An Open Letter to the World Health Organization:

The WHO Trans Fat REPLACE Program is Anti-Coconut Oil and Instead Promotes PUFA Seed Oils and Ultra-Processed Food

Prepared by the Scientific Advisory Committee for Health, International Coconut Community
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In 2019, the World Health Organization launched its **Trans Fat REPLACE Program: An action package to eliminate industrially produced trans-fatty acids** (WHO, 2020). The principal objective of this program is purportedly to remove industrial trans fats from the global food supply by 2023. However, this program has three other objectives: First, to promote polyunsaturated fatty acid (PUFA) seed oils; Second, to promote industrially produced interesterified fats; and Third, to discourage the consumption of coconut oil. (see **Figure**).

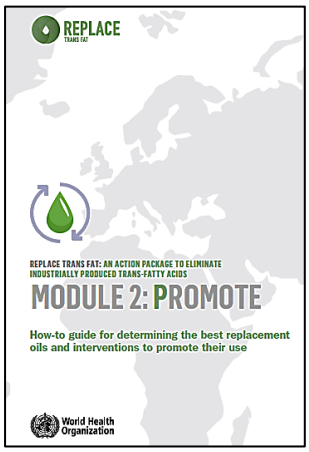
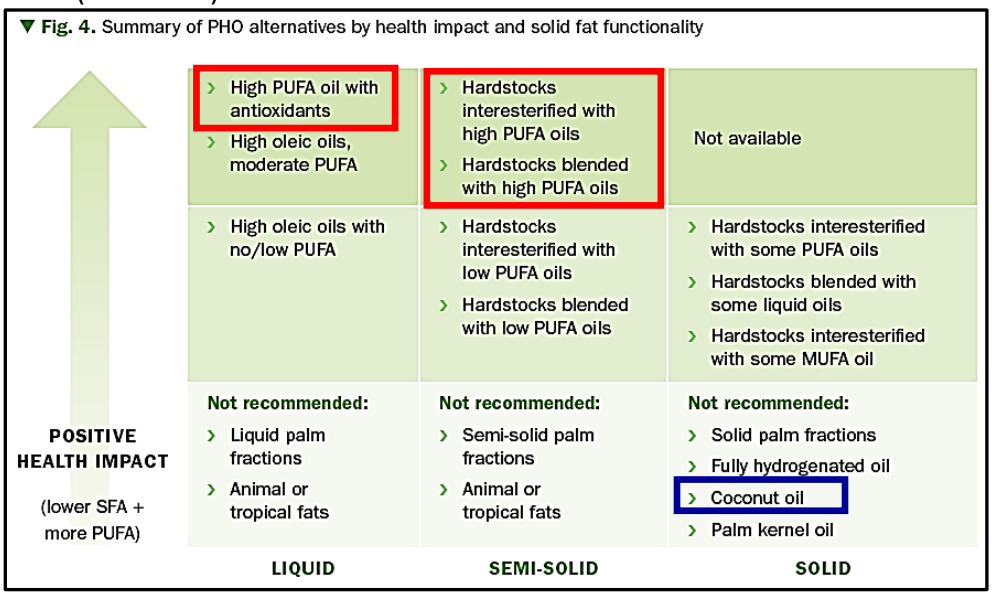


Figure 4 from the WHO Trans Fat Replace Program promotes high PUFA seed oils and industrially produced interesterified fats (**red** boxes) and discourages the consumption of coconut oil (**blue** box). WHO classifies coconut oil as a "solid fat."



Although the principal objective of this WHO program to remove trans fats from the global food supply should be supported, its other objectives are not supported by scientific evidence and will likely worsen the global state of health. Further, these other objectives oppose the Sustainable Development Goals (SDGs) of the United Nations.

1. Although polyunsaturated fatty acids (PUFA), in particular omega-6 linoleic acid and omega-3 linolenic acid, are essential fatty acids, the intake of PUFA is healthy only under three conditions:
    - First, scientific evidence supports the health benefits of omega-6 in the diet only up to about 7% of total energy (Maekawa, 2019; Zong, 2019). *Excessive omega-6 consumption is unhealthy*.
    - Second, *the ratio of omega-6 to omega-3 fatty acids should not exceed 5:1*. An excess of omega-6 fatty acid leads to obesity (Simopoulos & DiNicolantonio, 2016; Koop, 2019; Yamashima, 2020) and raises the risk of heart disease (Simopoulos, 2008).
    - Third, *PUFA oils are highly unstable to high heat and readily oxidize producing degradation products*, such as trans-fatty acids, aldehydes, ketones, epoxides, hydroxy compounds, and free radicals (Vascova, 2015). Thus, PUFA seed oils should not be used as frying oils. However, many PUFA oils, such as soybean, corn, and canola oil, are used in frying.

