Service. Nutrition standards in the National School Lunch and school breakfast programs; final rule. Federal Register. 2012;77(17):4088-167.

64. US Food and Drug Administration. Added Sugars on the New Nutrition Facts Label [Internet]. Silver Spring: US FDA; 2020 [cited 9 Jun 2021]. Available from: https://www.fda.gov/food/new-nutrition-facts-label/added-sugars-new-nutrition-facts-label

65. Centers for Disease Control and Prevention. Get the Facts: Added Sugars [Internet]. Atlanta: Centers for Disease Control and Prevention; 2021 [cited 9 Jun 2021]. Available from: https://www.cdc.gov/nutrition/data-statistics/added-sugars.html

66. Centers for Disease Control and Prevention. Know Your Limit for Added Sugars [Internet]. Atlanta: Centers for Disease Control and Prevention; 2021 [cited 9 Jun 2021]. Available from: https://www.cdc.gov/healthyweight/healthy_eating/sugar.html

67. Centers for Disease Control and Prevention. Get the Facts: Sugar-Sweetened Beverages and Consumption [Internet]. Atlanta: Centers for Disease Control and Prevention; 2021 [cited 9 Jun 2021]. Available from: https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html

68. Welsh JA, Sharma A, Abramson JL, Vaccarino V, Gillespie C, Vos MB. Caloric sweetener consumption and dyslipidemia among US adults. Journal of American Medical Association. 2010 Apr 21;303(15):1490-7.

69. Fung TT, Malik V, Rexrode KM, Manson JE, Willett WC, Hu FB. Sweetened beverage consumption and risk of coronary heart disease in women. American Journal of Clinical Nutrition. 2009 Apr 1;89(4):1037-42.

70. Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. American Journal of Public Health. 2007 Apr;97(4):667-75.

71. Johnson RK, Appel LJ, Brands M, Howard BV, Lefevre M, Lustig RH, et al. Dietary sugars intake and cardiovascular health: a scientific statement from the American Heart Association. Circulation. 2009 Sep 15;120(11):1011-20.

72. Ervin RB. Consumption of added sugar among US children and adolescents, 2005-2008. US Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2012.

73. Welsh JA, Sharma AJ, Grellinger L, Vos MB. Consumption of added sugars is decreasing in the United States. American Journal of Clinical Nutrition. 2011 Sep 1;94(3):726-34.

74. Ervin RB, Ogden CL. Consumption of added sugars among US adults, 2005-2010. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2013.

75. Bowman SA, Clemens JC, Martin CL, Anand J, Steinfeldt LC, Moshfegh AJ. Added Sugars Intake of Americans: What We Eat in America, NHANES 2013-2014 [Internet]. Washington, D.C: US Department of Agriculture; 2017. Available from: https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/DBrief/18_Added_Sugars_Intake_of_Americans_2013-2014.pdf

76. Putnam JJ, Allshouse JE. Food consumption, prices, and expenditures, 1970-97 [Internet]. Washington, D.C.: US Department of Agriculture; 1999. Available from: https://www.ers.usda.gov/publications/pub-details/?pubid=47115

77. Wibbertmann A, Kielhorn J, Koennecker G, Mangelsdorf I, Melber C. Benzoic Acid and Sodium Benzoate [Internet]. Geneva: World Health Organization; 2000. Available from: http://www.who.int/ipcs/publications/cicad/cicad26_rev_1.pdf

78. US Food and Drug Administration. Data on Benzene in Soft Drinks and Other Beverages [Internet]. Silver Spring: US FDA; 2006 [cited 9 Jun 2021]. Available from: http://wayback.archive-it.org/7993/20170112012123/http://www.fda.gov/Food/FoodborneIllnessContaminants/ChemicalContaminants/ucm055815.htm

79. Timbo B, Koehler KM, Wolyniak C, Klontz KC. Sulfites—a Food and Drug Aadministration review of recalls and reported adverse events. Journal of Food Protection. 2004 Aug 1;67(8):1806-11.

80. Food Allergy Research and Resource Program. Sulfites - USA [Internet]. Lincoln: Institute of Agriculture and Natural Resources; 2004 [cited 9 Jun 2021]. Available from: http://farrp.unl.edu/sulfites-usa

81. American Academy of Child & Adolescent Psychiatry. Caffeine and Children [Internet]. Washington, D.C.:American Academy of Child & Adolescent Psychiatry; 2020 [cited 9 Jun 2021]. Available from: aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Caffeine_and_Children-131.aspx

82. U.S. Food and Drug Administration. Spilling the Beans: How Much Caffeine is Too Much? [Internet]. Silver Spring: U.S. Food and Drug Administration; 2018 [cited 9 Jun 2021]. Available from: https://www.fda.gov/consumers/consumer-updates/spilling-beans-how-much-caffeine-too-much

83. American Bone Health. Kids and Caffeine [Internet]. Raleigh: American Bone Health; 2019 [cited 17 Jun 2021]. Available from: https://americanbonehealth.org/best-bones-forever/kids-and-caffeine-2/?highlight=caffeine

84. Temple JL. Caffeine use in children: what we know, what we have left to learn, and why we should worry. Neuroscience & Biobehavioral Reviews. 2009 Jun 1;33(6):793-806.

