

CKD: A Guide to Higher Fiber Foods¹

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Living with chronic kidney disease (CKD) presents many challenges, and diet is one of them. People with CKD may find it difficult to consume enough fiber-rich foods while following the other diet recommendations for CKD. As kidney function declines, individuals with CKD may be recommended to limit foods high in phosphorus and potassium. As some of the restricted foods may also be high in fiber, these restrictions may result in a diet lower in fiber.

National guidelines for fiber intake by individuals with CKD are lacking (Krishnamurthy et al. 2012), but it is generally recommended that people with CKD consume a diet higher in fiber. The fiber recommendations for CKD may be similar to what is recommended for healthy individuals: 21 to 25 g of fiber per day for women and 30 to 38 g of fiber for men depending on age (Trumbo et al. 2002). On average, people with CKD consume only about 15 g of fiber per day (Evenepoel and Meijers 2012). However, it is possible to follow the dietary restrictions for the later stages of CKD and still consume the recommended amount of fiber. This guide will discuss the health benefits of fiber and provide some examples of fiber-rich foods that may be good choices for people with CKD.

Health Benefits of Fiber and CKD

Fiber is naturally found in all plant foods, including fruits, vegetables, grains, nuts, seeds, and legumes. Fiber, when isolated from plants, can also be added to foods to create higher fiber foods. Consuming adequate fiber maintains a healthy digestive tract and lowers the risk of developing

heart disease, type 2 diabetes, and other chronic diseases (Dahl and Stewart 2015). Higher fiber intakes are also recommended for the management of many chronic diseases, as fiber helps lower cholesterol and control blood sugar. Fiber may also be beneficial for the management of blood pressure (Aleixandre and Miguel 2016).

Consuming the recommended amount of fiber may have a number of benefits for people with CKD. Higher fiber intakes are linked to improved survival (Krishnamurthy et al. 2012), as are healthy dietary patterns that provide fiber from fruit, vegetables, legumes, and whole grains (Kelly et al. 2016).

Adequate fiber, particularly insoluble fiber, may be helpful in promoting laxation and preventing constipation in people with CKD (Salmean, Zello, and Dahl 2013). Diabetes is a leading cause of kidney failure. Consuming foods that contain fiber may help with blood glucose control (Post et al. 2012) which might delay the progression of the disease (Shurraw et al. 2011; Lee et al. 2013). The higher risk of cardiovascular disease that comes with CKD may be lessened with fiber by lowering cholesterol and inflammation (Dahl et al. 2016).

Increasing Fiber with CKD

In the early stages of CKD, when there are usually no restrictions of potassium, it is recommended to consume a variety of foods providing fiber, such as whole grains, legumes, fruits, vegetables, nuts, and seeds.

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Many whole-grain foods and legumes are good sources of fiber, but have traditionally been limited in the CKD diet due to their phosphorus content. Although plant foods such as whole grains contain a significant amount of phosphorus, they are healthful food choices for those with CKD. This is because only a fraction of the phosphorus from whole grains is absorbed into the body (Williams, Ronco, and Kotanko 2013). Table 1 provides a list of whole grain foods.

Foods with added fiber can help to achieve fiber recommendations and may have beneficial health effects (Chiavaroli et al. 2014). Table 2 gives some examples of grain-based foods with added fiber. For more information on foods with added fiber, see <http://edis.ifas.ufl.edu/pdffiles/FS/FS23500.pdf>.

Fruits and vegetables are also important sources of fiber. Legumes, such as beans, peas, and lentils, are especially high in fiber, providing as much as 8 g of fiber per ½ cup serving. However, some people with CKD may need to restrict legumes and some fruits and vegetables due to their potassium content. For those with people with CKD who have been advised to restrict potassium, there are lower potassium fruits and vegetables to choose from. Examples are listed in Table 3.

It is recommended that people with CKD consult with a registered dietitian nutritionist (RDN), preferably one who specializes in kidney disease, before changing their diet. A dietitian can help with choosing optimum food sources of fiber for each stage of CKD.

Resources

For more information about the phosphorus contents of select foods, visit the United States Department of Agriculture's website at <http://www.nal.usda.gov/fnic/foodcomp/Data/SR17/wtrank/sr17a305.pdf>. This site provides an extensive index of all types of foods and their specific contents of phosphorus.

