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Benefits of Plants for Chronic Kidney Disease

Benefits of Plants for Chronic Kidney Disease

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Outline

- General info about CKD
- Benefits of plant-based diets in kidney disease
  - Delayed progression CKD
  - Acidosis
  - Gut health
  - Phosphorus
  - Potassium
  - Dialysis & mortality

Chronic Kidney Disease (CKD) Stats

- Affects 37 million people (1 in 7 adults) in US
- 80 million people (1 in 3 adults) in US *at risk* of kidney disease
- 90% of people with kidney disease *don't know they have it*
- 9th leading cause of death in U.S
- $120 billion annual Medicare dollars for all stages CKD (~15% total budget)
  - $84 billion on ESRD

Kidney Disease: The Basics. National Kidney Foundation. Published August 12, 2014. Accessed September 15, 2020. https://www.kidney.org/news/newsroom/factsheets/KidneyDiseaseBasics

Nutrition in CKD

Nutrition plays a role in:

- Delayed progression of CKD
- Improved symptoms
  - *Edema*
  - *Acidosis*
- Management of common co-morbidities
  - *Hypertension*
  - *Diabetes*
  - *Heart Disease*

88% of people never see a RD prior to dialysis ☹

- Over 90% covered by Medicare for entire CKD diagnosis
- 83% were interested in making dietary changes
- 50% feel confident they know how to eat to manage CKD

Slinin Y, Guo H, Gilbertson DT, et al. Prehemodialysis Care by Dietitians and First-Year Mortality After Initiation of Hemodialysis. American Journal of Kidney Diseases. 2011;58(4):583-590.
Kelley et al., "412 Patient Perspectives on Access to Medical Nutrition Therapy for Non–Dialysis-Dependent Chronic Kidney Disease." Poster at National Kidney Foundation Spring Meeting 2020.

Kidney Disease Outcomes & Quality Initiative (KDOQI) Updates

Joint Clinical Practice Guideline

- National Kidney Foundation (KDOQI)
- Academy of Nutrition & Dietetics

Officially Released August 2020

- Restricted to controlled intervention studies for intervention recommendations
  - Also used observational studies for assessment recommendations
- Now includes CKD and transplant patients & micronutrients/electrolytes!

Ikizler A, Burrowes J, Byham-Gray L, et al. KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update. Am J Kidney Dis. 2020;76(3):S1-S107.

Protein

	2000 KDOQI Guideline	2020 KDOQI/AND Guideline
Protein	Without Dialysis GFR<25ml/min: 0.6g/kg (up to 0.75g/kg if unable to maintain energy intake) Dialysis (clinically stable) Hemodialysis: 1.2g/kg; ≥50% high biological value Peritoneal Dialysis: 1.2-1.3g/kg; ≥50% high biological value	Without Dialysis CKD stage 3-5: 0.55-0.60g/kg IBW OR 0.28-0.43g/kg with keto analog supplementation to reduce risk of ESRD/death (1A) and improve QoL (1C) Without Dialysis - Diabetes CKD 3-5: 0.8-0.9g/kg IBW Dialysis (clinically stable) Hemodialysis: 1.2g/kg (1C) Peritoneal Dialysis: 1.2g/kg (OPINION) People with diabetes: 1.2g/kg (OPINION) Protein Type Insufficient evidence to make conclusion about the effects of protein type (plant vs animal) on nutritional status, calcium or phosphate levels, or blood lipid profile (OPINION)

Energy

	2000 KDOQI Guideline	2020 KDOQI/AND Guideline
Energy	Without Dialysis (GFR<25ml/min) & Dialysis Patients ≤60 years old: 35kcal/kg >60 years old: 30-35kcal/kg	CKD1-5D (1C) & Post-Transplant (OPINION) 25-35kcal/kg IBW based on age, gender, physical activity, body composition, weight status, CKD stage, concurrent illness, and inflammation to maintain nutritional status

Sodium

	2020 KDOQI/AND Guideline
Sodium	Blood Pressure Control: CKD 3-5 without dialysis (1B), dialysis (1C) & post-transplant (1C) Goal: <2300mg/day Proteinuira: CKD 3-5 without dialysis (2A) Goal: <2300mg/day Dry Body Weight: CKD 3-5D (2B) Reduced sodium intake to improve better volume control

Ikizler A, Burrowes J, Byham-Gray L, et al. KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update. Am J Kidney Dis. 2020;76(3):S1-S107.

Potassium

	2020 KDOQI/AND Guideline
Potassium	CKD 3-5D & Post-Transplant Adjust dietary potassium to maintain serum potassium within normal range (OPINION) Hyperkalemia: consider lowering dietary potassium intake (OPINION) CKD3-5 on Hemodialysis (2D) & Post-Transplant (OPINION) with hyperkalemia or hypokalemia Base dietary adjustments or supplemental potassium on clinician judgement

Phosphorus

	2020 KDOQI/AND Guideline
Phosphorus	CKD 3-5 & Hemodialysis Adjust dietary phosphorus to maintain serum phosphate levels in the normal range (1B) Dietary Phosphorus Source: CKD 1-5D & Post-Transplant Consider the bioavailability of phosphorus sources (OPINION) Hypophosphatemia in Post-Transplant Consider prescribing a high-phosphorus intake (diet or supplements) in order to replete serum phosphorus (OPINION)

Mediterranean Diet

	2020 KDOQI/AND Guideline
Mediterranean Diet	CKD 1-5 without dialysis and post-transplant With or without dyslipidemia, suggest prescribing a Mediterranean Diet to improve lipid profile (2C)

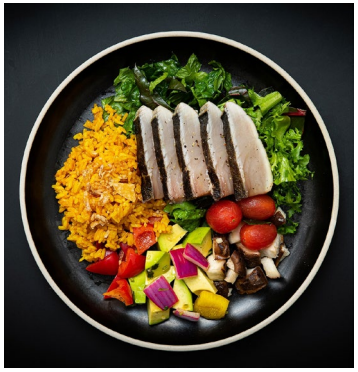
Fruits & Vegetables

	2020 KDOQI/AND Guideline
Fruits & Vegetables	CKD 1-4 Suggest prescribing increased fruit and vegetable intake may decrease body weight, blood pressure and net acid production (NEAP) (2C)

Traditional “Renal Diet” Approach:

What I Was Taught in School

What I Recommend



- Tends to be non-individualized & generic
- Reduces food to nutrients
  - Sodium
  - Potassium
  - Phosphorus
- Resulted in diet drastically reduced in generally healthy things!
  - Fiber
  - Most vitamins & minerals
  - Antioxidants
- Maybe not the best for our patients?

Benefits of Plant-Based Diets & CKD

- Delayed decline of kidney function
- Improved acid-base balance
- Improved gut health
- Reduced bioavailability of phosphorus
- Better potassium control?
- Reduced mortality in dialysis?
- In line with recommendations for common co-morbid conditions
  - *Diabetes*
  - *Hypertension*
  - *Hypercholesterolemia*
  - *Heart Failure*
  - *= Improved control CKD!*

Potentially improved adherence, quality of life and food satisfaction!

Plant-Based Diet Definition

No formal definition

Just eat more plants!

