

# Nutrition Perspectives

University of California, Davis, Department of Nutrition and the Center for Nutrition in Schools

## Potential Treatment May Lower Severity of Allergic Reaction in Those with Peanut Allergies

Peanut allergy is one of the most common food allergies; for some, exposure to peanuts can be life-threatening. Treatment of peanut allergies involves complete avoidance, or when exposure inadvertently takes place, rescue medications such as an epinephrine autoinjector (commonly referred to as an EpiPen).

One potential method of reducing severity of an allergic reaction when accidental exposure occurs is by increasing the tolerance to peanut protein through desensitization. Over time, gradually exposing patients to increasing amounts of peanut protein in a controlled environment is thought to raise the threshold of exposure needed for a severe reaction to occur. AR101 is a new drug developed from de-fatted peanut flour to assist with maintaining the higher threshold for a reaction. Using a double-blind, placebo-controlled study, researchers evaluated the safety and effectiveness of the drug in maintaining tolerance to 600 mg of peanut protein (the equivalent of two peanut kernels) (1).

At the start of the trial, participants (n=551) were randomly assigned to either AR101 or placebo in a 3:1 ratio. After randomization, trial participants received gradually increasing amounts of AR101 or



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placebo every two weeks for the first six months, starting with an initial dose of 0.5 mg. Once participants reached a dose of 300 mg, they received daily doses of 300 mg of AR101 or placebo to consume at home for maintenance. Following six months of maintenance, participants underwent a food challenge test that involved consuming gradually increasing doses of peanut protein, up to 1000 mg, as tolerated.

Among participants aged 4-17 years, 67 percent in the AR101 group were able to tolerate a dose of up to 600 mg of peanut protein compared to 4 percent in the placebo group ( $p < .001$ ). Before the study began, most could tolerate no more than 30 mg, the equivalent of one-tenth of a peanut kernel. In adults aged 18-55 years, 41.5 percent and 14.3 percent of the AR101 and placebo groups respectively tolerated the 600 mg dose, however the difference was not statistically significant.

While the treatment was effective at raising and maintain tolerance for peanut

protein, nearly all participants in the AR101 group experienced adverse events. These ranged from mild to severe (though none were categorized as life-threatening) and 14 percent required the administration of epinephrine. An associated editorial also cautioned that the long-term side effects of continuing to consume an allergen that produces an immune response is unknown (2). The editorial also pointed out that families are not likely to be interested in the maximum dose their child can tolerate, but

rather how much they can tolerate without any symptoms.

Despite these caveats, this type of treatment holds promise in reducing the severity of allergic reactions to accidental exposure. More research is needed to determine how this treatment could best be administered and what the long-term effects might be.



*Reserachers found that a larger percentage of those in the AR101 group were able to tolerate a dose of up to 600 mg of peanut protein.*

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## Changes to School Meals Impact Milk, Whole Grains, and Sodium Requirements



*With the new flexibilities, half of all grains served in school meals will be required to be whole grain-rich.*

fat) and flavored milk could only be offered if it was non-fat. Under this new rule, schools would also be able to offer low-fat flavored milk.

The second change impacts the requirement that *all* grains served must be whole grain-rich (at least 51 percent whole grain). Since February 2015, the USDA allowed states to grant waivers to the whole grain-rich requirement, provided schools could document that the requirement was causing a hardship. The new requirement would eliminate the waiver and instead relax the standard to require that *half* of grains served be whole grain-rich.

Lastly, the final rule impacts the sodium requirements that were to be implemented over the course of several years. The initial sodium reduction targets were to be rolled out in a step-wise

In December the USDA announced revisions to the National School Lunch Program standards to go into effect in February 2019 (1). While the changes have received a great deal of attention in the media as a “substantial relaxation in federal standards (2),” what do they really entail?

The USDA refers to the changes as menu planning flexibilities, and they are limited to three areas (3). The first is regarding milk options. When the Healthy, Hunger-Free Kids Act initially went into effect, schools were allowed to offer either plain or flavored milk, but plain milk could only be non-fat or low-fat (1 percent milk



*Over the course of several years, three gradually-reducing sodium targets were to be met. Target 3 is eliminated by the new rule.*

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## School Meals (Continued from page 3)

fashion, with Target 1 going into effect in 2014, Target 2 in 2017, and Target 3 in 2022. An interim rule published on November 30, 2017 retained Target 1 for another two school years. The final rule continues to push back Target 2, which is now set to go into effect in 2024. It also eliminates Target 3 entirely.