References

Aleixandre, A., and M. Miguel. 2016. "Dietary fiber and blood pressure control." *Food Funct* 7(4):1864–71. doi: 10.1039/c5fo00950b.

Chiavaroli, L., A. Mirrahimi, J.L. Sievenpiper, D.J. Jenkins, and P.B. Darling. 2014. "Dietary fiber effects in chronic kidney disease: a systematic review and meta-analysis of controlled feeding trials." *Eur J Clin Nutr*. doi: 10.1038/ejcn.2014.237.

Dahl, W. J., and M.L. Stewart. 2015. "Position of the Academy of Nutrition and Dietetics: Health Implications of Dietary Fiber." *J Acad Nutr Diet* 115(11):1861–70. doi: 10.1016/j.jand.2015.09.003.

Dahl, W.J., N.C. Agro, A.M. Eliasson, K.L. Mialki, J.D. Olivera, C.T. Rusch, and C.N. Young. 2016. "Health benefits of fiber fermentation." *Journal of the American College of Nutrition*.

Evenepoel, P., and B.K. Meijers. 2012. "Dietary fiber and protein: nutritional therapy in chronic kidney disease and beyond." *Kidney Int* 81(3):227–9. doi: 10.1038/ki.2011.394.

Kelly, J.T., S.C. Palmer, S.N. Wai, M. Ruospo, J.J. Carrero, K.L. Campbell, and G.F. Strippoli. 2016. "Healthy Dietary Patterns and Risk of Mortality and ESRD in CKD: A Meta-Analysis of Cohort Studies." *Clin J Am Soc Nephrol*. doi: 10.2215/cjn.06190616.

Krishnamurthy, V.M., G. Wei, B.C. Baird, M. Murtaugh, M.B. Chonchol, K.L. Raphael, T. Greene, and S. Beddhu. 2012. "High dietary fiber intake is associated with decreased inflammation and all-cause mortality in patients with chronic kidney disease." *Kidney Int* 81(3):300–6. doi: 10.1038/ki.2011.355.

Lee C.L., T.C. Li, S.Y. Lin, J.S. Wang, I.T. Lee, L.N. Tseng, Y.M. Song, S.F. Tsai, and W.H. Sheu. 2013. "Dynamic and dual effects of glycated hemoglobin on estimated glomerular filtration rate in type 2 diabetic outpatients." *Am J Nephrol*. 38:19–26.

Post, R.E., A.G. Mainous, D.E. King, and K.N. Simpson. 2012. "Dietary fiber for the treatment of type 2 diabetes mellitus: a meta-analysis." *J Am Board Fam Med* 25(1):16–23. doi: 10.3122/jabfm.2012.01.110148.

Salmean, Y.A., G.A. Zello, and W.J. Dahl. 2013. "Foods with added fiber improve stool frequency in individuals with chronic kidney disease with no impact on appetite or overall quality of life." *BMC Res Notes* 6:510. doi: 10.1186/1756-0500-6-510.

Shurraw, S., B. Hemmelgarn, M. Lin, S.R. Majumdar, S. Klarenbach, B. Manns, A. Bello, M. James, T.C. Turin, and M. Tonelli. 2011. "Association between glycemic control and adverse outcomes in people with diabetes mellitus and chronic kidney disease: a population-based cohort study." *Arch Intern Med*. 171:1920–1927.

Trumbo, P., S. Schlicker, A.A. Yates, and M. Poos. 2002.
“Dietary reference intakes for energy, carbohydrate, fiber,
fat, fatty acids, cholesterol, protein and amino acids.” *J Am
Diet Assoc.* 102(11):1621–30.

