

## **PRIORITIZING NUTRIENT CONTENT OVER LEVEL OF PROCESSING IN FOOD EVALUATION AMIDST THE ULTRA-PROCESSED FOOD DEBATE**

**By Mark Messina, PhD, MS**

“High UPF [ultra-processed food] consumption is associated with an increased risk of a variety of chronic diseases and mental health disorders. At present, not a single study reported an association between UPF intake and a beneficial health outcome.”<sup>1</sup> This statement, which comes from a recently published umbrella review of 39 meta-analyses of observational studies, should concern all health professionals, but especially those in the United States because by one estimate, Americans get 58% of their calories from UPFs; more than any other country, and in most instances, markedly so.<sup>2</sup>

### **Nova Food Classification System Defines Ultra-processed Foods**

The definition of UPF used by the authors of the aforementioned umbrella review was crafted in 2009 by Brazilian researchers who created the Nova food classification system, which divides all foods into four categories based ostensibly on the extent to which they have been processed, though formulation (e.g., whether a food contains an additive) is also considered.<sup>3</sup> While many foods classified as ultra-processed are high in fat, sugar, and sodium, nutritional quality is not a consideration in the classification of UPFs. In fact, Julie Hess and colleagues<sup>4</sup> recently showed that it is possible to devise a diet based almost exclusively on UPFs that results in a healthy eating index score of 86 out of 100, which is far greater than the average score for Americans of 59. Australian researchers found that of the more than 25,000 products analyzed, 1/3 of foods Nova-classified as ultra-processed received at least 3.5 stars based on the Health Star Rating system (5 stars being the highest score) whereas 1/3 of foods not classified as ultra-processed received fewer than 3.5 stars.<sup>5</sup>

Research on UPFs has increased markedly in recent years, an observation supported by the exponential increase in peer-reviewed publications on this topic. In 2023, 574 papers indexed in PubMed were related to UPFs whereas a decade earlier that figure was only nine. Another indication of the interest in UPFs is that the 2025 U.S. Dietary Guidelines for Americans Advisory Committee (subcommittee 1) is tasked with addressing the question, “What is the relationship between consumption of dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity?”

## Impact of Ultra-processed Foods on Soy Food Perception

The emergence of Nova potentially impacts the perception of many soy foods because 90% of all plant milks, including soymilk made from whole soybeans, and the entire new generation of plant meats based on concentrated sources of protein, such as soy protein isolate and soy protein concentrate, are classified as UPFs.<sup>6</sup> While it is beyond the scope of this article to comprehensively evaluate the merits of Nova, it makes little nutritional sense to place calcium and vitamin D-fortified soymilk, protein-rich soy burgers, and packaged snack cakes in the same category, and therefore to conclude that they similarly affect health. And yet, that is in essence what Nova does.

Nova paints with a very broad brush, which is evidenced by the results of several observational studies which show that although total UPF intake is associated with adverse health outcomes, subgroups of UPFs are often not associated with risk or are associated with a decreased risk.<sup>7-13</sup> For example, a recently published analysis of a multinational cohort found that higher UPF consumption was associated with an increased risk of multimorbidity of cancer and cardiometabolic diseases. However, whereas ultra-processed animal-based products and artificially and sugar-sweetened beverages were associated with marked increased risks, plant-based alternatives were associated with a non-significant decreased risk.<sup>7</sup> Similarly, although a combined analysis of three large U.S. cohorts found total UPF intake was associated with an increased risk of developing diabetes, the hazard ratio for seven of the 14 subgroups of UPF was below 1.00 (indicating a protective association).<sup>8</sup>

## Analyzing Nutrient Content and Level of Processing

When considering the two major categories of plant-based alternatives, plant milk alternatives and plant meat alternatives, it is the latter that have been most heavily criticized for the extent to which they are processed. When the merits of plant milks are evaluated, it is typically based on nutrient content and often in comparison to cow's milk. However, it is one thing to compare nutrient content and another to compare health outcomes. In a forthcoming analysis of randomized controlled trials (RCTs), researchers from the University of Toronto have done just that. See the article by Erlich and Sievenpiper in this issue for more details.

