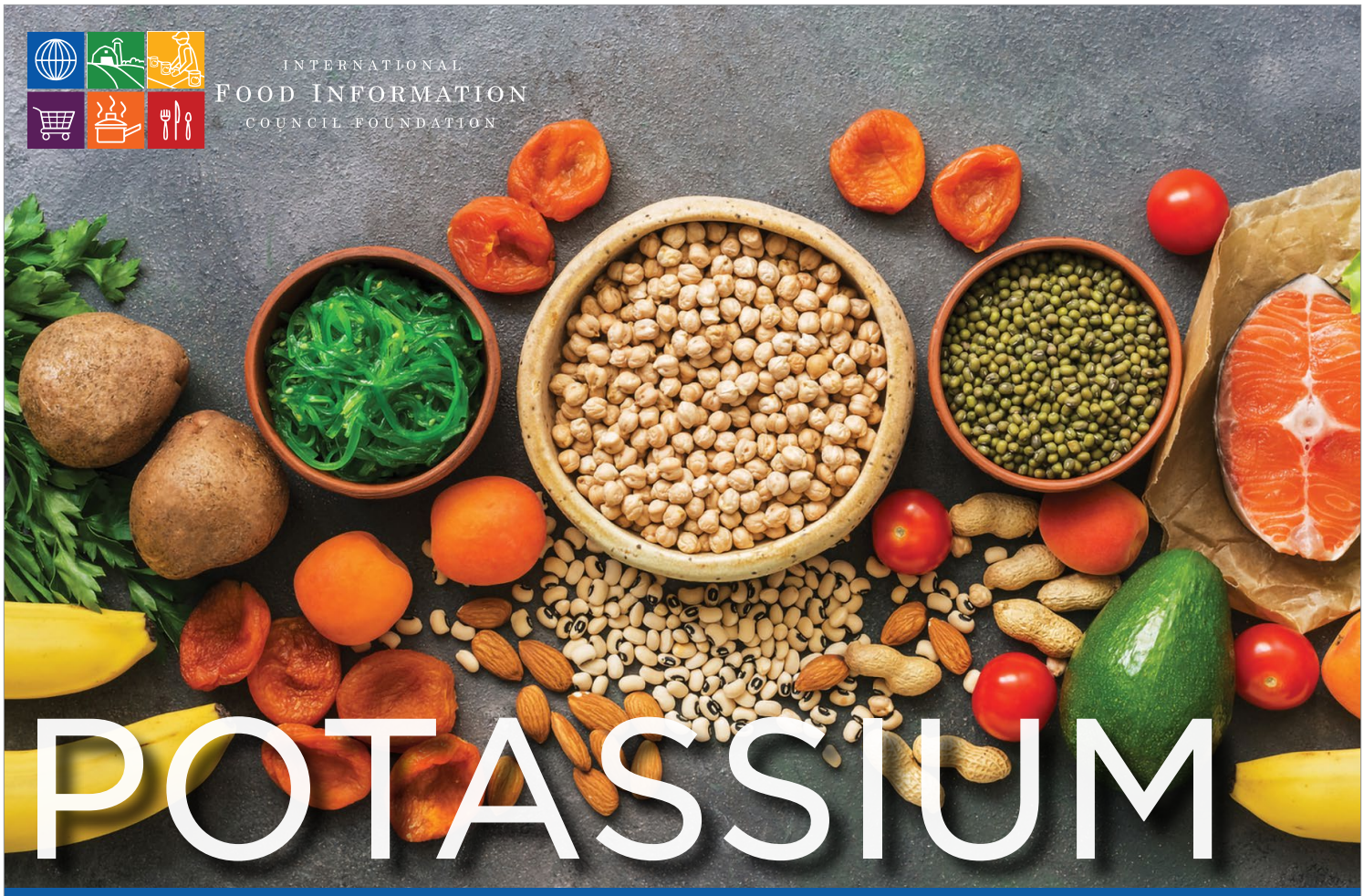


INTERNATIONAL FOOD INFORMATION COUNCIL FOUNDATION

POTASSIUM

BY THE INTERNATIONAL FOOD INFORMATION COUNCIL FOUNDATION

FOODINSIGHT.ORG

Potassium is a nutrient that is essential for health at the most basic level – it keeps the body's cells functioning properly. Along with sodium and other compounds, potassium is an electrolyte, working to regulate the balance of body fluids. These actions affect nerve signaling, muscle contraction, and the tone of blood vessels, with far-reaching impacts on the body.