- Average US Intake: 0.9 servings fruits & 1.4 servings vegetables

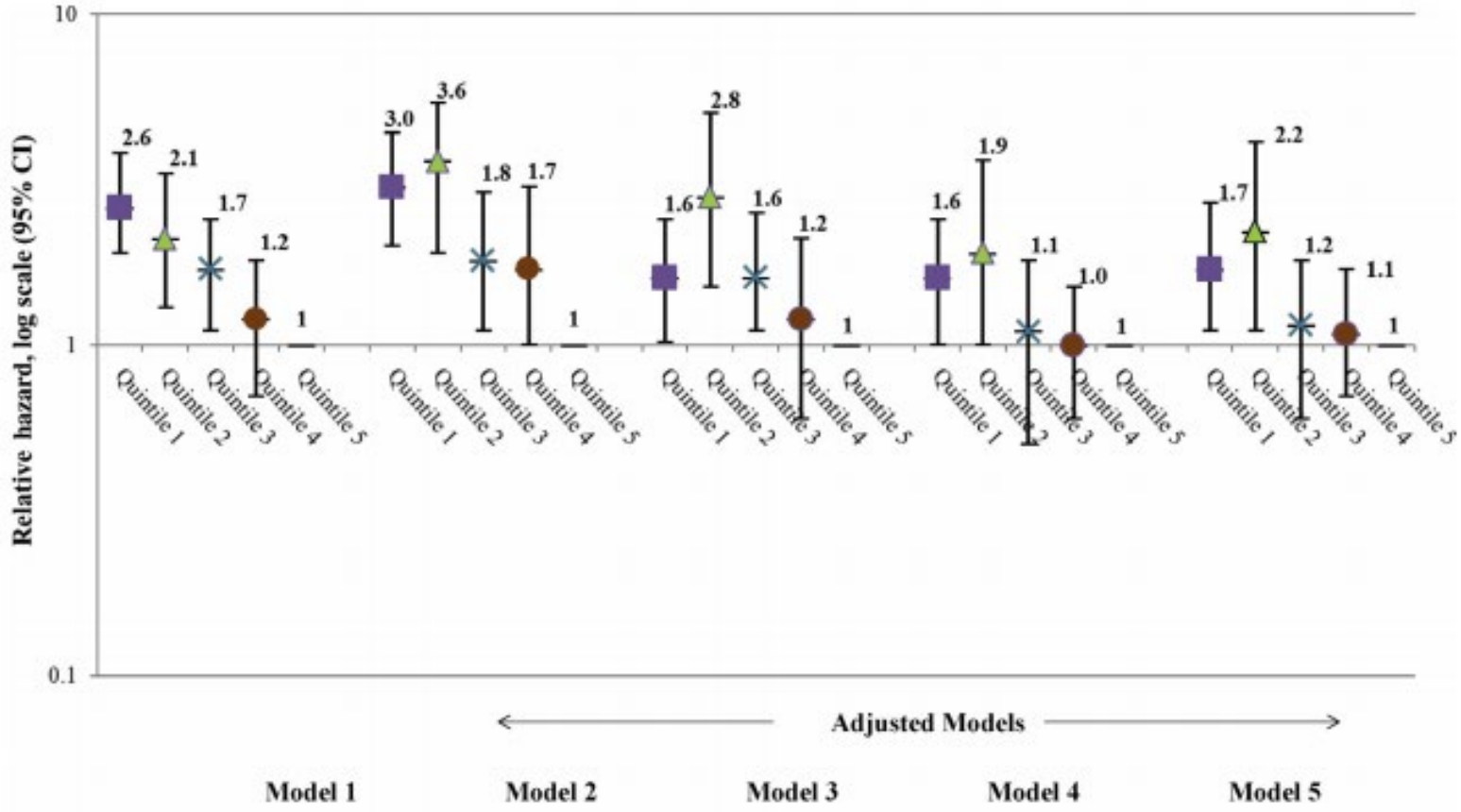
Examples:

- Vegan or Vegetarian Diet
- Mediterranean Diet
- DASH Diet
- MIND Diet

USDA ERS - Americans Still Can Meet Fruit and Vegetable Dietary Guidelines for $2.10-$2.60 per Day. Accessed August 19, 2020. https://www.ers.usda.gov/amber-waves/2019/june/americans-still-can-meet-fruit-and-vegetabledietary-guidelines-for-210-260-per-day/

Delayed Decline of Kidney Function

Lower Risk of ESRD with DASH in CKD Patients



Model 1 – Unadjusted
Model 2 – Model 1+ adjusted for socio-demographics
Model 3 – Model 2+ adjusted for diabetes, systolic BP, serum K
Model 4 – Model 3+ adjusted for total caloric intake, body mass index
Model 5 – Model 4+ adjusted for eGFR, ACR

Banerjee T, Crews DC, Tuot DS, et al. Poor accordance to a DASH dietary pattern is associated with higher risk of ESRD among adults with moderate chronic kidney disease and hypertension. Kidney International. 2019;95(6):1433-1442. doi:10.1016/j.kint.2018.12.027

Less GFR Decline with "Prudent" and DASH Eating Patterns

Table 5. Odds Ratios for eGFR Decline ≥30% by Quartiles of Diet Pattern Scores

	Q1	Q2	Q3	Q4
Western				
Age and energy intake adjusted	1.00 (reference)	1.37 (0.98-1.93)	1.84 (1.29-2.64)	1.95 (1.27-2.97)
Multivariable[a]	1.00 (reference)	1.22 (0.87-1.73)	1.57 (1.08-2.28)	1.48 (0.95-2.30)
Multivariable + analgesic medication use[b]	1.00 (reference)	1.22 (0.86-1.72)	1.52 (1.04-2.20)	1.40 (0.90-2.19)
Multivariable + high cholesterol or lipid-lowering drug	1.00 (reference)	1.23 (0.87-1.73)	1.57 (1.08-2.26)	1.46 (0.94-2.28)
Multivariable + diabetes duration	1.00 (reference)	1.22 (0.86-1.72)	1.58 (1.09-2.29)	1.46 (0.94-2.28)
Prudent				
Age and energy intake adjusted	1.00 (reference)	1.44 (1.05-1.97)	1.06 (0.76-1.48)	0.78 (0.53-1.13)
Multivariable[a]	1.00 (reference)	1.43 (1.04-1.98)	1.07 (0.76-1.51)	0.81 (0.55-1.19)
Multivariable + analgesic medication use[b]	1.00 (reference)	1.44 (1.04-1.98)	1.10 (0.78-1.56)	0.82 (0.56-1.21)
Multivariable + high cholesterol or lipid-lowering drug	1.00 (reference)	1.45 (1.05-2.00)	1.09 (0.77-1.54)	0.84 (0.57-1.23)
Multivariable + diabetes duration	1.00 (reference)	1.44 (1.04-1.98)	1.07 (0.76-1.51)	0.81 (0.55-1.19)
DASH-style				
Age and energy intake adjusted	1.00 (reference)	0.87 (0.64-1.18)	0.79 (0.58-1.09)	0.51 (0.36-0.72)
Multivariable[a]	1.00 (reference)	0.86 (0.63-1.17)	0.79 (0.57-1.09)	0.55 (0.38-0.80)
Multivariable + analgesic medication use[b]	1.00 (reference)	0.88 (0.65-1.21)	0.82 (0.60-1.13)	0.57 (0.39-0.83)
Multivariable + high cholesterol or lipid lowering drug	1.00 (reference)	0.86 (0.63-1.18)	0.79 (0.58-1.09)	0.55 (0.38-0.79)
Multivariable + diabetes duration	1.00 (reference)	0.87 (0.64-1.18)	0.79 (0.58-1.09)	0.55 (0.38-0.80)

Abbreviations: eGFR, estimated glomerular filtration rate; DASH, Dietary Approach to Hypertension; NSAIDs, nonsteroidal anti-inflammatory drugs; Q, quartile.

[a]Adjusted for age, hypertension, body mass index, physical activity (METs/week), energy intake, cigarette smoking, diabetes, cardiovascular disease, and angiotensin-converting enzyme–inhibitor/angiotensin receptor blocker medication use (alcohol intake and

Lin J, Fung TT, Hu FB, Curhan GC. Association of dietary patterns with albuminuria and kidney function decline in older white women: a subgroup analysis from the Nurses' Health Study. Am J Kidney Dis. 2011;57(2):245-254.doi:10.1053/j.ajkd.2010.09.027

Reduced Risk Death in CKD

Guiterrez et al.

