

## Research: Dry Bean Consumption Lowers Cholesterol, Improves Overall Health

By Andrea M. Hutchins, PhD, RDN

Dry beans are one of the oldest cultivated foods. As noted in the last issue of this newsletter, nearly every culture has its own favorite dry bean that is incorporated into traditional cuisine.<sup>1</sup>

Recommendations from the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) include the use of functional foods, such as dry beans, in the Therapeutic Lifestyles Diet recommendations.<sup>2</sup> The NCEP Adult Treatment Panel III (ATP III) guidelines identify dry beans as a good low saturated fat protein source and also recognize their contribution to viscous (soluble) fiber intake in the diet. One-half cup of cooked dry beans supplies 5.5–8 grams of total fiber, including 1–3.5 grams of viscous fiber or 10–35% of the 5–10 grams of daily viscous fiber intake recommended by the NCEP ATP III.

### RD/RDN Takeaway #1:

The cholesterol lowering effect of dry beans is likely due to a combination of factors including binding and increased excretion of bile acids, promotion of short-chain fatty acid production, and disruption of cholesterol micelle formation.

Since those guidelines were published in 2002, research studies have continued to demonstrate that regular consumption of dry beans, typically in the range of 3–4 cups per week, lowers low-density lipoprotein cholesterol (LDL-C) and total cholesterol, typically in the range of 5–8%.<sup>3–6</sup> Two recent meta-analyses<sup>5,7</sup> examined the pooled results of randomized controlled trials (RCTs) that tested the ability of dry beans to lower cholesterol. The first meta-analysis<sup>7</sup> focused on dry beans and identified 10 RCTs that compared

dry bean consumption to a control for at least 3 weeks on cholesterol concentrations in adults. The interventions that incorporated dry beans (median of 150 grams per day or approximately 2/3 cup, slightly more than 1 serving) lowered total cholesterol by a median of 11.8 mg/dL and LDL-C by a median of 8.0 mg/dL.

The second meta-analysis<sup>5</sup> examined the effect of the broader category of dietary pulses (dry beans plus chickpeas, lentils, and peas) on cholesterol concentrations identified. The 26 RCTs included in this analysis lasted at least 3 weeks and compared a diet that emphasized dietary pulse intake with an isocaloric diet that excluded dietary pulses. The researchers

concluded that diets including a median dose of 130 grams per day (approximately 1/2 cup or 1 serving) of pulses each day significantly lowered LDL-C compared to the control diets by approximately 6.5 mg/dL or 5% from baseline. In addition to research that focuses solely on the impact of dry beans on total and LDL-C cholesterol



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concentrations, many researchers have examined the heart healthy impact of dry beans as part of a certain type of diet (e.g. Mediterranean, Dietary Approaches to Stop Hypertension [DASH], vegetarian, etc.) or in conjunction with examining the risk for other chronic diseases (e.g., type 2 diabetes mellitus) and reported positive results.

### What about HDL cholesterol?

The effects of dry bean consumption on high-density lipoprotein cholesterol (HDL-C) are less clear. Some researchers report no effect of dry bean consumption on HDL-C,<sup>3,4,7</sup> while others report both an increase<sup>7</sup> and decrease<sup>7</sup> in HDL-C. The mixed results indicate that more research is required to truly determine if dry bean consumption impacts HDL-C concentrations.

#### RD/RDN Takeaway #2:

**Dry beans may be as effective as oatmeal at lowering LDL-C and total cholesterol.**

Despite dry beans' demonstrated efficacy at lowering LDL-C, they historically have not been as well-recognized or touted for their heart healthy benefits like the well-known and oft-advertised oatmeal<sup>8,9</sup> (even though beans appear to be more effective than oatmeal). RD/RDNs can research the heart healthy aspects of dry bean consumption, educate their clients about those benefits, and provide suggestions on how dry beans can be incorporated into the diet. Since dry beans are a part of most traditional cuisines from around the world, ample culturally appropriate and culturally sensitive ideas for including dry beans in the diet are available.

*Editor's note: The World Bean Kitchen is a great resource for recipes and videos about the use of beans in world cuisines. Visit [www.ciaprochef.com/northarvest/](http://www.ciaprochef.com/northarvest/)*

### How do dry beans lower cholesterol?

There are several possible mechanisms by which dry beans may lower cholesterol concentrations. The first is displacement of higher fat foods in the diet. However, RCTs have demonstrated that even when diets are isocaloric and have similar macro-

nutrient (carbohydrate, protein, and fat) contents, dry bean consumption results in lower cholesterol concentrations. Additional mechanisms that may contribute to dry beans' effectiveness at reducing cholesterol concentrations include direct binding of dietary cholesterol by viscous fiber in the intestine, which interrupts the reabsorption of bile acids, disrupts cholesterol micelle formation, and inhibits endogenous cholesterol synthesis by short chain fatty acids (SCFA). However, a definitive determination regarding which mechanism or combination of mechanisms is responsible for the cholesterol-lowering benefit of dry bean consumption remains to be determined.

