

Title: Potatoes & Chronic Kidney Disease: New Guidance Around Fruits and Vegetables Rich in Potassium

Audience: Registered Dietitian Nutritionists

Author: Jenny Heap, MS, RDN

Introduction

For many years, whole foods like avocados, bananas, potatoes, and tomatoes were broadly restricted for individuals with chronic kidney disease due to their high potassium and phosphorus content. Because kidneys help filter excess potassium from the blood, reduced kidney function can lead to hyperkalemia – a condition that may cause muscle weakness, irregular heartbeat, or even cardiac arrest. However, recent research questions not only the necessity of restricting these foods, but the wisdom of doing so. In fact, diets rich in fruits and vegetables – including potatoes – are now understood to support cardiometabolic health and may even slow the progression of kidney disease.^v

Cardiovascular-Kidney-Metabolic (CKM) Syndrome

According to the American Heart Association, one in three adults in the US have three or more risk factors that lead to cardiovascular disease, metabolic disorders, and kidney disease: elevated weight, blood pressure, cholesterol, blood glucose, and triglycerides. The trifecta is so interrelated that it's now referred to as cardiovascular-kidney-metabolic (CKM) syndrome. Plant-based diets – such as Mediterranean, vegetarian, and vegan approaches in addition to the DASH (Dietary Approaches to Stop Hypertension) – are widely recommended to support cardiometabolic health. Therefore, it is thought that personalizing and liberalizing diets for those with reduced kidney function could be especially beneficial for cardiometabolic health.

Why Potatoes for CKM health?

Vitamin C: 20mg; 30% of the Daily Value

It's thought that vitamin C might help prevent atherosclerosis, hypertension, and stroke^{vi}, and may be related to blood pressure. A 2020 meta-analysis showed serum vitamin C levels to be significantly lower in study participants with hypertension vs. those with normal blood pressure.^{vii} Vitamin C is also a topic of rising interest for diabetes researchers. Studies show that diabetes increases Vitamin C requirements and that higher intakes might help improve both blood pressure and glycemic control.^{viii}

Vitamin B6: 0.2mg; 10% of the Daily Value

This B vitamin is known to play an important role in carbohydrate metabolism, but it doesn't stop there. There is ample evidence to suggest that serum levels of vitamin B6 are inversely related to T2D and its progression.^{ix}

Magnesium: 46.7mg; 11% of the Daily Value

Potatoes are a significant source of magnesium in Americans' diets, with an estimated 5% coming from potatoes.^x Magnesium helps regulate blood pressure and blood glucose levels.

Magnesium insufficiency is common in T2D and is thought to worsen insulin sensitivity.^{xi} A new retrospective analysis of NHANES data (1999-2018) found that higher intakes of dietary fiber and magnesium were associated with reduced long-term risk of cardiovascular death and death from all causes in people with T2D.^{xii}

Dietary Fiber: 2g; 7% of the Daily Value

The fiber in potatoes helps slow the digestion and absorption of carbohydrates, helping to blunt the glucose response. Fiber also enhances satiety, contributes to bowel regularity, and may have beneficial effects on the gut microbiome. Systematic reviews suggest that total dietary fiber intake is associated with a reduced risk of both diabetes^{xiii} and cardiovascular disease^{xiv}.

Fiber is the only nutrient significantly reduced when a potato is peeled. Nearly 50% of the fiber is found in the skin, so leave the peel on to optimize cardiometabolic benefits.

A 2021 systematic review looking at the association of dietary patterns and the development and progression of chronic kidney disease (CKD) concluded that dietary patterns emphasizing intake of fruits, vegetables, and dietary fiber are protective of kidney health and associated with lower incidence and progression of CKD. Reduction of salt, sweets, fats, and protein also appeared protective of kidney health.^{xv} For healthy people and those with early-stage kidney disease, diets high in foods naturally rich in potassium such as fruits and vegetables are encouraged to help prevent disease progression and protect cardiometabolic health.^{xvi}

While it is still critically important for those with chronic kidney disease to watch and closely manage potassium levels, the relative impact of limiting healthy, whole foods is now better understood, and research suggests that the benefits of including these foods outweigh perceived risks. Other strategies are thought to be more practical and impactful for preventing and managing hyperkalemia.^{xvii}

1. Avoiding highly bioavailable potassium from processed foods and potassium additives:

Potassium from foods like fruits and vegetables is part of the food matrix and is less readily available during digestion. In contrast, potassium from food additives like potassium chloride (often added to low-sodium foods) can more quickly raise blood potassium levels due to high levels and easy absorption.

According to the KDIGO clinical practice guidelines updated in 2024, reduction of processed foods rich in highly bioavailable potassium – such as salt substitutes, processed meats, powdered drink mixes, electrolyte beverages, processed low-sodium foods – should be encouraged vs. limiting fresh, potassium-rich whole foods for hyperkalemia management.^{xviii} While nearly all of the potassium in food additives is absorbed by the body, less than 60% is absorbed from potassium-rich whole foods.^{xix} The following additives should be viewed with caution: potassium chloride, potassium lactate, potassium citrate, and potassium phosphate.

2. Reviewing medications: Many medications can impact potassium levels and potentially cause or worsen hyperkalemia, so it is important to review medications with a physician and work closely with the medical team.

3. **Managing blood sugar levels:** Because elevated blood sugar levels can also contribute to hyperkalemia, managing blood sugar is critical to managing potassium levels.
4. **Managing blood acidity:** The acidity of the blood can also impact potassium levels, with higher levels contributing to elevated potassium. Eating fruits and vegetables can help manage blood pH and support kidney function by neutralizing acid in your blood.
5. **Managing intestinal transit time:** Potassium is absorbed in the large intestine, and the longer food waste is present in the large intestine, the more potassium is absorbed. Fiber from diets high in fruits and vegetables helps manage constipation and regulate potassium absorption.

For cases in which the medical team agrees that further potassium reduction is necessary via limiting whole food sources, potassium in potatoes can be significantly reduced (by up to 70-90% in some cases) via double cooking (discarding water between boils) ^{xx} or using the following methods ^{xxi}:

- Fresh potatoes
 - Peel potato and cut into thin strips
 - Boil in water for 8 minutes
 - Drain and replace with fresh water
 - Soak for 12 hours
 - Drain and prepare as desired
- Canned potatoes
 - Drain potatoes
 - Soak in fresh water for 12 hours
 - Drain and prepare as desired
- Frozen French fries
 - Rinse and drain
 - Soak in water for 12 hours
 - Drain and prepare as desired (Frying will reduce moisture, and therefore increase the potassium per gram, but soaking the fries first will greatly reduce the potassium content.)

In conclusion, while managing blood potassium levels is essential to prevent hyperkalemia in those with impaired kidney function, current recommendations emphasize prioritizing minimally processed foods, avoiding highly bioavailable potassium additives, and maintaining blood sugar, acidity, and intestinal transit time. Encouraging healthy dietary patterns that include whole foods like potatoes—which offer 3 grams of plant-based protein per serving—can support kidney longevity and cardiometabolic health. Plant-based proteins are increasingly recognized as beneficial for preserving kidney function compared to animal-based sources.

Explore more at eatwisconsinpotatoes.com.

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