Reduced all cause mortality in CKD

- Plant based diet scores associated with reduced risk mortality (0.77: 95% CI: 0.61-0.97)
- Southern diet scores associated with increased risk mortality (1.51: 95% CI: 1.19-1.95
- No significant difference in CKD progression

Chen et al.

Reduced risk of death in PD patients

- 10% increase in plant-based protein =
  - *71% in all cause mortality*
  - *89% reduction CVD mortality*

Gutiérrez OM, Muntner P, Rizk DV, et al. Dietary patterns and risk of death and progression to ESRD in individuals with CKD: a cohort study. Am J Kidney Dis. 2014;64(2):204-213. doi:10.1053/j.ajkd.2014.02.013
Chen X, Wei G, Jalili T, et al. The Associations of Plant Protein Intake With All-Cause Mortality in CKD. American Journal of Kidney Diseases. 2016;67(3):423-430.

Improve Acid/Base Balance

Metabolic Acidosis in CKD

Definition: Serum Bicarbonate (CO_2) <22mEq/L

Prevalence

- 13% CKD stage 3
- 40% by CKD stage 4
- Acid retention early in CKD

Causes in CKD

- Impaired ammonia excretion
- Reduced bicarbonate reabsorption
- Reduced bicarbonate production

Kraut JA, Madias NE. Metabolic Acidosis of CKD: An Update. American Journal of Kidney Diseases. 2016;67(2):307-317. doi:10.1053/j.ajkd.2015.08.028

Metabolic Acidosis in CKD

Definition: Serum Bicarbonate (CO_2) <22mEq/L

Consequences:

- Increased bone resorption
- Increased muscle catabolism
- Aggravation secondary hyperparathyroidism
- Systemic inflammation
- Impaired myocardial contractility
- Increased mortality
- Progression of CKD

Kraut JA, Madias NE. Metabolic Acidosis of CKD: An Update. American Journal of Kidney Diseases. 2016;67(2):307-317. doi:10.1053/j.ajkd.2015.08.028

Dietary Acid Production

Diet is the main contributor to acid that must be excreted by the kidney

Balance of:

- Endogenous acid production (H+)
- Alkali intestinal absorption

Measuring Acid Load

- Net Acid Excretion (NAE, requires 24-hour urine test)
- Potential Renal Acid Load (PRAL)
- Net Endogenous Acid Production (NEAP)
- GI alkali absorption

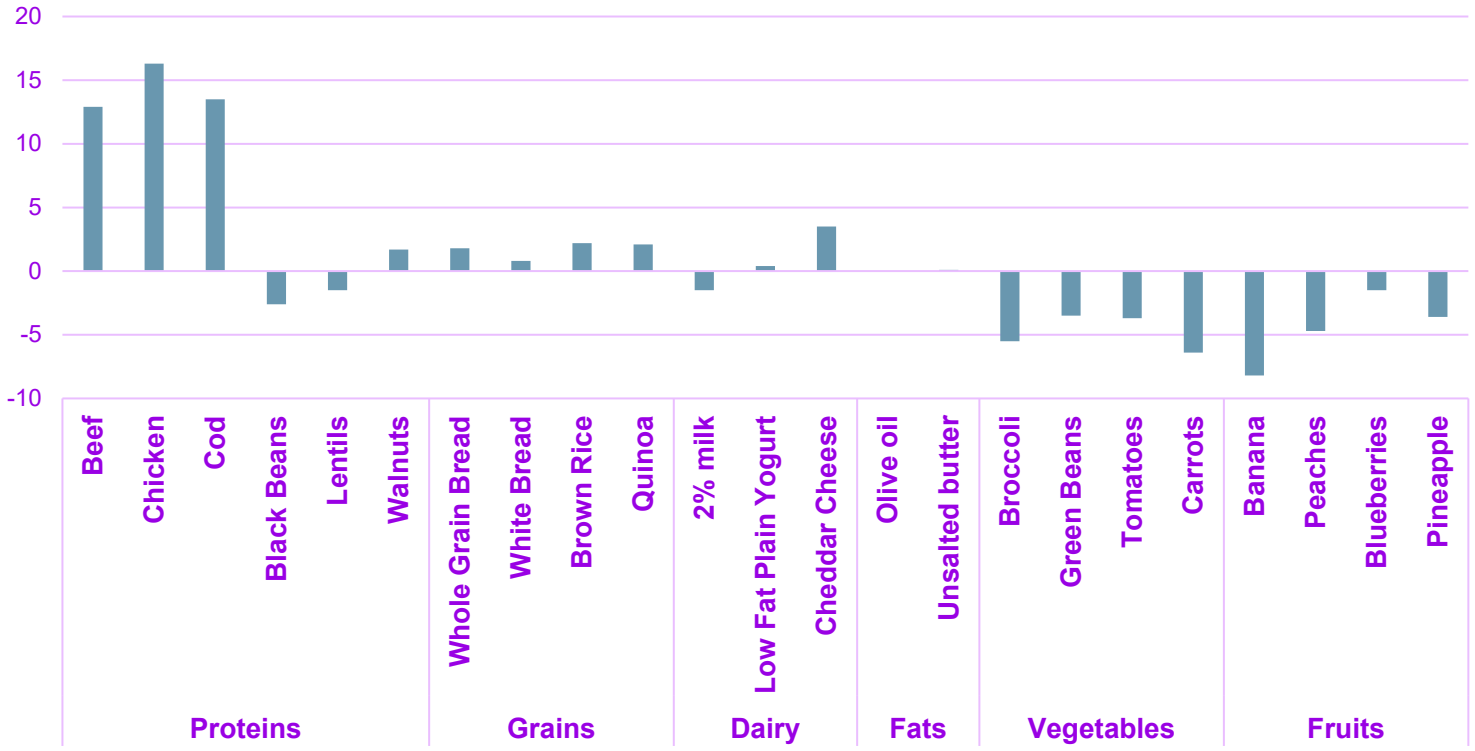
Scialla JJ, Anderson CAM. Dietary acid load: a novel nutritional target in chronic kidney disease? Adv Chronic Kidney Dis. 2013;20(2):141-149. doi:10.1053/j.ackd.2012.11.001
Ströhle A, Waldmann A, Koschizke J, Leitzmann C, Hahn A. Diet-dependent net endogenous acid load of vegan diets in relation to food groups and bone health-related nutrients: results from the German Vegan Study. Ann Nutr Metab. 2011;59(2-4):117-126. doi:10.1159/000331572

Potential Renal Acid Load (PRAL)

High acid load in typical US Diet
50-75 mEq/day

Vegan (or near vegan) diet: -43.5 - -39.0 mEq/day

Potential Renal Acid Load (per standard portion)