Table 1. Fiber and nutrient contents of some whole-grain foods. (USDA 2017)

Cereals	Serving Size	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Health Valley Fiber 7 Flakes	¾ cup	4.4	149	101	62
Health Valley Oat Bran Flakes	¾ cup	3.0	128	129	142
Kashi 7 Whole Grain Flakes	¾ cup	4.4	92	65	109
Kellogg's Mueslix	¾ cup	4.7	199	139	147
Kellogg's All-bran Bran Buds	¼ cup	9.6	183	113	154
Kellogg's Miniwheats unfrosted	15 biscuits	3.8	127	129	1
Post Shredded Wheat n' Bran	¾ cup	5.2	138	148	0
Post® Bran Flakes	¾ cup	5.5	160	135	162
Post® Grape Nuts	¼ cup	3.8	116	134	135
Post® Shredded Wheat n' Bran	¾ cup	5.2	138	148	0
Uncle Sam® Cereal	¾ cup	11.2	245	206	113
Weetabix Whole Grain	¾ cup	4.9	183	74	159
Breads	Serving Size*	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Cracked wheat	1 slice	1.6	50	43	153
Oatmeal	1 slice	1.1	46	36	127
Oat bran	1 slice	1.3	42	40	100
Pumpernickel	1 slice	1.8	59	50	169
Rice bran	1 slice	1.4	61	50	76
Sprouted wheat	1 slice	1.5	55	49	133
White wheat	1 slice	2.6	36	29	134
Whole wheat	1 slice	1.7	72	60	128
Crackers	Serving Size	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Triscuit® Crackers Hint of Salt	6 crackers	3	120 mg	10%	50 mg
Ryvita® Original Crispbread	2 slices	3	N/A	N/A	60 g

* Approximately one ounce (28 g); N/A = not available

Table 2. Fiber and nutrient content of some grain-based foods with added fiber. (USDA 2017)

Grain-based foods with added fiber	Serving Size	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Arnold Sandwich Thins®	1 roll (43 g)	5 g	N/A	N/A	170 mg
Barilla Pasta Added Fiber	2 oz	6 g	N/A	N/A	0 mg
Carb Balance Flour Tortillas	1 (42 g)	13 g	N/A	N/A	280 mg
FiberOne® with Bran cereal	½ cup	13.9 g	112 mg	60 mg	107 mg
FiberOne® Italian Bread	1 slice	3 g	N/A	N/A	130 mg
High Fiber Egg Noodles	2 oz	7 g	N/A	N/A	10 mg
MM Mania Fiber Biscotti	1 oz	6 g	N/A	N/A	70 mg
MM Mania Fiber Breadsticks	1 oz	11 g	N/A	N/A	140 mg
Quaker Instant Oatmeal High Fiber	1 pkt	10 g	115 mg	138 mg	213 mg
Wheatabix Crispy Flakes and Fiber Cereal	1 cup	4.4 g	124 mg	N/A	128 mg

Table 3. Fiber and nutrient contents of some lower potassium vegetables and fruits.* (USDA 2017)

Vegetables	Serving Size	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Broccoli (raw, chopped)	½ cup	1.2	144	30	15
Cabbage (raw, chopped)	½ cup	1.1	76	12	8
Carrot (raw)	1 small	1.4	160	18	34
Cauliflower (raw, chopped)	½ cup	1.1	160	24	16
Celery (raw, stalk)	1 medium	0.6	104	10	32
Corn (kernels, cooked)	½ cup	2.1	198	72	2
Cucumber (raw, peeled, chopped,)	½ cup	0.5	90	14	1
Eggplant (peeled, cubed, cooked)	½ cup	1.2	61	7	0
Green beans (cooked)	½ cup	2.0	91	18	1
Green Pepper (chopped, raw)	½ cup	1.3	130	15	2
Radish (raw, sliced)	½ cup	0.9	135	12	23
Zucchini (raw, with peel, chopped)	½ cup	0.6	162	24	5
Fruit	Serving Size	Fiber (g)	Potassium (mg)	Phosphorus (mg)	Sodium (mg)
Apple	1 small	3.6	159	16	1
Blueberries	½ cup	1.8	57	9	1
Blackberries	½ cup	3.8	117	16	1
Cherries (sweet, with pits)	½ cup	1.4	153	14	0
Grapefruit (raw, pink and red)	½ whole	1.4	156	11	0
Grapes (red or green)	15	0.7	140	15	1
Pear with skin	1 small	4.6	172	18	1
Pineapple (chunks)	½ cup	1.2	90	7	1
Plum with skin	1 medium	0.9	104	11	0
Raspberries	½ cup	4.0	93	18	1
Tangerine	1 small	1.4	126	15	2
Strawberries (whole)	½ cup	1.4	110	17	1

* Approximately one ounce (28 g); N/A = not available