It's important to note that the school meal standards are the minimum that schools have to follow and there is nothing preventing schools and school districts from choosing to hold their meals to a higher standard. While many schools will choose to adhere to the new minimums, many will likely choose to continue with the regulations they have become accustomed to, and others will choose to go above and beyond.

Overall, these changes, while comparatively minor, may lead to students consuming more sodium and fewer whole grains than they would have under the previous requirements. However, a press release from the School Nutrition Association praised the new requirements, stating that they will "entice more students to eat healthy school meals, which meet calorie limits and offer fruits, vegetables, and milk" (4). With studies suggesting that packed lunches brought from home tend to be less healthy than school lunches (5), research is needed to determine how these changes will ultimately impact child health.



*While salt is most commonly associated with sodium in food, other food ingredients may contribute to sodium content, such as baking soda (sodium bicarbonate).*

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## Unapproved Pharmaceuticals in Dietary Supplements

How sure are you of the ingredients in your dietary supplements? In addition to what is listed on the label, there may also be unapproved pharmaceuticals, especially in supplements marketed for sexual enhancement, weight loss, or muscle building (1).

To help keep consumers informed, the Food and Drug Administration (FDA) maintains a searchable database, the Tainted Products Marketed as Dietary Supplements\_CDER (also referred to as the Tainted Supplements database) to inform consumers of adulterated supplements that have been subject to an FDA warning. Researchers at the California Department of Public Health reviewed the database for adulterated supplements associated with a warning between 2007 and 2016 to identify trends. They identified 776 adulterated supplements over this time period, all of which contained unapproved pharmaceutical ingredients ranging from antidepressants, to drugs used to treat erectile dysfunction, to banned laxatives. While most contained only one drug, over 20 percent contained two or more, and two products each contained six different unapproved drug ingredients.

Of the 776 products, 353 were marketed for sexual enhancement. The majority of these (81 percent) contained sildenafil (commonly known as Viagra) or an analogue that could be metabolized in the body into the active form. In addition, 20 percent contained tadalafil (known by the brand name Cialis) and 1 percent contained vardenafil (also known by the brand name Levitra). In addition, antidepressants were found in 4 percent of these supplements.



*To help keep consumers informed, the FDA maintains a searchable database of tainted supplements.*



*The study identified over 700 products over 9 years that had been adulterated with pharmaceuticals.*

The next largest category of adulterated supplements were those marketed for weight loss. Of the 317 products, most contained drugs that were removed from the market due to safety concerns. The majority (85 percent) contained sibutramine, a weight loss drug banned in 2010 due to cardiovascular risks. The laxative phenolphthalein, banned in 1999 due to potential carcinogenic risks, was detected in 24 percent of

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## Supplements (Continued from page 5)



*Adulterated weight loss supplements commonly contained drugs that have been banned from the market, such as sibutramine or phenolphthalein.*

Unlike prescription drugs, these adulterated supplements contain unknown quantities of the active pharmaceuticals, with no prescribing physician oversight, information about contraindications, potential warnings, or drug-drug interactions. Those with pre-existing health conditions or already taking prescribed medications are at additional risk. One example the researchers highlighted was the potential interaction of sildenafil with nitrates found in drugs used to treat diabetes, high blood pressure, or other conditions. Men on nitrates who are advised not to use drugs like sildenafil due to potentially life-threatening interactions may instead turn to supplements with the presumption of safety, unaware they may be consuming the same pharmaceutical they were advised to avoid.

Each year, it is estimated there are over 20,000 emergency room visits and 2,000 hospitalizations linked to dietary supplements, further highlighting the risks of adverse health effects (2). "As the dietary supplement industry grows in the United States, it is essential to further address this significant public health issue," the researchers concluded.

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supplements.

Of the 92 supplements marketed as muscle building, nearly all contained steroids or steroid-like ingredients (89 percent) or aromatase inhibitors (11 percent), which block estrogen receptors and are used to treat some types of breast cancer.