POTASSIUM AND HUMAN HEALTH

Potassium plays a critical role in human health. It is involved in maintaining blood pressure and reducing risk of stroke, preserving calcium stores in bone and helping the kidneys work efficiently.[1-5] Dietary potassium is beneficial on its own and through its effects on the body's management of sodium. The benefits of potassium on hypertension and stroke are also captured within the U.S. Food and Drug Administration's health claim, which states, "Diets containing foods that are good sources of potassium and low in sodium intake may reduce the risk of high blood pressure and stroke."[6]

Potassium and sodium are both essential nutrients that interact with each other within the body. Potassium is pulled into cells while sodium is pushed out, and this interaction helps to power the transmission of signals along nerves and the contraction of muscles. Both nutrients are used to help maintain fluid and blood volume in the body. However, detrimental issues may arise when potassium intake is insufficient and/or when sodium intake is too high.

The sodium to potassium ratio provides a method of assessing sodium intake compared with potassium intake. Ideally, sodium intake values should be less than potassium; however, that typically is not the case. Today, average sodium intake (3,400 milligrams (mg)/day) is higher than average potassium intake (2,500 mg/day), a ratio of 1.36 to 1.[7] Greater intake of potassium-containing foods combined with reductions in sodium intake can reverse this ratio.

Potassium and Hypertension

There is a strong relationship between high sodium intake, inadequate potassium intake, and high blood pressure, also known as hypertension.[4,8] Variations in potassium intake can significantly affect the relationship between sodium and blood pressure.[9] For adults with hypertension, increasing dietary potassium can help lower blood pressure by helping to reduce the blood pressure-elevating effects of sodium. Adequate potassium helps to lessen the tension in blood vessel walls, which can also help reduce blood pressure.[1]

Potassium and Stroke

Research has shown that a higher sodium to potassium ratio has been associated with an increased risk for stroke, specifically ischemic stroke.[2] While the mechanisms are not fully understood, a diet that is adequate in potassium may help reduce the adverse effects of dietary sodium, in turn resulting in lower blood pressure and reduced stroke risk.[2]

Potassium and Bone Health

Adequate intake of dietary potassium may benefit bone health and bone mineral density.[10] One proposed mechanism of action is via its effects on acid-base balance. Potassium-containing foods, such as fruits and vegetables, provide precursors to bicarbonate ions, which in turn assist in buffering acids in the body to maintain a neutral blood pH of 7.35 to 7.45. If the diet is deficient in nutrients (such as potassium) that help maintain pH within this range, then the body may pull calcium from the bone. However, as potassium intake increases, more calcium content is preserved.[3]

Potassium and Kidney Health

Potassium also plays a role in helping the kidneys function properly. When potassium intake is too low, calcium reabsorption within the kidneys may be impaired, increasing calcium excretion and potentially leading to excess calcium in the urine and, in more extreme cases, kidney stones.[11] High sodium intake can also be damaging to the kidneys. One way to remove excess sodium from the body is to increase potassium intake. Gritter et al. reviewed six cohort studies and analyzed the association between urinary potassium excretion (a marker for intake) and renal outcomes.[12] In healthy subjects, a higher potassium intake and rate of potassium excretion were associated with a lower risk of chronic kidney disease.[4] In people with mild incidence of kidney disease, higher potassium intake and excretion were associated with a lower risk of renal decline.[13] In people with diabetes, a higher potassium excretion was associated with lower odds of renal replacement therapy or cardiovascular events.[14]