High acid load in typical US Diet: 50-75 mEq/day
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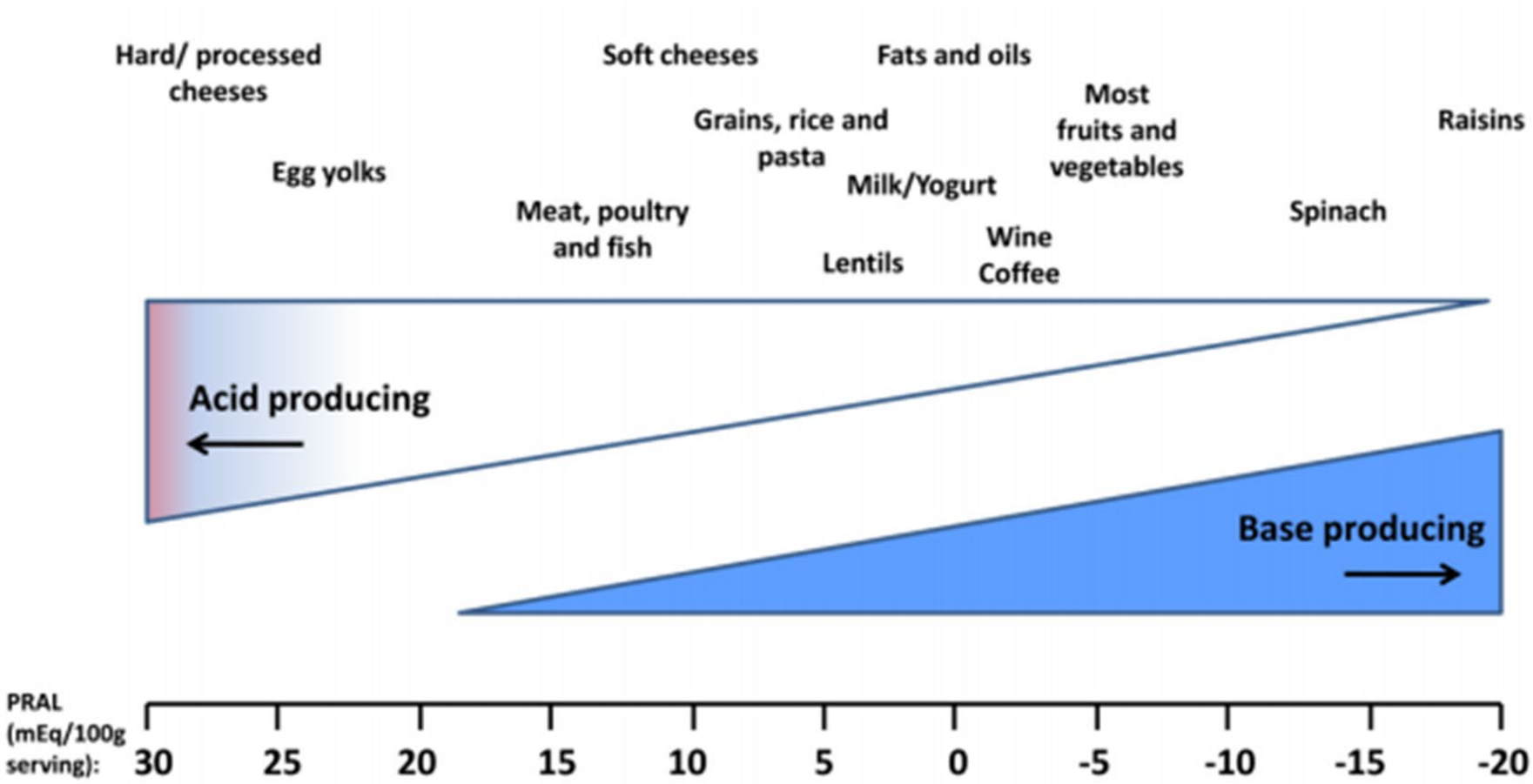


Scialla JJ, Anderson CAM. Dietary acid load: a novel nutritional target in chronic kidney disease? Adv Chronic Kidney Dis. 2013;20(2):141-149. doi:10.1053/j.ackd.2012.11.001

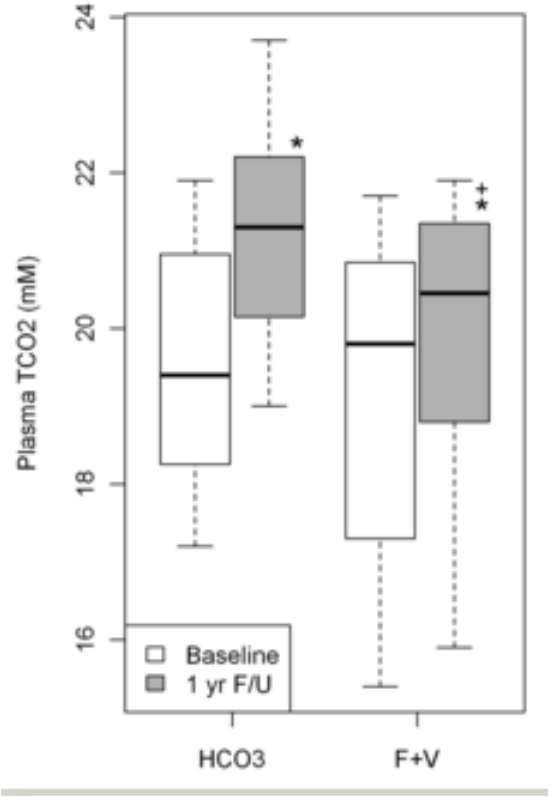
Treat Acidosis with Fruits & Veggies!

CKD stage 4 patients randomized to receive bicarbonate or fruits & veggies

- Fruits & vegetables group were given free produce
- Prescribed by RD to lower PRAL by ½
- *Enough produce for all people in household!*

After 1 year, fruit & vegetable group:

- Lower body weight (78 vs 84kg)
- Lower Systolic blood pressure (131.7 vs. 136.0 mmHg)
- Lower PRAL (39.6 vs. 59.3 mEq/day)
- Lower CO2 in both groups
- NO difference in plasma potassium or GFR

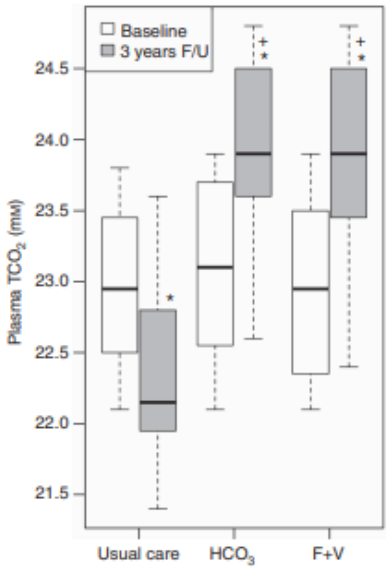


Goraya N, Simoni J, Jo C-H, Wesson DE. A Comparison of Treating Metabolic Acidosis in CKD Stage 4 Hypertensive Kidney Disease with Fruits and Vegetables or Sodium Bicarbonate. CJASN. 2013;8(3):371-381. doi:10.2215/CJN.02430312

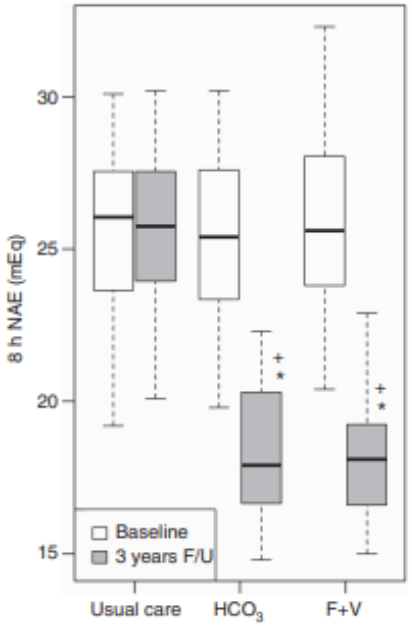
Treat Acidosis EARLY with Fruits & Veggies!