    The strong WHO endorsement of PUFA oils is based on studies that were done exclusively in developed countries. These studies promoted consumption of PUFA oils and discouraged saturated fat (Sacks, 2017). However, the Prospective Urban Rural Epidemiology (PURE) study which was conducted in 18 high-, medium- and low-income countries, concluded that fats, including saturated fatty acids, are not harmful (Dehghan, 2017).

2. Interesterified fats and oils are industrially synthesized triglycerides where the positions of the fatty acids on the glycerol backbone are manipulated for use in ultra-processed food products. We object to the strong WHO endorsement of interesterified fats and oils for the following reasons:
    - Unlike natural fats and oils for which there are clear fatty acid profiles and standards (for example, Codex Alimentarius), there are no accepted global standards for interesterified fats and oils. This means that the consumer will not know what they are consuming. *Global standards on interesterified fats and oils should be established and products with interesterified fats and oils should be labeled.*

- Interesterified fats and oils have not been subjected to sufficient dietary and health studies to permit global use. Their effects on glucose metabolism, inflammatory responses, hemostatic parameters, and satiety in the general population are still unknown (Mensink, 2016; Mills, 2017). *Randomized clinical trials of interesterified fats and oils on global consumers should be conducted*.

The strong support by WHO of interesterified fats and oils which are synthetic industrial products is an endorsement of ultra-processed food. Consumption of high amounts of ultra-processed food has been shown to be unhealthy (Bonaccio, 2021; Valicente, 2023) and should not be endorsed as a primary replacement of trans fat. Further, this will displace natural fats and oils which are widely consumed in developing countries. WHO should support safe, accessible, and affordable food for all.

3. *There is no evidence that coconut oil is unhealthy and that it causes heart disease*.
   - The detractors of coconut oil cite studies done mostly in western countries that report that saturated fat raises LDL cholesterol (Hooper, 2015) but ignore the fact that coconut oil also raises HDL cholesterol and gives a healthy LDL/HDL ratio (Feranil, 2011; Cardoso, 2015; Vijayakumar, 2016; Chinwong, 2017; Khaw, 2018; Vogel, 2020; Maiti, 2023). More important, a careful review of the literature also shows that, despite concerns with LDL as a risk factor, there is no evidence that coconut oil causes heart disease (Eyres, 2016).
   - Detractors against coconut oil also ignore its numerous beneficial properties such as: lowering of HbA1c and triglyceride levels, which makes it protective against heart disease (Jayawardena, 2020); improvement of abdominal adiposity, which prevents obesity (Cardoso, 2015); anti-bacterial and anti-viral properties (Dayrit, 2015), therapeutic efficacy against mild COVID-19 (Agdeppa, 2021), and improvement of cognitive performance in Alzheimer's patients (Dela Rubia Orti, 2017; Newport, 2021).
   - Populations that traditionally consumed large amounts of coconut oil did not show evidence of heart disease (Prior, 1981; Florentino, 1987; Kumar, 1997) and those that replaced their traditional coconut diet with the western diet became obese and diabetic (WHO, 2003; Westerdahl, 2006).
   - Coconut oil is made up of 65% medium-chain fatty acids. The metabolic benefits of medium-chain fatty acids, which are not shared by long-chain fatty acids, are well documented (Schonfeld, 2016; Watanabe, 2022).
   - The description of coconut oil as a "solid fat" is inappropriate because coconut oil is a liquid in the tropics where the coconut grows. This shows

unfamiliarity with coconut oil. Since the WHO Trans-fat Replace program is meant for world-wide adoption, *the classification of coconut oil as a "solid fat" should be removed*.

Conclusion:

The coconut is known as the "Tree of Life" among the many cultures because it provides countless food and non-food uses. The coconut is a prime example of sustainable development. Over 1 billion people in the world today consume a healthy and diverse coconut diet, which is a major source of their daily calorie and nutrient requirements.

The WHO Trans-Fat Replace Program therefore violates a number of SDGs, in particular, SDG#1: No Poverty; SDG#2: Zero Hunger; SDG#3: Good Health and Well-Being; and SDG#10, Reduce Inequality. As an agency of the United Nations, WHO should support the SDGs.

