

High-Fiber Gut Microbe Makeover Aids Weight Loss

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TOPLINE:

A fiber supplement also found in beans and other foods may lead to weight loss and improved [insulin](#) sensitivity in people with excess body weight, partly due to changes in the gut microbiota.

METHODOLOGY:

- In animal studies, resistant starch (RS), a kind of dietary fiber, has shown a potential to reduce body fat along with other metabolic benefits, but human dietary studies of RS have been inconsistent, especially with a high-fat diet.
- Researchers conducted a crossover, randomized trial to study the effect of RS as a dietary supplement on 37 individuals with overweight or [obesity](#) (average age, 33.43 years; 15 women; body mass index [BMI] > 24 or higher waist circumference).
- Participants were fed a similar background diet and either 40 g of RS (high-amylose maize) or an energy-matched placebo starch daily for 8 weeks and then switched between the two in a separate 8-week period.
- The primary outcome was body weight, and the secondary outcomes were visceral and subcutaneous fat mass, waist circumference, lipid profiles, insulin sensitivity, metabolome, and gut microbiome.
- RS's impact on gut microbiota composition and function was assessed with metagenomics and metabolomics, and RS-modified gut microbiota's effect on host body fat and glucose was confirmed by transferring from select average participants to mice.

TAKEAWAY:

- Participants showed a mean weight loss of 2.8 kg after consuming RS for 8 weeks ($P < .001$), but there was no significant change in body weight in those on placebo starch.
- RS improved insulin sensitivity in people to a greater extent than placebo starch ($P = .025$) and showed a greater reduction in fat mass, waist circumference, and other obesity-related outcomes.
- The abundance in the gut of the microbe *Bifidobacterium adolescentis* increased significantly following RS intervention, an increase that exhibited a strong correlation with decreased BMI, suggesting a role of RS in reducing obesity.
- The levels of pro-inflammatory cytokines, such as serum tumor necrosis factor-alpha and interleukin-1 beta, were significantly lower in participants who consumed RS than in those who had placebo starch.

IN PRACTICE:

"Our study provided an effective dietary recommendation using RS as a supplement (40 g/d with a balanced background diet containing 25%-30% fat), which may help to achieve significant weight loss," the authors commented.

SOURCE:

This study was led by Huating Li, Shanghai Clinical Center for Diabetes, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, and University of Hong Kong, Pok Fu Lam, Hong Kong, and published [online](#) in *Nature Metabolism*.

LIMITATIONS:

This study was limited by the small sample size and stringent inclusion criteria for participants. The use of database-driven and taxane-based methodology might have led to difficult-to-classify sequences being discarded and strain-level functional diversity being overlooked. The authors also acknowledged the need to validate the findings of this study in larger and more diverse cohorts.

DISCLOSURES:

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15 High Fiber, Low Carb Foods That Will Fill You Up

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Even if you don't follow a low carb diet, your bod can prob benefit from more high fiber, low carb foods. Getting enough fiber is crucial for overall health and it's especially important for your digestive system.

Plus, swapping foods rich in refined carbs for some lower carb options high in fiber can benefit blood sugar control, help protect heart health, and promote a healthy-for-you body weight. Not sure which foods to sub in? Here's the rundown of the best bites.

Benefits of low carb, high fiber foods

Most people don't get anywhere near the amount of fiber that's recommended for tip-top health. The average American consumes about 15 grams of fiber per day, which is much lower than the current fiber recommendations (between 25 and 38 grams per day for adults).

Research shows that people with high fiber diets are at a lower risk of developing heart disease, colorectal cancer, diabetes, and many more common health conditions.

Plus, most peep's diets are too high in ultra-processed sources of refined carbs like sugary breakfast cereals, candy, white bread, and soda. Eating these low fiber, high carb foods could lead to a number of health issues, including weight gain and heart disease.

You can get more fiber from lots of foods. Here are some of the best low carb sources.

1. Artichokes

Even though they aren't the most popular veggie, artichokes are packed with nutrients like fiber. *Bonus:* They're also low in carbs.