85. US Food and Drug Administration. Listing of Color Additives Exempt From Certification; Food, Drug, and Cosmetic Labeling: Cochineal Extract and Carmine Declaration [Internet]. Washington, D.C.: Federal Register; 2009. Available from: https://www.federalregister.gov/documents/2009/01/05/E8-31253/listing-of-color-additives-exempt-from-certification-food-drug-and-cosmetic-labeling-cochineal

86. Aaslyng MD, Martens M, Poll L, Nielsen PM, Flyge H, Larsen LM. Chemical and sensory characterization of hydrolyzed vegetable protein, a savory flavoring. Journal of Agricultural and Food Chemistry. 1998 Feb 16;46(2):481-9.

87. EFSA Panel on Contaminants in the Food Chain (CONTAM). Risks for human health related to the presence of 3–and 2–monochloropropanediol (MCPD), and their fatty acid esters, and glycidyl fatty acid esters in food. Efsa Journal. 2016 May;14(5):e04426.

88. Scopp AL. MSG and hydrolyzed vegetable protein induced headache: review and case studies. Headache: Journal of Head and Face Pain. 1991 Feb;31(2):107-10.

89. Bird RP, Eskin NM. The emerging role of phosphorus in human health. Advances in Food and Nutrition Research. 2021 Apr 15;96:27-88.

90. Ritz E, Hahn K, Ketteler M, Kuhlmann MK, Mann J. Phosphate additives in food—a health risk. Deutsches Ärzteblatt International. 2012 Jan;109(4):49.

91. Nadkarni GN, Uribarri J. Phosphorus and the kidney: what is known and what is needed. Advances in Nutrition. 2014 Jan;5(1):98-103.

92. Calvo MS, Moshfegh AJ, Tucker KL. Assessing the health impact of phosphorus in the food supply: issues and considerations. Advances in Nutrition. 2014 Jan;5(1):104-13.

93. International Agency for Research on Cancer (IARC). IARC Monographs evaluate consumption of red meat and processed meat [Internet]. Lyon: IARC; 2015. Available from: https://www.iarc.who.int/wp-content/uploads/2018/07/pr240_E.pdf

94. Saiz AI, Manrique GD, Fritz R. Determination of benzoyl peroxide and benzoic acid levels by HPLC during wheat flour bleaching process. Journal of Agricultural and Food Chemistry. 2001 Jan 15;49(1):98-102.

95. Adelman M, Mohammad T, Kerr H. Allergic Contact Dermatitis Due to Benzoyl Peroxide From an Unlikely Source. Dermatitis. 2019 May 1;30(3):230-1.

96. U.S. Department of Health and Human Services, Food and Drug Administration, Center for Food Safety and Applied Nutrition. The Declaration of Allulose and Calories from Allulose on Nutrition and Supplement Facts Labels: Guidance for Industry [Internet]. Silver Spring: US Food and Drug Administration; 2020. Available from: https://www.fda.gov/media/123342/download

97. Center for Science in the Public Interest. CSPI Comments on FDA Draft Guidance re: Declaration of Allulose [Internet]. Washington, D.C.: Center for Science in the Public Interest; 2019. Available from: https://cspinet.org/resource/cspi-comments-fda-draft-guidance-re-declaration-allulose

98. Zhanjiang Fisheries College. Properties, manufacture and application of seaweed polysaccharides- agar, carrageenan and algin. In: Training Manual on Gracilaria Culture and Seaweed Processing in China [Internet]. Zhanjiang: Food and Agriculture Organization of the UN; 1990. Available from: http://www.fao.org/3/AB730E/AB730E03.htm

99. EFSA Panel on Food Additives and Nutrient Sources added to Food (ANS), Younes M, Aggett P, Aguilar F, Crebelli R, Filipič M, Frutos MJ, Galtier P, Gott D, Gundert–Remy U, Kuhnle GG. Re–evaluation of carrageenan (E 407) and processed Eucheuma seaweed (E 407a) as food additives. EFSA Journal. 2018 Apr;16(4):e05238. Available from: https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2018.5238

100. International Agency for Research on Cancer. Some Food Additives, Feed Additives and Naturally Occurring Substances [Internet]. Geneva: World Health Organization; 1983. Available from: https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Some-Food-Additives-Feed-Additives-And-Naturally-Occurring-Substances-1983