Policy Recommendations:

- The removal of trans fat from the food supply should be supported.
- PUFA seed oils and interesterified fats should *not* be promoted as primary replacement for trans-fat.
- Coconut oil should be removed from the "Not Recommended" list.
- The classification of coconut oil as a "solid fat" should be removed.
- The WHO Trans Fat Replace program should promote a *balanced intake* of different natural fats and oils.
- WHO should more vigorously support the UN Sustainable Development Goals.

Signed: Scientific Advisory Committee for Health, International Coconut Community

Fabian M. Dayrit, PhD; Chair, SACH; Professor, Department of Chemistry, Ateneo de Manila University, Philippines

Amit Ghosh, PhD; Professor, Department of Physiology, All India Institute of Medical Sciences, Bhubaneswar, India

Rituparna Maiti, MD; Professor, Department of Pharmacology, All India Institute of Medical Sciences, Bhubaneswar, India

Jeyan A. Moses, PhD; NIFTEM-Thanjavur, Ministry of Food Processing Industries, Govt. of India

Mary T. Newport, MD; Physician, Spring Hill Neonatology, Inc., Spring Hill, FL USA

Kapila Seneviratne, PhD; Senior Professor in Chemistry, University of Kelaniya, Sri Lanka

Sineewanlaya Wichit, PhD; Asst. Prof., Department of Clinical Microbiology and Applied Technology Faculty of Medical Technology, Mahidol University, Thailand

References:

Agdeppa IA, Nacis JS, Capanzana MV, Dayrit FM, Tanda KV. (2021). Virgin coconut oil is effective in lowering C-reactive protein levels among suspect and probable cases of COVID-19. Journal of Functional Foods. 83, 104557.

Bonaccio M, Di Castelnuovo A, Costanzo S. (2021). Ultra-processed food consumption is associated with increased risk of all-cause and cardiovascular mortality in the Moli-sani Study. American Journal of Clinical Nutrition. 113:446–455.

Cardoso DA, et al (2015). A Coconut Extra Virgin Oil-Rich Diet Increases HDL Cholesterol and Decreases Waist Circumference and Body Mass in Coronary Artery Disease Patients. Nutrición Hospitalaria, 32(5), 2144-2152.

Chinwong, S., Chinwong, D. Mangklabruks, A. (2017). Daily Consumption of Virgin Coconut Oil Increases High-Density Lipoprotein Cholesterol Levels in Healthy Volunteers: A Randomized Crossover Trial. Evidence-Based Complementary and Alternative Medicine, Volume 2017, Article ID 7251562, 8 pages.

Dayrit FM. (2015). The Properties of Lauric Acid and Their Significance in Coconut Oil. Journal of the American Oil Chemists Society. 92:1–15.

Dehghan M, et al. on behalf of the PURE study investigators (2017). "Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study." Lancet. 390(10107): 2050–62.

De la Rubia Ortí JE, Sánchez Álvarez C, Selvi Sabater P, Bueno Cayo AM, Sancho Castillo S, Rochina MJ, Hu Yang I. (2017). Influencia del aceite de coco en enfermos de alzhéimer a nivel cognitive (How does coconut oil affect cognitive performance in alzheimer patients?) Nutrición Hospitalaria. 34:352-356.

DiNicolantonio JJ, O'Keefe JH. (2018). Effects of dietary fats on blood lipids: a review of direct comparison trials. Open Heart 2018;5:e000871. Doi:10.1136/openhrt-2018-000871DiNicolantonio, 2018

Eyres L, Eyres MF, Chisholm A, Brown RC. (2016). Coconut oil consumption and cardiovascular risk factors in humans. Nutrition Reviews, 74(4):267–280

Feranil AB, Duazo PL, Kuzawa CW, Adair LS. (2011). Coconut oil predicts a beneficial lipid profile in pre-menopausal women in the Philippines. Asia Pacific Journal of Clinical Nutrition. 20(2): 190–195.

Florentino RF, Aguinaldo AR. (1987). Diet and Cardiovascular Disease in the Philippines. Philippine Journal of Coconut Studies. 13(2): 56-70.

Hooper L, Martin N, Abdelhamid A, Davey Smith G. Reduction in saturated fat intake for cardiovascular disease. Cochrane Database of Systematic Reviews 2015, Issue 6. Art. No.: CD011737.