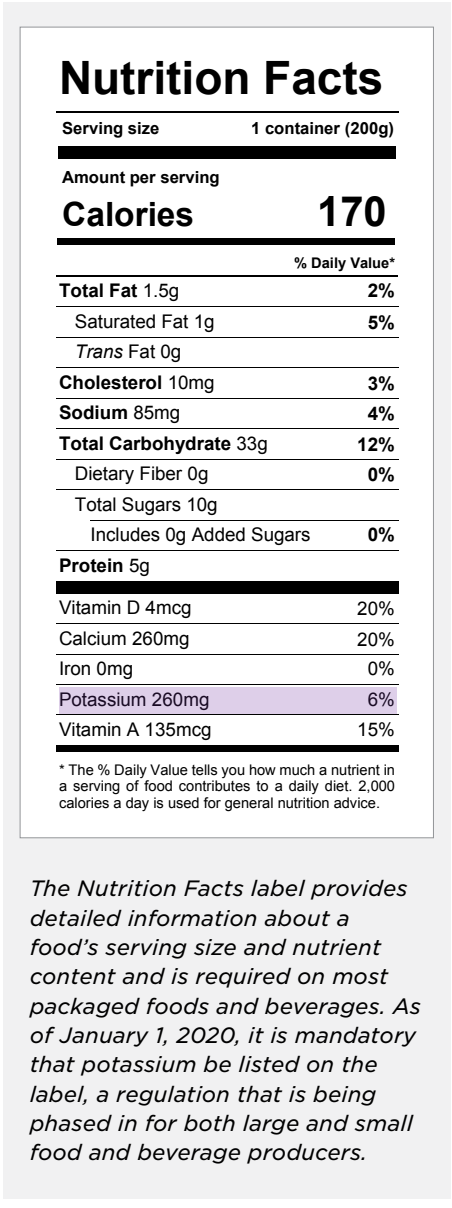
POTASSIUM RECOMMENDATIONS AND CURRENT USUAL INTAKES

The National Academies of Sciences, Engineering, and Medicine (NASEM) Dietary Reference Intake (DRI) committee has established Adequate Intakes

(AI) for potassium based on median intakes observed in healthy people (Table 1).[11] Until 2019, the potassium AI for adults was set at 4,700 milligrams (mg) per day. This number is still reflected in the percent Daily Value (% DV) calculations on the Nutrition Facts label.

In 2019, NASEM updated the DRIs for potassium. For females 19 years and older, the revised AI is 2,600 mg/day and for males 19 years and older the revised AI is 3,400 mg/day.[11]

A Tolerable Upper Intake Level (UL), which is the highest level of daily intake that is likely to pose no adverse health effects in most people, is not defined for potassium. This is because the body is efficient at getting rid of excess potassium in the urine. However, people with certain health conditions – such as chronic kidney disease, diabetes and heart failure – and those who use angiotensin-converting enzyme inhibitors (ACE-Is) and angiotensin II receptor blockers (ARBs) may be at increased risk of potassium toxicity. NASEM's DRI committee has also examined evidence to determine a Chronic Disease Risk Reduction Intake (CDRR) for potassium. The CDRR is a recommended intake level that is expected to reduce the risk of certain chronic diseases. However, there has been insufficient evidence to establish a CDRR for potassium at this time.[11]



Nutrition Facts

Serving size	1 container (200g)
Amount per serving	
Calories	**170**
	% Daily Value*
Total Fat 1.5g	**2%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 10mg	**3%**
Sodium 85mg	**4%**
Total Carbohydrate 33g	**12%**
Dietary Fiber 0g	**0%**
Total Sugars 10g	
Includes 0g Added Sugars	**0%**
Protein 5g	
Vitamin D 4mcg	20%
Calcium 260mg	20%
Iron 0mg	0%
Potassium 260mg	6%
Vitamin A 135mcg	15%

* The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

The Nutrition Facts label provides detailed information about a food's serving size and nutrient content and is required on most packaged foods and beverages. As of January 1, 2020, it is mandatory that potassium be listed on the label, a regulation that is being phased in for both large and small food and beverage producers.

USUAL INTAKES OF POTASSIUM

Throughout life, Americans of all backgrounds, both male and female, consume less potassium than is recommended. According to What We Eat in America, the National Health and Nutrition Examination Survey (NHANES) for 2013-2016, adult men who are 19 years and older eat and drink an average of 2,988 mg potassium per day, while women of the same age consume an average of 2,323 mg potassium daily. That is approximately 88 percent and 89 percent of the AI for potassium for men and women, respectively.[15]

TABLE 1: ADEQUATE INTAKE (AI) FOR POTASSIUM BY AGE, SEX AND LIFE STAGE

Life-Stage	AI (mg/day)
Infants	
0-6 months	400
7-12 months	860
Children	
1-3 years	2,000
4-8 years	2,300
Males	
9-13 years	2,400
14-18 years	3,000
19-30 years	3,400
31-50 years	3,400
51-70 years	3,400
>70 years	3,400
Females	
9-13 years	2,300
14-18 years	2,300
19-30 years	2,600
31-50 years	2,600
51-70 years	2,600
>70 years	2,600
Pregnancy	
14-18 years	2,600
19-30 years	2,900
31-50 years	2,900
Lactation	
14-18 years	2,500
19-30 years	2,800
31-50 years	2,800