One cooked artichoke provides:

- **Calories:** 64
- **Fiber:** 7 grams (g)
- **Carbs:** 14 g

In addition to being high in fiber and low in carbs, artichokes are rich in vitamin C, vitamin K, folate, potassium, and many more important nutrients.

Cooked artichokes are particularly rich in soluble fiber. That may help benefit your heart health by reducing your heart disease risk factors like high LDL cholesterol.

2. Avocados

Creamy, delicious, and super nutritious, avocados are staple in lots of kitchens. These fruits full of healthy fat also happen to be low in carbs and high in fiber.

A half of an avocado provides:

- **Calories:** 161
- **Fiber:** 7 g
- **Carbs:** 9 g

Because avocados are a great source of fiber and low in carbs, they're a go-to if you're following a low carb diet. Plus, they're an excellent source of nutrients like potassium, vitamin C, magnesium, folate, B5, and vitamin E.

A bunch of studies have even linked eating avocados with potential health benefits like reducing heart disease risk factors, increasing fullness, and improving gut health.

3. Asparagus

Asparagus is another veg that's low in carbs, yet high in fiber.

A 1-cup serving of these fibrous veggies provides:

- **Calories:** 40
- **Fiber:** 4 g
- **Carbs:** 7 g

Asparagus is a good source of many nutrients like folate, vitamin C, and vitamin K.

Plus, it's packed with plant compounds that act as powerful antioxidants in your bod like the carotenoid lutein, which plays important roles in preserving and protecting eye health.

4. Peppers

Like a little spice in your life? You got it. Want to stay in the sweet zone? Totally cool. Either way, there's a pepper out there for you. And you can rest assured you'll be noshing on a nutrient-packed veggie that's low in carbs and high in fiber.

A large sweet red pepper provides:

- **Calories:** 43
- **Fiber:** 3 g
- **Carbs:** 10 g

Peppers also pack a punch when it comes to vitamin C, a nutrient that's critical for your immune system to work properly. A large sweet red pepper contains an impressive 233 percent of the Daily Value (DV) for this vitamin.

5. Cauliflower

Cauliflower is a low carb lover's dream. It's high in fiber, low in carbs and can be made into a tasty pizza crust. Can we get a cauli-lujah?!

1 cup of cooked cauliflower provides:

- **Calories:** 29
- **Fiber:** 3 g
- **Carbs:** 5 g

Cauliflower is a super versatile veggie. You can eat it raw or cooked, it makes an excellent low carb rice alternative, and can be added to dishes like stir-fries, soups, and more.

It's also loaded with important nutrients like vitamin C, vitamin K, and folate.

6. Brussels sprouts

If you typically steer clear of brussels sprouts, you might just be prepping them the wrong way.

If you're willing to give these tasty little gems another shot, try roasting, sautéing, or adding thinly shaved sprouts to a salad.

A 1-cup serving of cooked brussels sprouts provides:

- **Calories:** 70
- **Fiber:** 6 g
- **Carbs:** 14 g

Brussel's sprouts are an excellent source of bioactive plant compounds (like carotenoids) and sulfur-containing compounds (called glucosinolates). These have powerful antioxidant activity and may help protect your cells from oxidative damage.

7. Unsweetened coconut

Coconut is a high fiber food, but coconut products can be high in carbs if they contain sweetener. Choosing unsweetened coconut products gives you a lower carb option.

A 1-ounce serving of unsweetened dried coconut meat provides:

- **Calories:** 187
- **Fiber:** 5 g
- **Carbs:** 7 g

Try sprinkling a couple of teaspoons of unsweetened coconut on a bowl of yogurt or adding it to smoothies for a tropical kick. Not only will you be adding a boost of fiber, but you'll be getting a dose of minerals like manganese, copper, and selenium, too.

8. Mushrooms

Your fave fungi, mushrooms, are also a great low carb, high fiber option.

A 1-cup serving of cooked white button mushrooms provides:

- **Calories:** 44
- **Fiber:** 3 g
- **Carbs:** 8 g

Research shows that adding mushrooms (like oyster mushrooms) into your diet may help increase your intake of important nutrients. This includes fiber, phosphorus, potassium, vitamin D, and selenium — a mineral that's critical to your thyroid function.

