

# Chronic Kidney Disease: Potassium and Your Diet<sup>1</sup>

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Potassium is an essential mineral (also known as an electrolyte) required for normal body function. It is part of the fluid found inside and outside of body cells (intracellular and extracellular fluid). Potassium helps maintain normal blood pressure, fluid and electrolyte balance, muscle and nerve function, as well as bone density. For more information about potassium, see *Facts about Potassium*: <http://edis.ifas.ufl.edu/fy889>.

## Chronic Kidney Disease and Potassium in the Diet

Chronic kidney disease (CKD), also known as chronic renal disease, is a loss of kidney function over time. The kidneys function to maintain normal blood composition by regulating water and electrolyte balance (e.g., potassium, sodium, and phosphorus) and removing waste products.

In the later stages of CKD, the kidneys are less able to tightly regulate blood potassium, causing levels of potassium in the blood to rise. As part of a total treatment plan, people with CKD, particularly those requiring renal replacement therapy (dialysis), may be advised to adhere to certain dietary restrictions to help keep their blood potassium level in a safe range. Very high blood potassium (hyperkalemia) is a serious medical condition that can be life threatening, if not corrected and carefully managed. Symptoms of hyperkalemia include nausea, muscle weakness, and slow or irregular pulse. The normal range of potassium level of the blood (serum potassium) is 3.5–5.0 mEq/L. If serum potassium is 5.1–6.0 mEq/L, this is above

the normal range and caution is required. A level higher than 6.0 is considered to be in the danger zone. (National Kidney Foundation 2016)

For people with CKD and elevated blood potassium, limiting dietary potassium may help maintain normal blood potassium levels. A registered dietitian-nutritionist (RDN), who specializes in kidney disease, can help to create a personalized eating plan. The eating plan should provide a nutritious diet focusing on important elements for people with chronic kidney disease.

## Dietary Potassium Intake

The recommended intake for potassium is 4700 mg/day for adults (IOM 1997). Tolerable Upper Levels known as ULs have been set for nutrients for the healthy population to prevent overconsumption. There is no UL for potassium as no adverse effects of excessive consumption have been documented in healthy adults. However, there may be significant risk with high intakes for those with kidney disease, particularly those on dialysis (Noori et al. 2010).

A typical dietary potassium intake in the United States is about 2600 mg/d, with only 2% of American achieving the recommended amount (Cogswell et al. 2012). However, those with CKD, particularly those requiring dialysis, have lower intakes, often less than 2000 mg/d (Noori et al. 2010). A typical diet for the management of high blood potassium on dialysis is 2,000–3,000 mg/day of potassium and

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involves limiting high potassium foods (>200 mg/serving) (St-Jules, Goldfarb, and Sevick 2016).

## Food Sources of Potassium

Potassium is found in many foods, especially fruits and vegetables. Other food sources of potassium include milk, yogurt, nuts, peanut butter, and seeds. Meats, particularly those that have been enhanced with potassium additives, are also sources of potassium (Sherman and Mehta 2009). Limiting consumption of the high potassium foods may help keep blood potassium levels in a safe range while allowing for a varied diet. In addition, products with high potassium content that need to be avoided include salt substitutes (e.g., potassium chloride) and certain nutritional supplements.

Table 1 lists some lower-potassium fruits and vegetables. The recommended serving size for these foods is about ½ cup. Although these foods are low in potassium, eating large servings can turn these foods into high sources of potassium (Nelms et al. 2016).

**Table 1. Lower potassium fruits and vegetables.**

Fruits	Vegetables
Apple, apple juice, applesauce, blackberries, blueberries, cherries, cranberries, fruit cocktail, grapefruit, grape juice, grapes, mandarin oranges, peaches, pears, pineapple, pineapple juice, plums, raspberries, strawberries, tangerine, watermelon.	Alfalfa sprouts, asparagus, green beans, cabbage, cauliflower, celery, corn, cucumber, eggplant, kale, lettuce, mixed vegetables, mushrooms, okra, onions, parsley, green peas, peppers, radish, rhubarb, water chestnuts, watercress, yellow squash, zucchini squash

Table 2 lists some higher potassium fruits and vegetables. The serving size of these items is ½ cup. As these foods are higher in potassium, those with high blood potassium may be recommended to limit how much and how often they choose these foods (Nelms et al. 2016). By choosing foods in Table 1 more often, someone on dialysis can enjoy fruits and vegetables in moderation.

**Table 2. Higher potassium fruits and vegetables.**

Fruits	Vegetables
Apricot, avocado, banana, cantaloupe, dates, dried fruits, figs, grapefruit juice, honeydew melon, kiwi, mango, nectarine, orange, orange juice, papaya, pomegranate, pomegranate juice, prunes, prune juice, raisins	Acorn squash, artichoke, bamboo shoots, baked beans, butternut squash, refried beans, beets, broccoli, Brussels sprouts, Chinese cabbage, carrots, dried beans, peas and lentils (legumes), various greens, kohlrabi, mushrooms, parsnips, sweet potatoes, white potatoes, rutabagas, spinach, tomatoes, tomato juice/sauce/paste, vegetable juices

## Leaching Vegetables to Lower Potassium Content

For those people with high blood potassium, leaching is a way to remove some of the potassium from high-potassium vegetables.

Directions for potatoes, sweet potatoes, carrots, beets, and rutabagas:

- Peel and cut vegetables into ¼-inch thick slices.
- Rinse vegetable slices in water for a few seconds.
- Soak vegetable slices in water for a minimum of two hours. Use ten times the amount of water to the amount of vegetables.
- After soaking, rinse vegetable slices again in water for a few seconds.
- Cook vegetable slices with five times the amount of water to the amount of vegetables.

Directions for mushrooms and frozen greens:

- Thaw frozen vegetables and drain.
- Rinse vegetables in water for a few seconds.
- Soak vegetables in water for a minimum of two hours. Use ten times the amount of water to the amount of vegetables.
- After soaking, rinse vegetables again in water for a few seconds.
- Cook vegetables with five times the amount of water to the amount of vegetables.

Leaching removes only some of the potassium in high-potassium vegetables. It is still important to limit how much and how often you eat these vegetables if you have high blood potassium (Nelms et al. 2016).

## Fiber and Potassium

Although removal of excess potassium is an important role of the kidneys, some potassium can also be removed from the body by the large intestine (colon). Prevention of constipation is thought to be important to maintain blood potassium levels because infrequent bowel movements may contribute to high blood potassium (St-Jules, Goldfarb, and Sevick 2016). Consuming foods with fiber, while maintaining recommended dietary restrictions for CKD, may enhance potassium losses in the stools. Foods with added fiber may be good choices to increase fiber intake in people with CKD and high blood potassium. (See *Shopping*

for Health: Foods with Added Fiber <http://edis.ifas.ufl.edu/fs235>).

## Summary

Potassium is an important nutrient for good health. For healthy people, increased intakes are recommended because most people do not consume enough fruits and vegetables to achieve the desired potassium intake. However, those people in the late stages of CKD, such as those on dialysis, may need to moderate their potassium intake. Since the diet for CKD is complex, guidance from a registered dietitian-nutritionist (RDN) is recommended.

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