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Unpacking the Science of Seed Oils

Learn from leading nutrition experts about how seed oils are made and how they can benefit your health.

Seed oils are some of North America's most widely consumed edible oils —nutritious, versatile, and affordable pantry staples in many kitchens. However, conflicting information on social media about their healthfulness can make it challenging to separate fact from fiction.

Prominent health organizations such as the American Heart Association, the Academy of Nutrition and Dietetics, and the World Health Organization recommend seed oils as good sources of fat. Recent peer-reviewed papers published in prestigious scientific journals, including the British Journal of Nutrition and Nutrition Today, confirm the health benefits of diets high in linoleic acid, the primary essential fat in most seed oils, including reduced risk of developing cardiovascular disease.[1,2] We invited two contributing authors to explain the scientific evidence on seed oils, alongside a registered dietitian nutritionist who shares tips on how best to use them. So, whether you are browsing your local supermarket or scrolling through your newsfeed – read on to make more informed decisions, based on decades of research.

All studies and findings mentioned throughout these responses are part of the recent published, peer-reviewed perspectives of scientific literature supported by the United Soybean Board.

Seed oils are a subset of vegetable oils that are derived from the seed rather than the fruit of plants. These include canola, corn, cottonseed, grapeseed, rice, safflower, sesame, and soybean oil. While the composition of different seed oils varies, they are all relatively high in unsaturated fatty acids and low in saturated fatty acids.[3]

Q&A

What does the research say about seed oil consumption?

Seed oils are predominantly of the omega-6 polyunsaturated fatty acid, linoleic acid–an essential fat your body needs but can't make on its own.[4] It supports cell function and overall health.[1]

Some claim that linoleic acid causes inflammation because it can be converted in your body to arachidonic acid, another type of omega-6 fat that has been linked with inflammation. However, because our body tightly regulates levels of arachidonic acid, research shows that linoleic acid has little to no effect on blood or tissue levels of this fatty acid. More importantly, randomized controlled trials, considered the highest quality of evidence, demonstrated that linoleic acid does not increase inflammation.[1,2]

– Mark Messina, PhD, MS

How do different types of seed oils benefit your health?

Seed oils are mostly composed of unsaturated fatty acids.[5] Population studies often involving tens of thousands of individuals who have been monitored for many years and even decades, show that diets high in linoleic acid are associated with lower risks of developing several chronic diseases including cardiovascular disease and type 2 diabetes.[1,2] Health agencies consistently recommend replacing saturated fats (like those in butter, lard, or beef tallow) with unsaturated fats to support heart health.[6,7]

– Mark Messina, PhD, MS

How do seed oils support heart health?

Seed oils support heart health primarily due to their fat composition. Linoleic acid has been shown to lower both total cholesterol and LDL-cholesterol levels when used as a replacement for dietary saturated fat.[8] Elevated blood cholesterol is a major coronary heart disease risk factor.[8]

Soybean oil has one of the highest amounts of linoleic acid, which is why the U.S. Food and Drug Administration recognizes North America's most consumed edible oil with a qualified health claim.[9]

– Kristina S. Petersen, PhD

Do seed oils impact other chronic diseases?

Population studies show that higher intake of unsaturated fats may help reduce the risk of type 2 diabetes. For example, a meta-analysis of 102 clinical trials with over 4,000 adults found that replacing just 5% of calories from saturated fat with unsaturated fats significantly lowered blood sugar levels and insulin resistance.[10] A long-term study involving more than 200,000 men and women in the U.S. found that people whose diet was higher in linoleic acid was associated with a lower risk of developing type 2 diabetes.[11]

All in all, studies suggest that eating more unsaturated fats, especially polyunsaturated fatty acids, may help manage and reduce the risk of developing type 2 diabetes.[1]

– Kristina S. Petersen, PhD

Should you be concerned with consuming too many omega-6 fatty acids like linoleic acid?

Linoleic acid accounts for about 90% of the polyunsaturated fat Americans consume.[2] This intake typically accounts for about 8% of total daily calories, which is well within the guidelines set by the National Academy of Medicine.

There is no official consensus on the ratio at which we should consume omega-6 to omega-3 fatty acids.[1] It is important to consume adequate quantities of each because both are beneficial. The good news is that soybean oil and canola oil provide both omega-3 and omega-6 fatty acids.[12,13] In fact, soybean oil is also a source of alpha-linoleic acid (ALA) omega-3s.[12]

– Kristina S. Petersen, PhD

How are seed oils made?