Khaw KT, et al. (2018). Randomised trial of coconut oil, olive oil or butter on blood lipids and other cardiovascular risk factors in healthy men and women. BMJ Open, 8(3), e020167. Doi:10.1136/bmjopen-2017-020167

Koop W. (2019). How Western Diet And Lifestyle Drive The Pandemic Of Obesity And Civilization Diseases. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy 2019:12 2221–2236

Kumar PD. (1997). The role of coconut and coconut oil in coronary heart disease in Kerala, south India. Tropical Doctor. 27(4):215-7.

Maekawa S, Takada S, Nambu H, et al. (2019). Linoleic acid improves assembly of the CII subunit and CIII2/CIV complex of the mitochondrial oxidative phosphorylation system in heart failure. Cell Communication and Signaling. 17:128.

Maiti R, Mohanty RR, Dey A, Maji S, Padhan M, Mishra A. (2023). Effect of Virgin Coconut Oil (VCO) on Cardiometabolic Parameters in Patients with Dyslipidemia: A Randomized, Add-on Placebo-Controlled Clinical Trial. Journal of the American Nutrition Association. 14:1-8.

Mensink RP, Sanders TA, Baer DJ, Hayes KC, Howles PN, Marangoni A. (2016). The Increasing Use of Interesterified Lipids in the Food Supply and Their Effects on Health Parameters. Advances in Nutrition 7:719–29.

Mills CE, Hall WL, Berry SEE. (2017) What are interesterified fats and should we be worried about them in our diet? Nutrition Bulletin, 42: 153–158.

Newport M. (2021). Review of Strategies to Overcome Brain Insulin Resistance Through Mild Nutritional Ketosis for Alzheimer's and Mild Cognitive Impairment. Current Developments in Nutrition. 5, supplement 2: 912.

Prior IA, Davidson F, Salmond CE, Czachanska Z. (1981). Cholesterol, coconuts, and diet on Polynesian atolls: a natural experiment: the Pukapuka and Tokelau Island studies. American Journal of Clinical Nutrition. 34: 1552-1561.

Schonfeld P, Wojtczak L. (2016). Short- and medium-chain fatty acids in energy metabolism: the cellular perspective. Journal of Lipid Research, 57(6): 943-954.

Simopoulos AP. (2008) The Importance of the Omega-6/Omega-3 Fatty Acid Ratio in Cardiovascular Disease and Other Chronic. Exp Biol Med (Maywood). 233: 674.

Simopoulos AP, DiNicolantonio JJ. (2016). The importance of a balanced ω-6 to ω-3 ratio in the prevention and management of obesity. Open Heart. 3:e000385.

Valicente VM, Peng C-H, Pacheco KN. (2023). Ultraprocessed Foods and Obesity Risk: A Critical Review of Reported Mechanisms. Advances in Nutrition. 14: 718–738

Vaskova H, Buckova M. (2015) Thermal Degradation of Vegetable Oils: Spectroscopic Measurement and Analysis. Procedia Engineering. 100: 630 – 635.

Vijayakumar M, et al (2016). A randomized study of coconut oil versus sunflower oil on cardiovascular risk factors in patients with stable coronary heart disease. Indian Heart Journal, 68(4), 498-506.doi:10.1016/j.ihj.2015.10.384

Vogel CE, Crovesy L, Rosado EL, Soares-Mota M. (2020). Effect of coconut oil on weight loss and metabolic parameters in men with obesity: A randomized controlled clinical trial. Food Funct., 2020, DOI: 10.1039/D0FO00872A.

Watanabe S, Tsujino S (2022). Applications of Medium-Chain Triglycerides in Foods. Frontiers in Nutrition. 9:802805.

WHO. (2003). Diet, Food Supply and Obesity in the Pacific. WHO Regional Office for the Western Pacific. ISBN 92 9061 044 1

WHO (2020). REPLACE trans fat: an action package to eliminate industrially produced trans-fatty acids. Module 2: Promote. How-to guide for determining the best replacement oils and interventions to promote their use. Geneva: World Health Organization.

Westerdahl J. (2006). Part I: The Traditional Hawaiian Diet: A Paradise of Healthy Foods. Vegetarian Nutrition Update. 14(4): 1.

Yamashima T, et al., (2020). Intake of ω-6 Polyunsaturated Fatty Acid-Rich Vegetable Oils and Risk of Lifestyle Diseases. Advances in Nutrition. 11:1489–1509.

Zong G, Liu G, Willett WC, Wanders AJ, Alssema M, Zock PL, Hu FB, Sun Q. (2019). Associations Between Linoleic Acid Intake and Incident Type 2 Diabetes Among U.S. Men and Women. Diabetes Care. 42: 1406–1413.