## Conclusion

In several recently published RCTs, the health effects of plant-based meat alternatives have been compared to meat, which is Nova-classified as unprocessed or minimally processed.<sup>14-17</sup> Overall, these trials show that health effects are driven by nutrient content, not by processing level. However, the trials were only four to eight weeks in duration, which may be too short to see all potential differences. One recent analysis did find that the common attributes of UPFs (e.g., hyperpalatability, calorically dense, soft texture) do not apply to soymilk or soy burgers more so than to their animal-based counterparts, cow's milk or meat, respectively, even though the former are classified as UPFs and the latter as unprocessed or minimally processed foods.<sup>18</sup> So, while it is fair to say that more mechanistic work aimed at understanding the health effects of UPFs is needed, considerable evidence indicates that when evaluating foods, emphasis should continue to be placed on nutrient content.

## ABOUT THE AUTHORS

**Mark Messina, PhD, MS**, is chairperson of the Soy Connection editorial board and director of nutrition science and research for Soy Nutrition Institute (SNI) Global. He is also the co-owner of Nutrition Matters, Inc., a nutrition consulting company, and is an adjunct professor at Loma Linda University. His research focuses on the health effects of soy foods and soybean components.

# EXPLORING SOYMILK AND CARDIOMETABOLIC HEALTH: A SYSTEMATIC REVIEW AND META-ANALYSIS

By Madeline N. Erlich, RD, PhD(c) and John L. Sievenpiper, MD, PhD, FRCPC

Amid growing concerns about sustainability and health, dietary guidelines consistently advocate for a transition towards plant-based diets.<sup>1-8</sup> The market for dairy, meat, and egg alternatives has expanded rapidly in response, with plant-based foods projected to reach almost 10% of the global protein market by 2030.<sup>9</sup> Though these foods may aid in the transition to and maintenance of plant-based diets, systems like the World Health Organization-endorsed Nova food classification system labels these alternatives as ultra-processed and suggest limiting consumption.<sup>10</sup>

This contradiction is exemplified by fortified soymilk, which is recognized by the Dietary Guidelines for Americans (2020-2025) as the sole nutritionally comparable plant-based alternative to cow's milk, and yet is classified as an ultra-processed food.<sup>1</sup> Furthermore, the common practice of adding sugars to soymilk, intended to match the natural sweetness of cow's milk (Nova-classified as minimally processed), would disqualify it from meeting the Food and Drug Administration's proposed definition of a "healthy" food.<sup>11</sup> To address the contradictory messaging and explore the health effects of soymilk, a recent analysis evaluated the cardiometabolic impacts of soymilk compared to cow's milk.

## Effects of Soymilk and Cow's Milk in Cardiometabolic Health

A University of Toronto research team has undertaken a comprehensive systematic review and meta-analysis of randomized controlled trials that compare the effects of soymilk with cow's milk on cardiometabolic health in adults. This evidence synthesis aims to explore the specific contributions of sweetened and unsweetened soymilk to health outcomes, including lipids, glycemic control, blood pressure, inflammation, adiposity, and renal and hepatic function in adults of any health status over a duration of ≥3 weeks. The protocol was registered at ClinicalTrials.gov (identifier, NCT05637866).

Preliminary data restricted to the effect of substituting sweetened soymilk for cow's milk was presented at the 2023 American Society for Nutrition Conference (NUTRITION 2023, Boston, MA, USA). The search identified 10 trials with a total of 277 adult participants. Available outcome data included LDL cholesterol (6 trials), HDL cholesterol (4 trials), non-HDL cholesterol (3 trials), triglycerides (4 trials), HbA1c (1 trial), fasting plasma glucose (3 trials), 2-hour plasma glucose (1 trial), fasting insulin (2 trials), systolic blood pressure (3 trials), diastolic blood pressure (3 trials), C-reactive protein (1 trial), body weight (3 trials), body mass index (BMI) (3 trials), waist circumference (2 trials), alanine aminotransferase (ALT) (1 trial), and aspartate aminotransferase (AST) (1 trial).