AI = Adequate Intake; mg/day = milligrams per day; Table adapted from Dietary Reference Intakes for Sodium and Potassium[11]

TABLE 2: FOOD SOURCES OF POTASSIUM*

Food	Standard Portion Size	Potassium (mg) in Standard Portion	Calories in Standard Portion
Potato, baked, flesh & skin	1 medium	941	163
Prune juice, canned	1 cup	707	182
Tomato paste, canned	1/4 cup	669	54
White beans, canned	1/2 cup	595	149
Plain yogurt, nonfat	1 cup	579	127
Sweet potato, baked in skin	1 medium	542	103
Salmon, Atlantic, wild, cooked	3 ounces	534	155
Orange juice, fresh	1 cup	496	112
Acorn squash, cooked	1/2 cup	448	58
Banana	1 medium	422	105
Apricots, dried	1/4 cup	378	78
Avocado	1/2 cup	364	120
Milk, reduced fat (2%)	1 cup	342	122
Broccoli, raw	1 cup	288	31
Chicken breast	3 ounces	241	122
Coffee, brewed	1 cup	118	2.4
Tea, hot, leaf, black	1 cup	88.8	2.4

**Table adapted using data from the 2015-2020 Dietary Guidelines for Americans (8th Edition) and USDA's FoodData Central Database.*[16,18]

Data from the 2015-2016 NHANES indicates primary sources of potassium in adults and children. Major food sources of potassium in children were milk (11.7%), fruits (7.1%), white potatoes (5.6%), mixed dishes – sandwiches (5.2%) and 100% fruit juices (4.8%). In adults, the major sources of potassium were coffee and tea (8.1%), vegetables excluding potatoes (7.9%), fruits (6.2%), white potatoes (6.1%), and milk (4.9%).[19]

POTASSIUM AS A SHORTFALL NUTRIENT

Potassium has been designated a "shortfall" nutrient or a "nutrient of concern," meaning that it is often under-consumed across populations in the U.S. In an attempt to increase awareness surrounding nutrients of public health significance, a new proposed ruling has affected the information presented on Nutrition Facts labels.[16] Previously, potassium was not required to be listed on the Nutrition Facts label; its inclusion was completely voluntary. However, in order to draw more attention to potassium's significant contributions to health as well as its current insufficient intake, potassium is now a required component of the recently updated Nutrition Facts label.[17] It is important to note that the % DV listed for potassium on Nutrition Facts labels is still calculated using the previous AI of 4,700 mg per day.

FOOD SOURCES OF POTASSIUM

Potassium is found in a wide variety of foods, including fruits, vegetables, dairy products, seafood and legumes. Based on usual serving sizes, baked potatoes (with the skin), canned prune juice, canned carrot juice, passionfruit juice, canned tomato paste, cooked beet greens, cooked adzuki beans, canned white beans, plain nonfat yogurt and tomato puree are the ten highest food sources of potassium.[16] **Table 2** highlights commonly consumed foods and their potassium content, based on standard portions.

STRATEGIES TO INCREASE POTASSIUM INTAKE

Since potassium intake is highly correlated with energy intake, individuals who consume more calories generally have higher potassium intake. However, increasing calorie consumption as a means to increase potassium intake is not a beneficial population-wide recommendation. It is well known that most Americans already regularly consume more calories than needed.[16]

Choosing plenty of food sources of potassium throughout the day is necessary to meet recommendations. For instance, standard portions of nonfat plain yogurt and bananas at breakfast, baked potato with wild Atlantic salmon and avocado at dinner, plus one-and-a-half cups of non-fat milk during the day could help potassium intake reach approximately 3,400 mg.

It is also important to note that potassium leaches from vegetables into boiling water, particularly when the vegetables have been cut. Therefore, using dry-heat cooking methods such as grilling, roasting or sautéing improves the bioavailability of potassium and other nutrients while preventing losses in cooking water.

THE BOTTOM LINE

Potassium is an essential nutrient for normal cell function. Together with sodium, potassium plays a critical role in fluid homeostasis, with broad health effects. Potassium's role in reducing elevated blood pressure is increasingly well documented. Food sources of potassium include many other nutrients that may be beneficial for cardiovascular and general health. Most Americans consume insufficient potassium and too much sodium. Consequently, increased intake of fruits, vegetables, dairy products, seafood and legumes is necessary to meet the recommended amounts of potassium per day.

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