108 CKD stage 3 patients randomized to usual care, fruits & veggies OR bicarbonate (not necessarily CO2<22)
After 3 years…

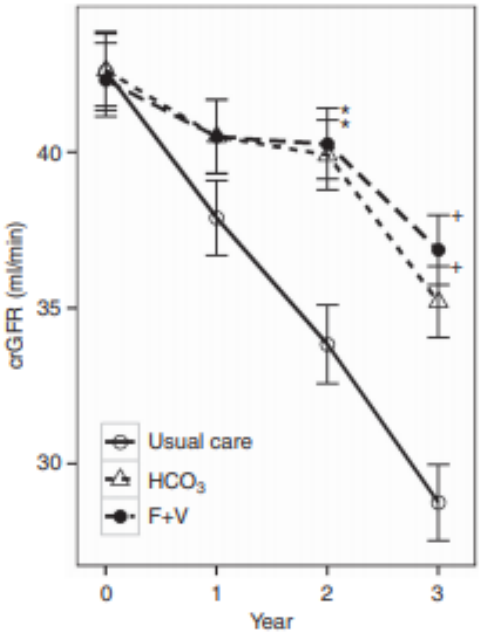
Higher CO2



Lower Net Acid Excretion



Preserved kidney function!



Lower PRAL May Benefit Many Health Conditions

Chronic Kidney Disease

Kidney Stones

Diabetes/Insulin Resistance

Bone health

Reduced Absorption of Phosphorus

2020 KDOQI/AND Guidelines

Dietary Phosphorus Source: CKD 1-5D & Post-Transplant
"Consider the bioavailability of phosphorus sources" (OPINION)

CKD 3-5 & Hemodialysis
"Adjust dietary phosphorus to maintain serum phosphate levels in the normal range" (1B)

No absolute amount of phosphorus recommended.

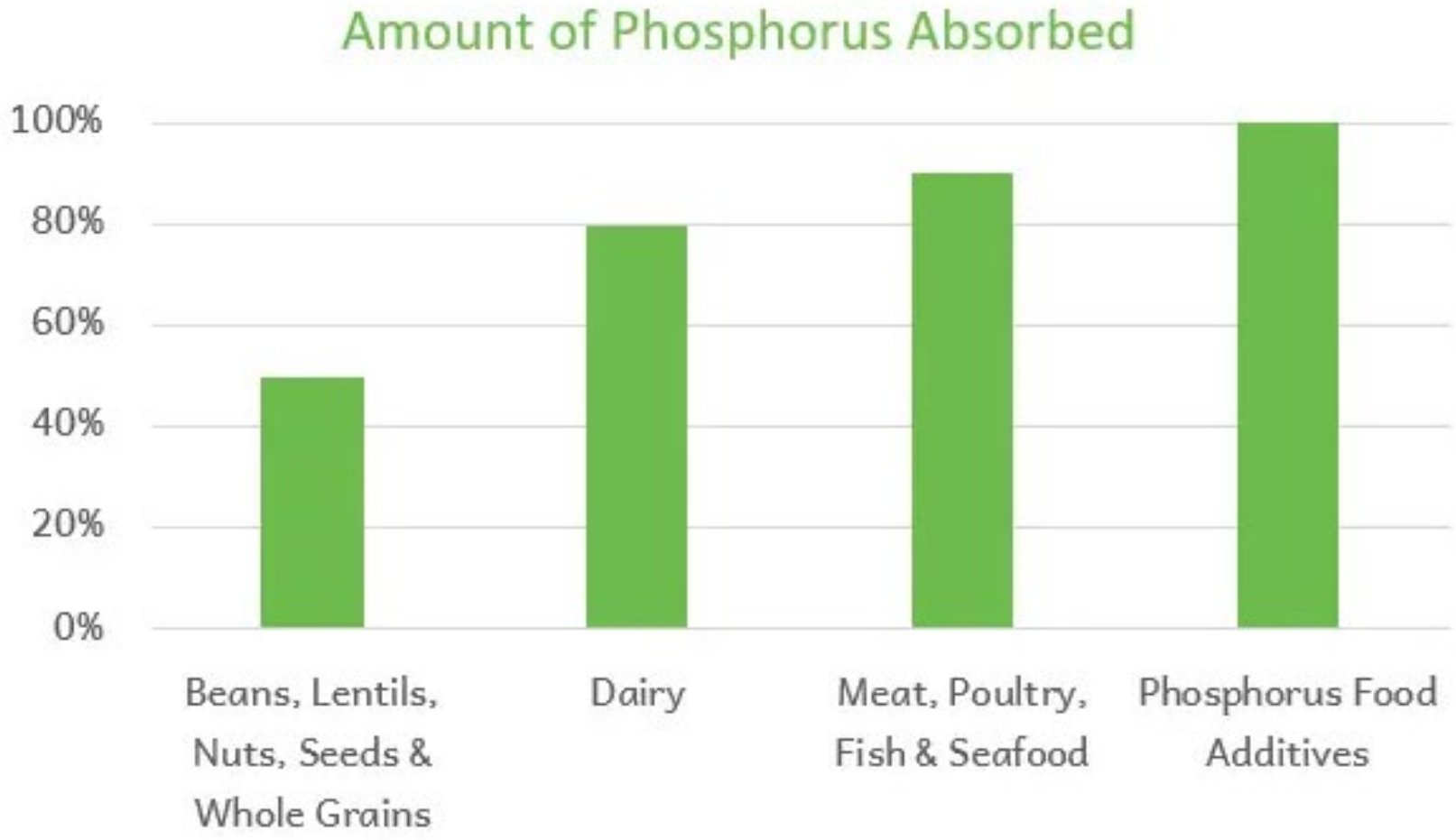
Ikizler A, Burrowes J, Byham-Gray L, et al. KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update. Am J Kidney Dis. 2020;76(3):S1-S107.

4oz. cooked chicken breast

Calories: 182
Protein: 34g
Potassium: 408mg
Phosphorus: 260mg

½ cup black beans

Calories: 57
Protein: 8g
Potassium: 306mg
Phosphorus: 121mg



Noori N, Sims JJ, Kopple JD, et al. Organic and inorganic dietary phosphorus and its management in chronic kidney disease. Iran J Kidney Dis. 2010;4(2):89-100.
Itkonen ST, Karp HJ, Lamberg-Allardt CJE. Bioavailability of phosphorus. Dietary Phosphorus: Health, Nutrition, and Regulatory Aspects. Published online January 1, 2017:221-233. doi:10.1201/9781315119533

4oz, cooked chicken breast

Calories: 182
Protein: 34g
Potassium: 408mg
Phosphorus: ~~260mg~~ 234mg

½ cup black beans

Calories: 57
Protein: 8g
Potassium: 306mg
Phosphorus: ~~121mg~~ 61mg

Phosphorus Food Additives

Contribute 300-1000mg phosphorus per day

Can increase phosphate content of food up to 70%

Are becoming more common in food supply
- 37% of foods consumed

Common in many OTC and prescribed medications in CKD
- Norvasc, Amiloride, Januvia, Epogen, Tums, Crestor, Zoloft

Often not reflected in dietary analysis nutrient databases

Calvo MS, Uribarri J. Contributions to Total Phosphorus Intake: All Sources Considered. Seminars in Dialysis. 2013;26(1):54-61.; Benini O, D'Alessandro C, Gianfaldoni D, Cupisti A. Extra-Phosphate Load From Food Additives in Commonly Eaten Foods: A Real and Insidious Danger for Renal Patients. Journal of Renal Nutrition. 2011;21(4):303-308.; Picard K. Potassium Additives and Bioavailability: Are We Missing Something in Hyperkalemia Management? Journal of Renal Nutrition. 2019;29(4):350-353.

Common Sources Phosphorus Food Additives

Snack Foods

Processed cheese or dairy (non-dairy creamer)

Frozen prepared foods

Beverages (more than just cola!)

Cereals

Sauces & dressings

Shelf stable prepared foods (canned meals, convenience foods)

Non-dairy creamer

RESTAURANTS & FAST FOOD

Possible Better Potassium Control?