Most seed oils are processed to ensure they are safe and healthy to consume. This can involve using food-grade solvents like hexane (an organic compound) to efficiently extract the oils from the seeds; but the hexane is then efficiently removed post-use. In fact, to reach even the minimal amount of hexane that's considered unsafe for consumption, the average person would have to consume 100 times more seed oils (the equivalent of a gallon of vegetable oil daily!) every day—far more than is typically consumed.[2]

As a final step, seed oils are deodorized to eliminate any unwanted colors, odors, or other environmental contaminants. Even after processing, seed oils retain beneficial nutrients like vitamin E, an antioxidant crucial for immune function, vision, brain health, and skin protection.[2]

– Kristina S. Petersen, PhD

Which seed oils are best to grab at the store and how do you use them?

Choosing the best oil will depend on the taste profile and the desired culinary application, especially when it comes to the smoke point. Cooking oils beyond their smoke point can lead to the formation of compounds that cause off flavors.

For example, soybean oil's smoke point is 450°F while canola oil is 435°F and corn oil is 410°F.

Seed oils like soybean and canola are great for sautéing or grilling veggies, creating dressings for salads and sandwiches, and baking your favorite treats.

Soybean oil has a neutral taste, which means it won't impact the overall flavor profile of the food being heated or prepared.

– Pam Smith, RDN

What is the best way to store seed oils?

Storing oils properly and protecting them from light, oxygen, and heat will help prevent them from going rancid. For this reason, seed oils should be stored in a tightly sealed container in a dark, dry, and cool location such as a pantry or cupboard, away from heat sources. Since the shelf life of different seed oils varies, it is recommended to use these oils within 6–12 months of purchase and within 3–5 months after opening for optimal freshness.

– Pam Smith, RDN

MEET OUR EXPERTS

KRISTINA S. PETERSEN, PHD

Dr. Petersen was a contributing author on the peer-reviewed papers published in the British Journal of Nutrition and Nutrition Today

Kristina Petersen is an associate professor at Penn State University leading research on dietary interventions for cardiometabolic health. She directs the Diet and Cardiometabolic Health Lab, conducting clinical trials on the effects of foods and dietary patterns on disease risk factors. She is a member of the American Heart Association Nutrition Committee and has contributed to various scientific statements and advisory groups. Kristina has a Bachelor of Nutrition and Dietetics (Honors) from Flinders University (Australia) and a Ph.D. in Nutrition from the University of South Australia (Australia).

MARK MESSINA, PHD, MS

Dr. Messina was a contributing author on the peer-reviewed papers published in the British Journal of Nutrition and Nutrition Today

Dr. Messina is the Director of Nutrition Science and Research for Soy Nutrition Institute Global. Over the past three decades, he has devoted his time to the study of the health effects of soy foods and soybean components such as isoflavones, soy protein, and soybean oil. He has published more than 100 peer-reviewed articles and given more than 800 presentations to both consumer and professional groups in 55 countries. Dr. Messina is the chairperson of the editorial advisory board and writes a regular column for the Soy Connection, a quarterly newsletter that reaches over 250,000 dietitians and other health professionals. He has also organized and chaired 10 international symposia on the role of soy in preventing and treating chronic disease and has organized smaller meetings in the United States, China, India, Brazil, and Italy. Dr. Messina is the co-author of three books, The Simple Soybean and Your Health, The Vegetarian Way, and The Dietitian's Guide to Vegetarian Diets: Issues and Applications.

PAM SMITH, RDN

Pam Smith is a registered dietitian nutritionist, culinary innovator and flavor consultant, best-selling author, TV and radio host, and provides strategic menu development and insight for clients such as Disney, Nike, Darden Restaurants, Hyatt Hotels and Resorts, Cracker Barrel, and Firebirds Wood Fired Grill. She is the co-creator of Bahama Breeze and Seasons 52 restaurants and has hosted all 24 years of the Epcot Food and Wine Festival. Smith has coached professional, corporate and life athletes in winning plans— the NBA's Shaquille O'Neal, Orlando Magic, and the PGA. She has authored 17 books, including her best-selling Eat well—Live Well and her daily radio spot "Living Well" is heard on over 800 stations nationwide. As founding principle of Shaping America's Plate and co-chair of The Culinary Institute of America's Healthy Menus R&D Collaborative, Smith works to increase offerings of fresh, innovative, and tasty menu options that are delicious, nutritious, and sustainable — helping to serve up "Delicious Wellness" one plate at a time at top restaurants and home kitchens across America.

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