Participants consumed a median of 602mL of sweetened soymilk daily, which contained 24.5g protein and 19g added sugars (7g/250 mL). In comparison, the median daily consumption of cow's milk was 538 mL, with 24.5g protein and 26g lactose (12g/250 mL). In these trials, replacing cow's milk with sweetened soymilk led to moderate reductions in LDL cholesterol (MD, -0.22 mmol/L [95% CI, -0.34 to - 0.09 mmol/L]) and large reductions in systolic (-7.51 mmHg [-10.26 to -4.76 mmHg]) and diastolic (-4.08

mmHg [-6.59 to -1.58 mmHg]) blood pressure. No differences in HDL-C, non-HDL-C, triglycerides, HbA1c, fasting plasma glucose, 2-hour plasma glucose, fasting insulin, C-reactive protein, body weight, BMI, waist circumference, AST, or ALT were seen. The 8% reduction in LDL-cholesterol and 7.5 mmHg reduction in systolic blood pressure is comparable to the reductions seen with drugs used as add-on therapy to statins for cholesterol lowering (e.g., bile acid sequestrants) and first line drugs used for blood pressure lowering at submaximal doses (e.g., ACE inhibitors [angiotensin-converting enzyme inhibitors]; ARBs [angiotensin receptor blockers], and CCBs [calcium channel blockers]), respectively.<sup>12,13</sup>

The certainty of the evidence was rated as moderate for the reduction in LDL-cholesterol, moderate and low for the reductions in systolic and diastolic blood pressure, respectively, and generally moderate for the effects across all other outcomes using the established Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.<sup>14,15</sup> There were no trials that examined apolipoprotein B, plasma glucose area under the curve, body fat, creatinine, estimated glomerular filtration rate, creatinine clearance, albuminuria, albumin-to-creatinine ratio, uric acid, intrahepatocellular lipid, or fatty liver index, highlighting an area for future research.

## Summary

The evidence from these preliminary analyses provides a good indication that substituting sweetened soymilk for cow's milk does not have an adverse effect on a broad range of intermediate cardiometabolic outcomes and that sweetened soymilk (with up to 7g of added sugars per 250mL) may even have advantages for LDL-C and blood pressure reduction.

If the findings hold in the full analysis, these results suggest that classifying plant-based dairy alternatives like soymilk as ultra-processed could be misleading regarding their cardiometabolic effects. The results of the full analysis involving sweetened and unsweetened soymilk are expected in late 2024.

## ABOUT THE AUTHORS

**Madeline N. Erlich, RD, PhD(c)**, is a registered dietitian and PhD candidate in Nutritional Sciences at the University of Toronto, and a CIHR master's and doctoral award recipient. Under the supervision of Dr. John L. Sievenpiper, her research focuses on the role of soy in metabolic health.

**John L. Sievenpiper, MD, PhD, FRCPC**, is a clinician scientist who holds appointments as a professor at the University of Toronto and staff physician and scientist at St. Michael's Hospital. He has established an internationally recognized research program focused on using randomized controlled trials and epidemiological approaches to address questions of clinical and public health importance in relation to diet and cardiometabolic disease prevention. He is the recipient of numerous awards. He is directly involved in clinical practice guidelines development for obesity, diabetes, and cardiovascular disease with appointments to expert committees in Canada and Europe. He has authored more than 280 papers.