It is unclear exactly how widespread the issue of adulteration with pharmaceuticals is, as these findings were limited to the supplements tested by the FDA, which does not report the numbers and varieties of products tested. Further, FDA sampling has concentrated on online sales or import screening, which leaves out retail establishments entirely.

Adulterated dietary supplements present health risks to consumers for a variety of reasons.



*Muscle building supplements were among the most common adulterated supplements.*

## Cannabis Use and Risk of Diabetic Ketoacidosis in Adults with Type 1 Diabetes



*Diabetic ketoacidosis is a potentially serious condition characterized by high blood sugar and large amounts of ketones in the blood stream.*

In the last few years, several states across the US have legalized the use of cannabis products for medical or recreational use. While there has been widespread media attention about potentially therapeutic uses, including for Type 2 diabetes, limited research is available about the potential drawbacks of cannabis use for those with conditions such as Type 1 diabetes (T1D). After noticing a trend of diabetic ketoacidosis with cannabis use in patients with T1D, researchers conducted a study to investigate the potential link (1,2).

The study took place at the Barbara Davis Center for Diabetes in Colorado, where cannabis was legalized for recreational use in 2014. Adult patients with T1D (n=450) were invited to complete a questionnaire that included questions about cannabis use, diabetes history, and demographic information. In addition, hemoglobin A<sub>1c</sub>, an overall measure of blood glucose control, was assessed during the clinic visit in which the questionnaire was completed.

Using logistic regression and controlling for potentially-related factors, such as age, sex, income, insurance, and education level, researchers found that cannabis use within the previous 12 months was associated with an increased risk of diabetic ketoacidosis, a potentially serious condition in which the body produces large amounts of ketones that build up in the bloodstream. In addition, cannabis users were also found to have a mean HbA<sub>1c</sub> level 0.41 percentage points higher (8.3 percent compared to 7.9 percent in non-users). The American Diabetes Association recommends a target of less than 7 percent for adults with T1D (3).

The researchers speculated that the increased risk for diabetic ketoacidosis might arise from the effects of cannabis on the gastrointestinal tract; research suggests that cannabinoids may cause hyperemesis and impact gut motility (1,4). However, they did caution that the small sample size, the single study location, and the possibility of unmeasured confounders limit the generalizability of the results of this study. Further research is needed to elaborate on the effects of cannabis use on patients with T1D.



*Cannabis users were found to have higher hemoglobin A<sub>1c</sub> levels compared to non-users.*

*Ketoacidosis Continued with references on Page 8*

## Ketoacidosis (Continued from page 7)

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## Some Facts About Water

### What are the functions of water in the body?

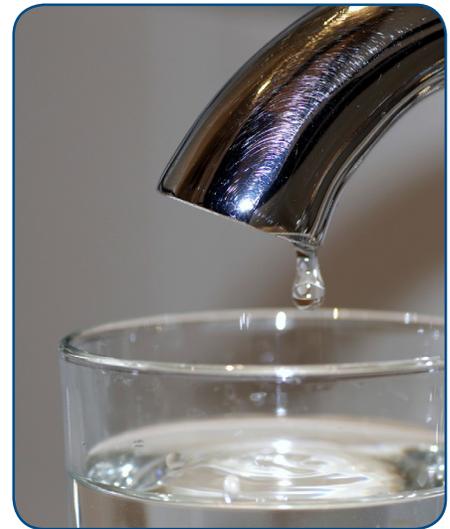
Water is a simple molecule composed of two hydrogen atoms attached to one oxygen atom. It accounts for 55% - 65% of the human body (1). Water is most often thought of in its roles in bodily fluids, such as blood and saliva, but the majority of water in the human body is actually located within cells. Approximately two-thirds of total body water resides as intracellular fluid, compared to the one-third in the extracellular fluid (2). Within all cells, water serves vital functions involved in transport, waste management, and energy metabolism (3).

Many biological processes require water. It is critical for maintaining body temperature and is used in waste disposal to dilute harmful compounds such as urea (3).

### What are the recommendations for water intake?

Water intake is extremely variable from day to day, and from person to person (4,5). While a Recommended Dietary Allowance (RDA) is not currently established for water, Adequate Intake (AI) levels have been set as 2.7-3.7 liters per day for healthy adults (6,7). It is important to note that water from other foods and beverages also counts toward this total. Moisture in fruits, vegetables, and other foods account for approximately 20% of daily intake (7).