Viscous (soluble) fiber has long been recognized for its beneficial effects on cholesterol concentrations.<sup>6,7</sup> By binding bile acids in the gastrointestinal tract and preventing their reabsorption, the liver is forced to pull cholesterol from the blood in order to produce bile to replace that which was excreted. Viscous fiber and resistant starch, starch that escapes digestion in the small intestine, are fermented in the colon, serving as prebiotics. Fermentation of viscous fiber and resistant starch promotes the production of short-chain fatty acids and contributes to decreased hepatic cholesterol synthesis.<sup>6,10,11</sup> It is this fermentation that also contributes to the flatulence effect associated with dry bean consumption. Note: There are ways to mitigate or negate this effect including gradually increasing dry bean intake and soaking beans before cooking them. With regular consumption of dry beans, the effect does subside over time for most people.<sup>12</sup>

#### RD/RDN Takeaway #3:

**Dry beans' positive influence on heart health goes beyond their ability to favorably impact cholesterol.**

Dry beans contain small to moderate amounts of phytosterols and saponins, both of which have cholesterol-lowering properties. Phytosterols and saponins from bean seed coats have been shown to inhibit cholesterol micelle formation and phytosterols have also been shown to decrease lipogenesis *in vitro*.<sup>13,14</sup>

Dry beans are a good source of potassium, magnesium, and antioxidants,<sup>6</sup> dietary compo-



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nents whose consumption has been associated with a lower risk of cardiovascular disease. Dry beans cooked from scratch are also low in sodium. Manufacturers have worked to lower the sodium content of canned beans, which can be lowered even further if the beans are rinsed before eating. Increasing potassium and lowering sodium in the diet have a beneficial impact on blood pressure, which is one reason that dry bean consumption is encouraged with the DASH diet.<sup>15</sup> Daily consumption of ½ cup of pulses (including dry beans) was associated with improvements in arterial function independent of their effect on cholesterol concentrations.<sup>16</sup> Since the improvement in arterial function and reduction in corresponding peripheral artery disease and cardiovascular disease risk were independent of the cholesterol-lowering effect of dry bean consumption, components other than dietary fiber are likely to be responsible.

### Conclusion

Research supports the cholesterol-lowering effects of dry beans. Due to the fact that many dry beans are inexpensive, readily available, and versatile, RDNs can be confident that encouraging increased dry bean consumption to lower LDL-C and the risk of cardiovascular disease is a realistic lifestyle change. Although people with excessively elevated serum cholesterol profiles and genetic predisposal to cholesterol abnormalities generally require the help of medications, such as statins, to achieve normal, healthy cholesterol concentrations, the use of medications to achieve these concentrations is not optimal for everyone due to safety concerns and cost constraints.<sup>2,5</sup> Therefore, people who do not require the use of such medications should be encouraged to make reasonable diet and lifestyle changes, such as consumption of dry beans, that are generally safer, more affordable, offer fewer side effects, and provide more widespread health benefits. 🌱

### About the Author

**Andrea M. Hutchins, PhD, RDN** is an Associate Professor of Nutrition in the Department of Health Sciences at the University of Colorado Colorado Springs. She contributes to the education of future nutrition professionals and conducts research on the healthful effects of dry beans. Dr. Hutchins serves on the DBQ editorial board.

## Marinated Black Bean Salad



### Ingredients

- 1 15.5-ounce can black beans
- 1½ cups cooked brown rice  
(½ c. dry)
- 2 Tablespoons onion, chopped
- 1½ cups broccoli, chopped

### Dressing

- 2 Tablespoons canola or olive oil
- 2 Tablespoons red wine vinegar
- ¾ teaspoon dry thyme
- ¼ teaspoon garlic powder
- 1½ teaspoons dried parsley flakes
- ¼ teaspoon black pepper

### PREPARATION

1. Drain and rinse black beans. Add brown rice, onion, and broccoli. Gently mix.
2. In a small bowl, mix remaining ingredients for dressing.
3. Add dressing to bean mixture. Mix gently.
4. Refrigerate to allow flavor to develop. Serve chilled.

**YIELD:** 10 servings

**SERVING SIZE:** One half cup

### NUTRIENT INFORMATION PER SERVING:

Calories: 96; Fat: 3g (5%); Carbohydrates: 14g (5%);  
Protein: 3g; Cholesterol: 0g; Fiber: 3g (12%),  
Sodium: 135mg (6%)

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***Managing Editor's Note:** We're glad to share these ideas from readers on how they encourage patients and clients to enjoy dry beans. Send your tip to me at [DBQ@mail.com](mailto:DBQ@mail.com).*

"Figure out the foods clients already enjoy and then find a way to incorporate beans. Love burgers? Try a bean burger. Like tacos? Add some refried beans. Sandwich fan? Add a bean-based spread. Are they into soups? Oh, the possibilities!"

— Christine Twait, RDN  
Woodbury, MN

"I recommend adding beans to the meat to double a recipe and freeze some for later. Most meat dishes are excellent with beans! Example: add black beans to the ground beef in burritos, add garbanzo beans to a chicken salad, the list goes on forever!"

— Ashlyn Jones, RDN  
Rapelje, MT

"Stealth them into stews and braised dishes. White beans with pork, kidney beans in beef stew."

— Mary Place Herrstrom, RDN  
Collegeville, PA

"Soups! Mostly, I try to keep it simple and start slow. Too many beans too quickly might turn my patients off beans forever!"

— Christine Johnson Del Pizzo, RDN  
Hawthorne, NY

"Choose a "Bean of the Week." Include it in lunch, either in a pita pocket with vegetables and tangy dressing or in a quesadilla with mashed beans, cheese, and favorite seasonings."

— Merrill Adelman, RDN  
Norwalk, CT

"Choose a different bean every weekend. On Friday, soak beans in pot and cover with water. On Saturday, boil one hour and let sit. Sunday, drain and freeze in one cup scoops. Use one scoop per day as a salad topper, mix into pasta dishes or quicker chili, smash like potatoes, serve with rice, make a party dip. You'll always have a variety of beans on hand, ready to go, lowest in sodium and cheaper than canned."

— Natalie Stephens, RDN  
Gahanna, OH

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