# THE ROLE OF ULTRA-PROCESSED FOODS AS PART OF A HEALTHY DIET

By Karen Ansel, MS, RDN, CDN

Ultra-processed foods are controversial. Yet, despite the headlines, we rarely hear about their benefits. For example, many ultra-processed foods are extremely nutrient-dense, not to mention convenient, affordable, and accessible. As a result, they can help busy clients and patients prepare healthful, nutrient-rich meals without spending hours in the kitchen. Because ultra-processed foods have a long shelf life, they can also reduce food waste as well as time spent shopping for food.

## The Science Behind Ultra-processed Foods

Most nutrition research uses the Nova classification system to categorize food based on what it terms level of processing.<sup>1</sup> However, the Nova system does not address nutritional quality. According to Nova, a food or beverage is ultra-processed if it contains multiple industrially processed ingredients. This broad umbrella may include foods high in saturated fat, added sugars, and sodium. Conversely, it may also include fortified tofu, lightly sweetened yogurt, fire-roasted canned tomatoes, fortified cereal, peanut butter, whole-wheat bread, soymilk, infant formula, and more.

To better understand the nutritional spectrum of ultra-processed foods, consider the results of a 2021 study that examined the nutritional content of plant-based milks. Of 641 plant milk samples analyzed, only soymilk met the proposed nutrient standards for energy, sugar, calcium, protein, and vitamins A, D, and B12.<sup>2</sup> With 7 grams of complete protein per cup, soymilk is the only plant-based milk recommended by the Dietary Guidelines for Americans and the American Academy of Pediatrics.<sup>3,4</sup> By comparison, other plant-based milks, such as almond or oat milk, offer a respective 1 and 3 grams of protein and may not be fortified with calcium and vitamin D.

## Putting Healthy Ultra-processed Foods into Action

Understandably, clients may need guidance regarding the role of ultra-processed foods in a healthy diet. As health and nutrition professionals, we can help them by showing how certain nutrient-dense, ultra-processed foods can make it easier to incorporate food groups and nutrients their diets may lack.

### To get started, here are some practical tips:

- Start the day with fortified whole-grain cereal, a sliced banana, and soy or cow's milk.
- Stir pumpkin puree or microwaved frozen berries into instant oatmeal.
- Spread nut butter like peanut or soy on a whole-wheat bagel or English muffin.
- Whip up a tofu scramble for breakfast or lunch.
- Blend 1 cup of plain unsweetened soymilk, 1 small banana, ½ cup of frozen strawberries, and 1 tablespoon of nut butter into a smoothie for 12 grams of protein (versus 6 grams in a smoothie made with almond milk).
- Snack on Greek yogurt with chopped dried figs or dates.
- Combine rinsed, drained canned chickpeas with mayonnaise and curry powder and serve on whole-wheat bread.
- Toss canned, drained salmon into a salad and drizzle with bottled vinaigrette.
- Top pasta with tomato sauce from a jar and sprinkle with soy-based cheese crumbles or textured vegetable protein. Serve with a side dish of microwaved frozen edamame, peas, or spinach.

In the end, sorting through the nuances of ultra-processed foods requires some detective work. However, by taking a close look at the nutrient profiles of these foods, we can help our clients and patients make the best possible choices for a healthy, balanced diet.

## ABOUT THE AUTHOR

**Karen Ansel, MS, RDN, CDN**, is a nationally recognized nutrition consultant, speaker, journalist, and author. As a regular contributor to national women's, health, and cooking magazines, Karen's meal plans, diet advice, recipes, and healthy eating articles have been featured in *Cooking Light*, *Fitness*, *Shape*, *Oprah*, *Weight Watchers*, *Family Circle*, *All You*, *Prevention*, *Parade*, *Woman's Day*, and *Women's Health*. She is the co-author of *The Calendar Diet: A Month By Month Guide to Losing Weight While Living Your Life* (2012), *Healthy in a Hurry: Simple, Wholesome Recipes for Every Meal of the Day* (2012), the IACP finalist, *The Baby & Toddler Cookbook: Fresh, Homemade Foods for a Healthy Start* (2010), and *Healing Superfoods for Anti-Aging: Stay Younger, Live Longer* (2017).

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