Daily water consumption varies significantly between individuals, and differences can be based on many factors (5). Those who partake in vigorous exercise may have greater water needs, due to increased losses from sweating. Elderly individuals may also have higher water needs, as advanced age has been associated with greater risk of dehydration due to lower body fluid volume. Parents and caregivers of young children should also be mindful of a child's water needs, especially during play and warm weather (8,9).



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### What is dehydration and how is it prevented?

Dehydration can occur when fluid losses exceed fluid intake. Although marketing efforts from beverage companies often cite dehydration as a major concern, dehydration in healthy individuals is easily avoidable (10)

Fluid balance is tightly regulated, both in terms of consumption cues (thirst) and water losses. When the body loses fluids, fluid volume in the body decreases, signaling a hormonal response that reduces fluid losses by concentrating urine and increasing fluid intake through increased thirst (11). By decreasing fluid excretion and increasing fluid consumption, the resulting increase in extracellular fluid volume signals an end to these responses, and water balance is restored (2).

In the event that measures to restore fluid balance fail, dehydration can occur. Symptoms can range from moderate to severe, as described in Table 1.

### What is water toxicity?

There is no recorded Toxic Upper Limit (UL) for water, although there have been cases where injury or death has occurred after drinking excessive amounts of water. Normally functioning kidneys are able to handle and excrete enough water to maintain fluid balance. High levels of water intake result in increased frequency of urination, resulting in urine with a very light-yellow color, or perceived as clear.

Acute water toxicity and even death have been reported in rare cases wherein individuals consumed large quantities of water,

which diluted solutes in the body, most notably sodium (13). Reports of hyponatremia (low blood sodium levels) have occurred when endurance athletes replenish water during events like marathons, with little replenishment of sodium. This Exercise-associated hyponatremia (EAH) features symptoms of nausea, vomiting, fatigue, and impaired performance. If left untreated, a continued reduction in serum sodium levels may



result in hyponatremic encephalopathy (EAHE), which is characterized by headache, convulsions/seizures, and/or coma (14,15). The American College of Sports Medicine recommend that fluids used to replace those lost during endurance events contain carbohydrates and electrolytes (16).

### Is there a difference between bottled and tap water?

Objectively, bottled and tap water are equivalent products. Consumers have many reasons for choosing to drink one over the other, including taste, odor and appearance differences, health perceptions, mineral content (hardness), and as substitutes for other beverages (17). Another reason consumers may prefer bottled over tap water are concerns regarding safety. Bottled water companies have been observed to market their products as being “safer” than municipal water supplies. However, due to very stringent tap water regulations from the Environmental Protection Agency and the Food and Drug Administration, tap water is considered safer than bottled water (18,19).

Heavy metal toxicity has been a concern

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## Water (Continued from page 9)

in the US, particularly in vulnerable groups, such as children. To ensure the safety of citizens, Congress passed the Safe Drinking Water Act in 1974. This act stated that contaminants in the water, ranging from heavy metals like lead and copper to microbial contamination, must be kept below levels that would result in harm to an individual. To protect water safety, pollution is regulated at many levels, including protecting the water source, treating the water, maintaining its distribution, and working to provide the public with up-to-date information about any changes in water safety (20). These standards are not in place for private-use water sources, including bottled water.



### **Are there benefits or risks associated with sports drinks, alkaline water, and raw water?**

Sports drinks, such as Gatorade®, have been advertised since the 1970's as athletic hydration and carbohydrate replacement tools, and since that time, these have been marketed more broadly to the general public. Data from the 2010 National Youth Physical Activity and Nutrition survey of high school students indicate that 16 percent of these students consume one or more sports drinks daily, with students who are not active for >60 minutes daily more likely to consume these beverages. The American Academy of Pediatrics does not recommend the use of sports drinks for general hydration, citing plain water as being adequate to meet the needs of hydration, while not providing an excess of added sugar to the diet (21).

Although sports drinks are typically marketed as superior hydration sources for athletes, the Institute of Medicine has found that evidence for this claim is lacking, and that studies done on the efficacy of sports drinks in trained athletes often contain conflicts of interest (22).