Potassium

Hyperkalemia in kidney disease

- Accounts for 25% of emergent dialysis treatments
- Leads to abdominal cramping, weakness, paresthesia, cardiac arrhythmias and cardiac arrest

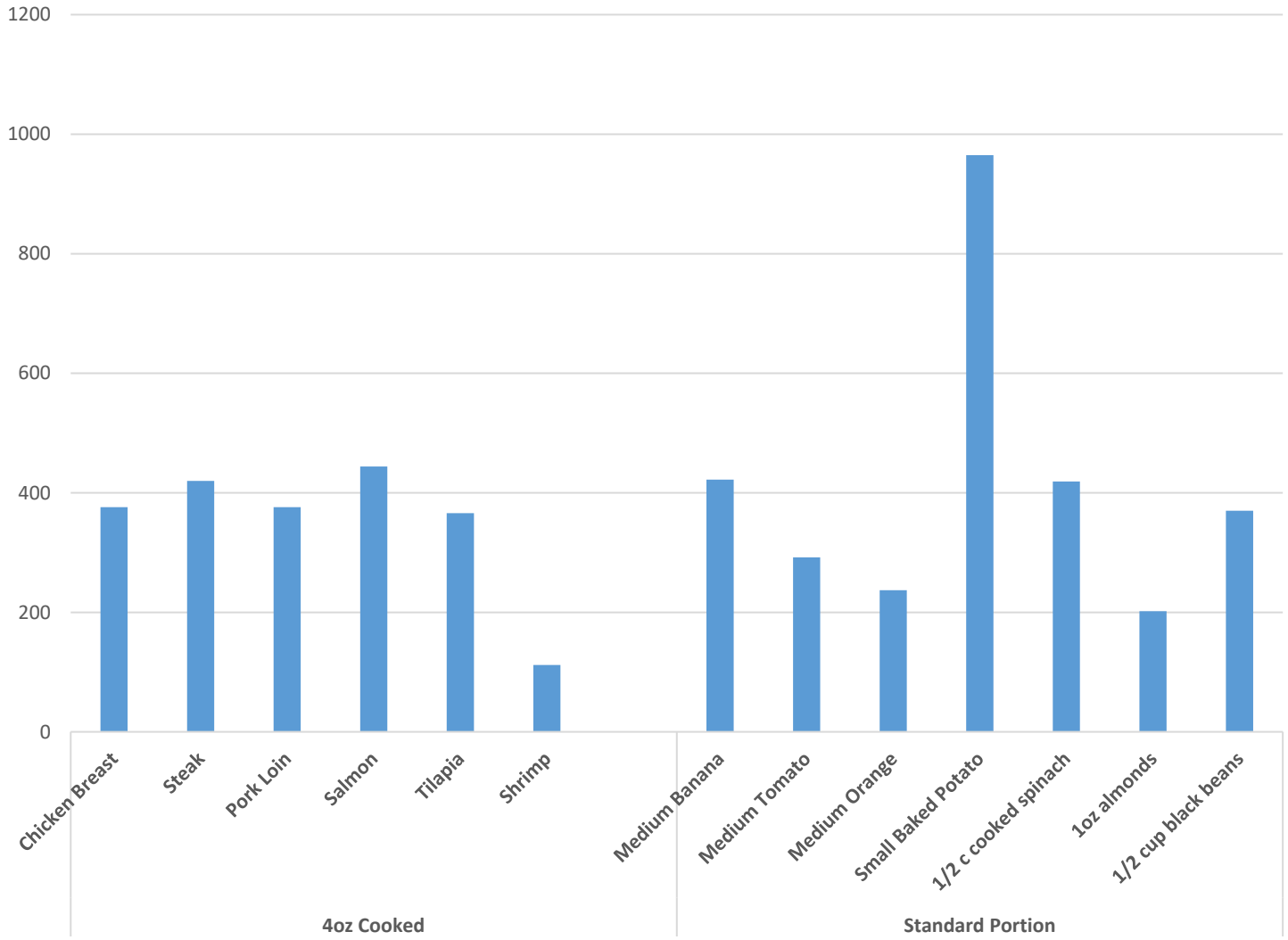
Little to no research to support a low potassium diet for CKD or ESRD

Other factors that can impact potassium

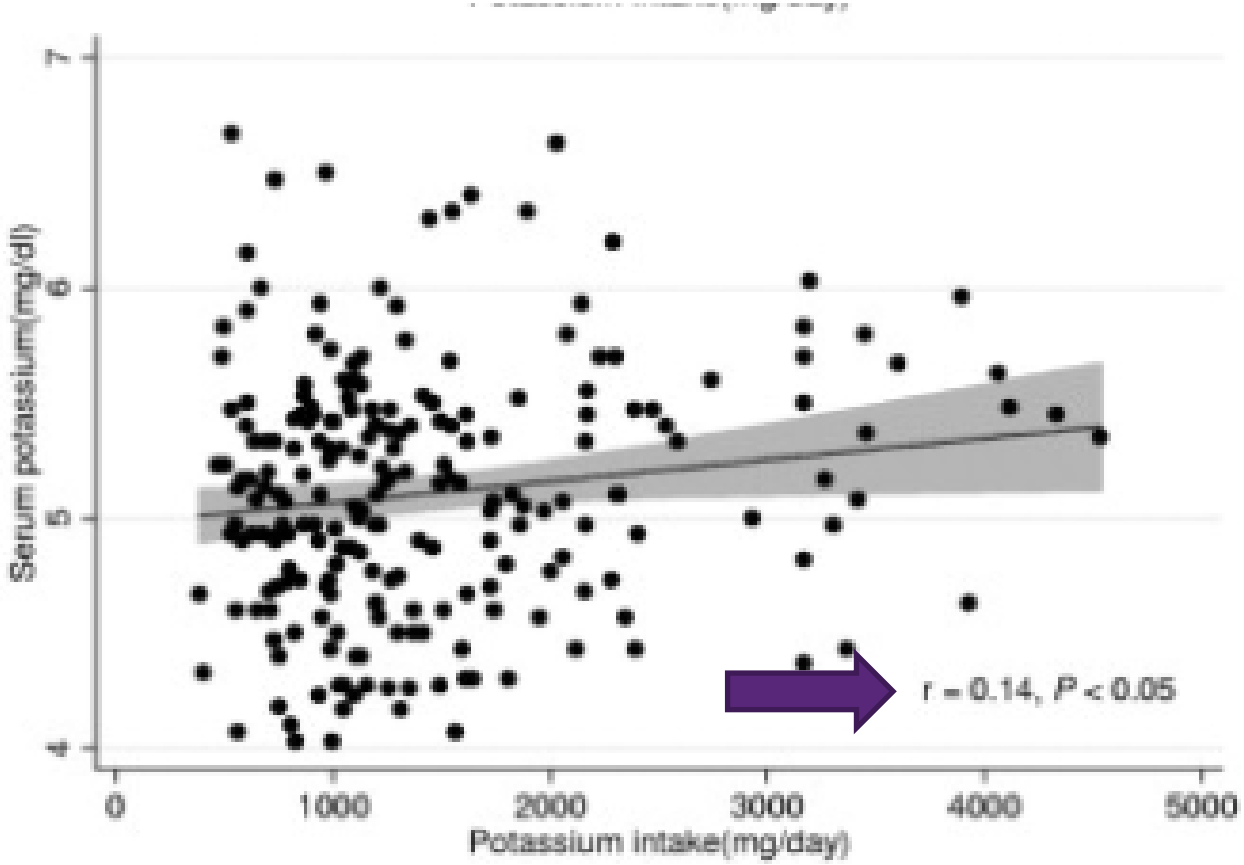
- Medications
- Residual kidney function
- Hydration status
- Acid-base status
- Glycemic control
- Adrenal function
- Catabolism
- GI (vomiting, diarrhea, constipation, bleeding)