9. Collard greens

Collard greens are one of the most nutritious greens you can eat. They're an excellent source of vitamin K, calcium, provitamin A, vitamin C, and folate.

A 1-cup serving of cooked collard greens provides:

- **Calories:** 44
- **Fiber:** 6 g
- **Carbs:** 8 g

Try subbing collard greens in dishes like stir-fries and soups. They're also delicious sautéed, roasted, or stewed.

10. Raspberries

Raspberries are lower in carbs than most fruits and are loaded with fiber.

A 1-cup serving of raw raspberries provides:

- **Calories:** 78
- **Fiber:** 10 g
- **Carbs:** 18 g

Studies have linked berry-rich diets to all sorts of health benefits. For example, some research findings suggest that eating berries (like raspberries) may help promote healthy blood sugar regulation. It could also help reduce your heart disease risk factors like high blood pressure.

11. Chia seeds

Chia seeds are a popular way to up your fiber intake. They're high in fiber but low in carbs, and you can incorporate them into fun recipes like chia pudding.

A 1-ounce serving of chia seeds provides:

- **Calories:** 138
- **Fiber:** 10 g
- **Carbs:** 12 g

As you can see, chia seeds contain an impressive amount of fiber. Plus, they're also rich in nutrients like calcium, iron, and magnesium. Magnesium's a mineral that's important for blood pressure and blood sugar regulation, nerve function, and lots of other critical body processes.

12. Pecans

Pecans are versatile nuts that taste great in both sweet and savory recipes.

They're lower in carbs than many popular nuts, like cashews, but they're still a good source of fiber.

A 1-ounce serving of pecans provides:

- **Calories:** 196
- **Fiber:** 3 g
- **Carbs:** 4 g

Pro tip: Try tossing some roasted pecans in a green salad topped with roasted chicken. Or, make a low carb granola with pecans, coconut, and pumpkin seeds.

13. Macadamia nuts

Macadamia nuts have a slightly sweet taste and a creamy-yet-crunchy texture. But they don't just taste good. They're also lower in carbs than many other nuts and contain a good amount of fiber.

A 1-ounce serving of raw macadamia nuts provides:

- **Calories:** 204
- **Fiber:** 2 g
- **Carbs:** 4 g

Macadamia nuts are also rich in several vitamins and minerals, including manganese, a nutrient that your body needs for bone health, immune response, blood clotting, and more.

14. Turnips

If you're looking for a low carb alternative to mashed potatoes that's high in fiber, look no further than the humble turnip.

Turnips are lower in carbs than potatoes, but take on the same creamy texture when you mash 'em.

A 1-cup serving of mashed turnips provides:

- **Calories:** 51
- **Fiber:** 5 g
- **Carbs:** 12 g

Turnips are super nutritious and they're especially high in vitamin C.

You can also eat the leaves of these root vegetables. Try sautéing turnip leaves with a bit of garlic and olive oil for a unique and nutrient-dense side dish.

15. Cacao nibs

If you're a chocolate lover, you're going to love this low carb, high fiber option.

Cacao nibs are tiny pieces of crushed cacao beans that are highly nutritious. They contain minerals like magnesium, iron, manganese, and copper. They're also an excellent source of flavonoid antioxidants (like catechin and epicatechin).

A 1-ounce serving of cacao nibs provides:

- **Calories:** 160
- **Fiber:** 8 g
- **Carbs:** 14 g

Even though cacao nibs aren't sweet like chocolate bars, they can give dishes a rich, chocolatey flavor without added sugar.

Try sprinkling cacao nibs on coconut yogurt or using them in low carb granola and trail mixes for a low carb-friendly chocolatey snack.

Bottom line

Low carb, high fiber foods can benefit almost everyone's diet. If you're looking for some delish swaps, this list has lots of ideas. From avocados to raspberries, there's plenty of options for all dietary restrictions and taste buds.

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13 sources expanded

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