Both alkaline and untreated water (currently referred to as "raw water") have more recently been introduced by the water industry. Alkaline water refers to water that is more alkaline, or basic, than typical tap or bottled water, with a pH of up to 8.8, rather than 6.7-7.4.

The higher pH has been observed to permanently denature pepsin, and consumption of this product may be beneficial as part of a low-acid diet in treating acid reflux (22). It is marketed as a superior product for its proposed potential to support an ideal body pH, although health claims for this product are not currently supported by scientific literature (23).

Raw water is similar to bottled water, with the major difference being that it is marketed as being untreated, unfiltered, and unmodified in any way before being sold to the consumer (24,25). As this water comes from private sources, it is not subject to the same rigorous standards set in place for municipal water sources by the EPA. Consumers and raw water advocates do not report health claims associated with this product. However, due to the lack of safety regulations in place for this product, it is not recommended for consumption. Risks of consuming raw water include exposure to water-borne parasites and bacteria, which can cause severe illness (26).

*Water Continued on page 11*

## Water (Continued from page 10)

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## Say No to Raw Dough!



*Raw flour and eggs may contain harmful bacteria, such as *E. coli* or *Salmonella*.*

There are many special occasions through the year that are perfect to spend time with loved ones while preparing delicious baked foods in the kitchen. Follow these safety tips to help you and your loved ones stay healthy when handling raw dough.

When you prepare homemade cookie dough, cake mixes, or even bread, you may be tempted to taste a bite before it is fully cooked. But steer clear of this temptation—eating or tasting unbaked products that are intended to be cooked, such as dough or batter, can make you sick. Children can get sick from handling or eating raw dough used for crafts or play clay, too.

### Raw Dough Can Contain Bacteria That Cause Disease

Flour is typically a raw agricultural product which means it hasn't been treated to kill germs like *Escherichia coli* (*E. coli*). Harmful germs can contaminate grain while it's still in the field or at other steps as flour is produced. The bacteria are killed when food made with flour is cooked. This is why you should never taste or eat raw dough or batter—whether made from recalled flour or any other flour. In 2016, an outbreak of *E. coli* infections linked to raw flour made 63 people sick. Flour products have long shelf lives and could be in people's homes for a long time. If you have any recalled flour products in your home, throw them away (see below for where to find out if you have any recalled products).

In addition, raw eggs that are used to make dough or batter can contain a germ called *Salmonella* that can make you sick if the eggs are eaten raw or lightly cooked. Eggs are safe to eat when cooked and handled properly.

### Follow safe food-handling practices when you are baking and cooking with flour and other raw ingredients:

- Do not taste or eat any raw dough or batter, whether for cookies, tortillas, pizza, biscuits, pancakes, or crafts made with raw flour, such



*Do not let children play with or eat raw dough, including dough for crafts.*

*Raw Dough Continued on page 13*

## Raw Dough (Continued from page 12)

as homemade play dough or holiday ornaments.

- Do not let children play with or eat raw dough, including dough for crafts.
- Bake or cook raw dough and batter, such as cookie dough and cake mix, before eating.
- Follow the recipe or package directions for cooking or baking at the proper temperature and for the specified time.
- Do not make milkshakes with products that contain raw flour, such as cake mix.
- Do not use raw, homemade cookie dough in ice cream.
- Cookie dough ice cream sold in stores contains dough that has been treated to kill harmful bacteria.
- Keep raw foods such as flour or eggs separate from ready-to eat-foods. Because flour is a powder, it can spread easily.
- Follow label directions to refrigerate products containing raw dough or eggs until they are cooked.
- Clean up thoroughly after handling flour, eggs, or raw dough.
- Wash your hands with running water and soap after handling flour, raw eggs, or any surfaces that they have touched.
- Wash bowls, utensils, countertops, and other surfaces with warm, soapy water.



*Wash your hands with running water and soap after handling flour, raw eggs, or any surfaces they have touched.*

### Is recalled flour in your kitchen?

In 2016, a large outbreak of *E. coli* infections made people sick in 24 states. Disease detectives linked the illnesses to flour sold under several brand names, including Gold Medal, Gold Medal Wondra, and Signature Kitchens.

This flour, and baking mixes and other foods containing this flour, were recalled.

Check your pantry and throw away any recalled products. For more info, visit: <https://www.cdc.gov/ecoli/2016/o121-06-16/advice-consumers.html>.