St-Jules D, Goldfarb D, Sevick M. Nutrient non-equivalence: Does restricting high-potassium plant foods help to prevent hyperkalemia in hemodialysis patients? J Ren Nutr. 2016;26(5):282-287. doi:10.1053/j.jrn.2016.02.005

Potassium Content of Foods

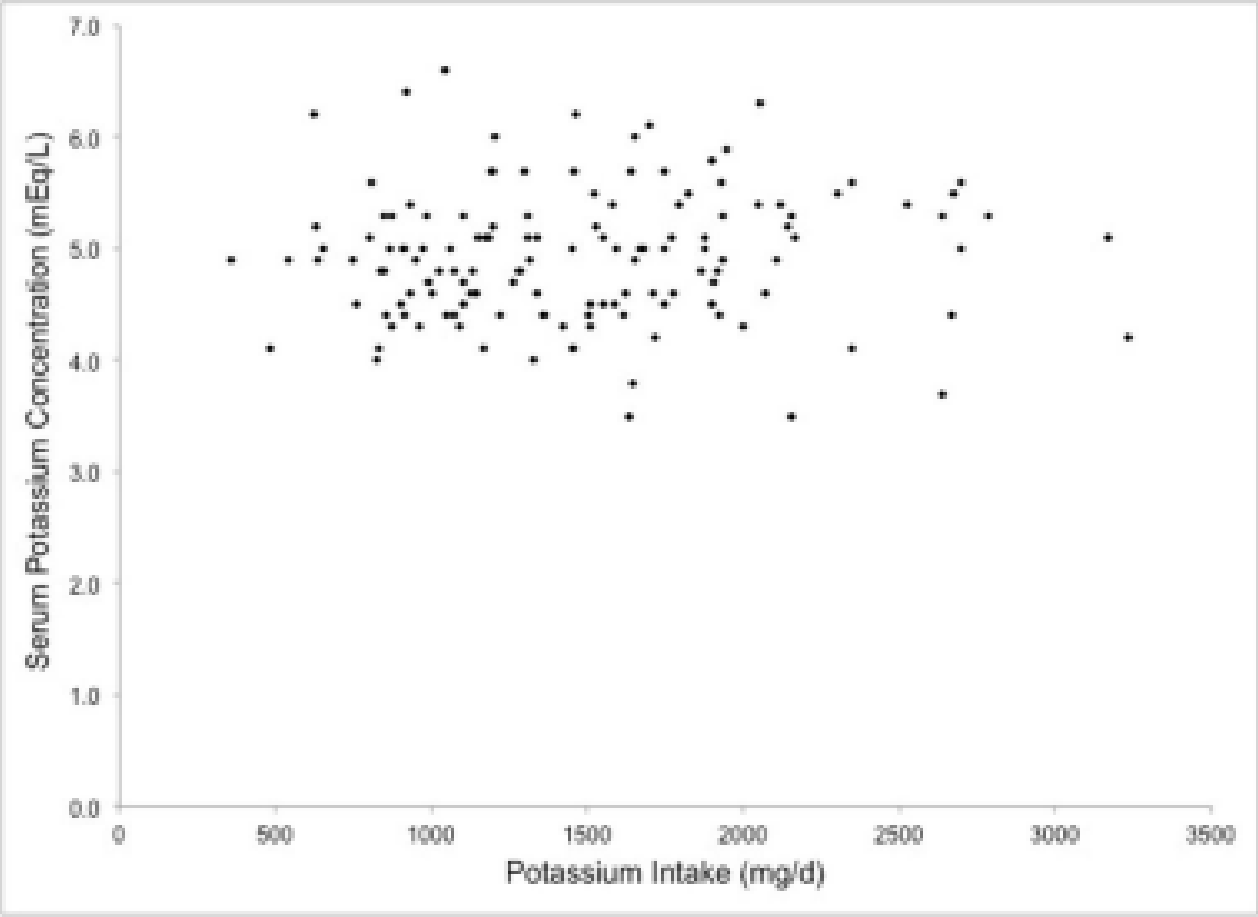


Potassium Intake ≠ Serum Potassium



Noori N, Kalantar-Zadeh K, Kovesdy CP, et al. Dietary Potassium Intake and Mortality in Long-term Hemodialysis Patients. American Journal of Kidney Diseases. 2010;56(2):338-347. doi:10.1053/j.ajkd.2010.03.022

Potassium Intake & Potassium Diet
Density ≠ Serum Potassium



St-Jules D, Goldfarb D, Sevick M. Nutrient non-equivalence: Does restricting high-potassium plant foods help to prevent hyperkalemia in hemodialysis patients? J Ren Nutr. 2016;26(5):282-287. doi:10.1053/j.jrn.2016.02.005

Potassium & Acid-Base Balance

In acidic environments, more potassium shifts to extracellular compartments (↑ serum potassium)

Higher bicarbonate dialysate results in faster lowering of serum potassium, despite removing less potassium

Remember:

- Meat has a HUGE acid load (PRAL)
- Adding fruits and veggies reduced acidosis

St-Jules D, Goldfarb D, Sevick M. Nutrient non-equivalence: Does restricting high-potassium plant foods help to prevent hyperkalemia in hemodialysis patients? J Ren Nutr. 2016;26(5):282-287. doi:10.1053/j.jrn.2016.02.005; Heguilén RM, Sciurano C, Bellusci AD, et al. The faster potassium-lowering effect of high dialysate bicarbonate concentrations in chronic haemodialysis patients. Nephrol Dial Transplant

Potassium & Insulin Resistance

Insulin helps shift potassium into cells

- Lower peak in serum potassium if glucose is provided with meal [2,3]
- In fasted state, see higher peak in serum potassium with potassium challenge [3]

High prevalence of insulin resistance in CKD (diabetes 2nd cause of CKD)

Plant based diets associated with improved insulin sensitivity

1. St-Jules D, Goldfarb D, Sevick M. Nutrient non-equivalence: Does restricting high-potassium plant foods help to prevent hyperkalemia in hemodialysis patients? J Ren Nutr. 2016;26(5):282-287. doi:10.1053/j.jrn.2016.02.005

2. Hc G, Cr K, Me R, Mh M. Functional impairment in chronic renal disease. 3. Studies of potassium excretion. Am J Med Sci. 1971;261(5):281-290. doi:10.1097/00000441-197105000-00007

3. Allon M, Dansby L, Shanklin N. Glucose modulation of the disposal of an acute potassium load in patients with end-stage renal disease. Am J Med. 1993;94(5):475-482. doi:10.1016/0002-9343(93)90081-Y

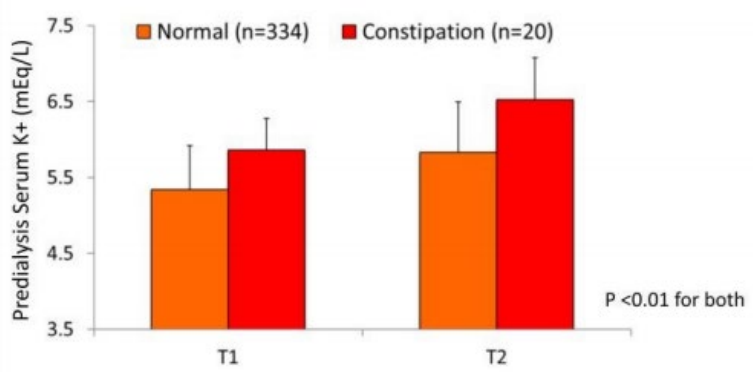
Excretion of Potassium in Stool

Eventually, potassium must be removed from body

- 90% of potassium removed by kidneys in healthy people[1]

3x higher stool potassium excretion in dialysis (37% vs. 12%)[2]

- Stool potassium excretion directly related to potassium intake[2]



- About half of HD patients report constipation[3]
- Up to 19% in CKD (need more studies)[4]
- Constipation associated with higher serum potassium in HD patients[5]

1. St-Jules D, Goldfarb D, Sevick M. Nutrient non-equivalence: Does restricting high-potassium plant foods help to prevent hyperkalemia in hemodialysis patients? J Ren Nutr. 2016;26(5):282-287.