If you stored flour in a container and no longer have the package, throw out the flour to be safe. Make sure that you clean your container with warm, soapy water before using it again.

*Raw Dough Continued on Page 14*

## Raw Dough (Continued from page 13)

### Pay Close Attention to Any Symptoms

Food poisoning symptoms may range from mild to severe and may differ depending on the germ you swallowed. The symptoms of *E. coli* infections vary for each person but often include severe stomach cramps, diarrhea (often bloody), and vomiting.



*If you store flour in a container and no longer have the package, throw out the flour to be safe.*

People usually get sick 3 to 4 days after swallowing the germ. Most people recover within a week. However, some people develop a serious type of kidney failure called hemolytic uremic syndrome (HUS).

The symptoms of *Salmonella* infections typically appear 6 to 48 hours after eating a contaminated food, though this period is sometimes longer. Symptoms typically include diarrhea, fever, and abdominal cramps. In most cases, illness lasts 4 to 7 days and people recover without antibiotics. Illness from *Salmonella* bacteria can be serious and is more dangerous for older adults, infants, and people with weakened immune systems.

Source: Centers for Disease Control and Prevention. CDC Features. December 3, 2018. <https://www.cdc.gov/features/no-raw-dough/index.html>

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## Celebrate Holiday Bounty and Give Back – USDA Tips to Reduce Food Loss and Waste

The holidays are a time for entertaining and for giving back. USDA's food loss and waste initiative offers tips on making the most of both sides of the season.

In the U.S. alone, it is estimated that between 30-40 percent of the food supply is wasted. For the average family, \$1,500 is spent on wasted food each year. As families and friends mark the year's end, there are many ways to keep the feast out of the landfill.

### Plan for the party.

Are you hosting a holiday party for five,

*Food Waste Continued on page 15*



*Before shopping for holiday meals, check your kitchen pantry to make sure you aren't buying products you already have.*

## Food Waste (Continued from page 14)

ten, or 20 guests? Plan your menu and make a grocery list. Before you hit the supermarket, check your kitchen pantry. Not sure what you can use? Remember, just because a food's "sell by" date has passed does not mean you have to toss it. Get started with this USDA food product dating fact sheet, available at: <https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/food-labeling/food-product-dating/food-product-dating>.



### Don't let leftovers languish!

How long can you keep leftovers after the party? Find the answer right on your smartphone with the FoodKeeper App. This free, online app created by USDA, Cornell University, and the Food Marketing Institute offers tips on storage times for more than 500 fresh and shelf-stable foods. Learn more at: <https://www.foodsafety.gov/keep/foodkeeperapp/index.html>.

*Take advantage of leftovers by learning how long they can safely be stored with the FoodKeeper App.*

### After you celebrate, donate!

Did you know that the U.S. government encourages the donation of food and grocery products to nonprofit organizations for distribution to those in need? There are also Good Samaritan food donation liability protections (1) for persons and businesses who donate food to nonprofit organizations. Unopened food from that catered holiday party at work or kitchen pantry at home would make a perfect contribution to a local charity's holiday offerings. Food donations are eligible for charitable tax deductions when donating to a nonprofit organization.

USDA is a partner in the Winning on Reducing Food Waste initiative, a joint agreement (2) with the U.S. Environmental Protection Agency and the U.S. Food and Drug Administration, aimed at reducing food loss and waste through combined and agency-specific action. Other collective efforts include the U.S. Food Loss and Waste 2030 Champions, a group of more than 20 businesses that have made a public commitment to reduce food loss and waste in their own operations in the United States by 50 percent by the year 2030. Learn more at the USDA Food Loss and Waste website at <https://www.usda.gov/foodlossandwaste>.

#### References:

1. Bill Emerson Good Samaritan Food Donation Act, P.L. No 104-210, §110 Stat. 3011 (1996).
2. Winning on Reducing Food Waste Initiative. [Internet]. October 18, 2018. Available from: <https://www.usda.gov/sites/default/files/documents/usda-fda-epa-formal-agreement.pdf>

Source: USDA Press Releases. December 21, 2018. <https://www.usda.gov/media/press-releases/2018/12/21/celebrate-holiday-bounty-and-give-back-usda-tips-reduce-food-loss>

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