2. Hayes CP, McLeod ME, Robinson RR. An extravenal mechanism for the maintenance of potassium balance in severe chronic renal failure. Trans Assoc Am Physicians. 1967;80:207-216.

3. Murtagh FEM, Addington-Hall J, Higginson IJ. The prevalence of symptoms in end-stage renal disease: a systematic review. Adv Chronic Kidney Dis. 2007;14(1):82-99.

4. Sumida K, Yamagata K, Kovesdy CP. Constipation in CKD. Kidney Int Rep. 2019;5(2):121-134.

5. El-Sharkawy M, Khedr E, Abdelwhab S, Ali M, Said KE. Prevalence of Hyperkalemia among Hemodialysis Patients in Egypt. Renal Failure. 2009;31(10):891-898.

Potassium Food Additives

Prevalence in food supply is growing
- 9% of foods consumed in dialysis patients
- Known to be high in meats – especially processed

meats
- *2-3X higher potassium in enhanced meats*

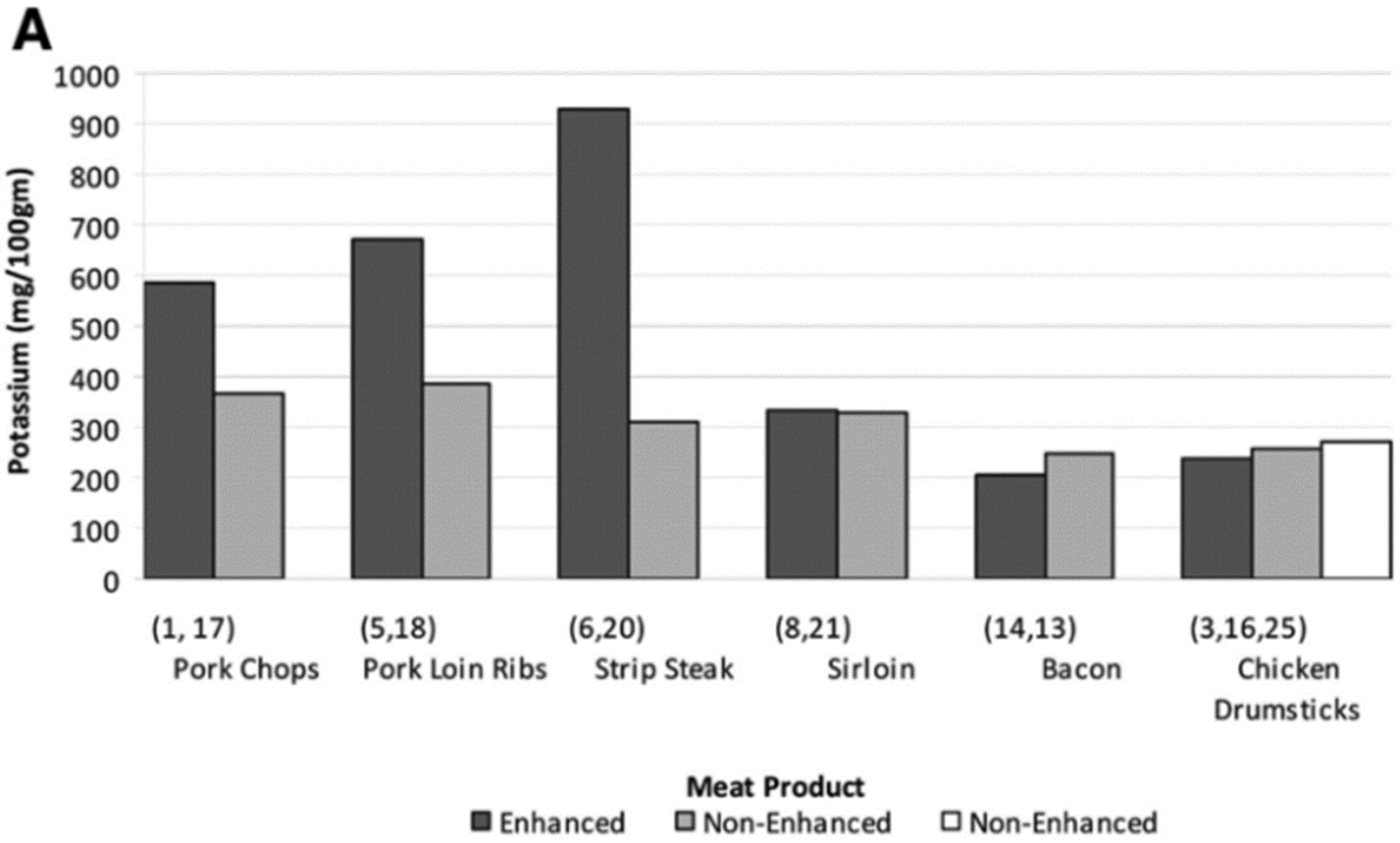
Often used in “low sodium” products
- 44% more potassium

Likely more bioavailable than naturally occurring potassium
(~90-100% vs. 50-60%)

Crystal Light label: https://www.myfoodandfamily.com/

Picard K. Potassium Additives and Bioavailability: Are We Missing Something in Hyperkalemia Management? Journal of Renal Nutrition. 2019;29(4):350-353.

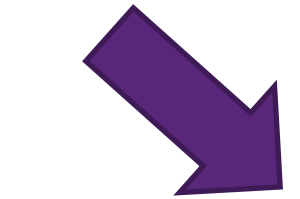
Potassium Food Additives



Summary

Perhaps more absolute potassium & phosphorus, BUT:

- Higher in protein & lower in alkali
  - Faster CKD progression
- More bioavailable phosphorus
- More difficult to control potassium?
  - Likely potassium additives
  - Lacking benefits for:
    - Constipation (control?)
    - Glucose Control
    - Acidosis
- No benefits for blood pressure
- Impact on gut microbiota?
- More Restrictive
  - Reduced food satisfaction and adherence?



Need More Research!

- Large scale intervention trials
- Get more professionals on board & further update guidelines
- Understand actual impact of diet on potassium & phosphorus control
- Adequate protein intake/malnutrition? Especially for dialysis populations
- MUCH more to understand effects of diet and/or probiotics on CKD outcomes
- Is this do-able for patients?

Questions?

Thank you!

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Upcoming Event

Vitamin D in Health and Performance: Evidence, Strategies, and Misinformation

Wednesday, April 19, 2023 1:00-2:00PM EST

This webinar will explore recent research on the health and performance benefits of Vitamin D, discuss strategies for appropriately assessing Vitamin D status and provide practical solutions for achieving and maintaining optimal vitamin D levels.

Continuing education credit will be available for this session!

https://oneop.org/event/142488

Military Family Readiness Academy

June 2023

The 90s-minute asynchronous course will equip service providers with the skills to discuss, identify, and connect families to resources to reduce the prevalence of food insecurity among military families

June 7: This panel discussion will provide service providers with program eligibility information and resources on accessing food security programs.

June 28: Facilitators will guide service providers through finding and assessing existing food security programs and partnerships, identifying gaps, making connections with other providers, and leveraging local Extension offices and programs, to create an actionable strategy to improve the food security of military families.

Continuing Education

This webinar has been approved for the following continuing education (CE) credits:

- 1.0 CPEU for RDNs and NDTRs
- Certificate of attendance

Evaluation Link

Go to the event page for the evaluation and post-test link.

Continuing Education

Questions?

Email Bethany Daugherty:
OneOpNutritionWellness@gmail.com

https://oneop.org/event/134979

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