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Half-truths and misinformation about palm oil

Coffee Beans

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The oil palm (*Elaeis guineensis*) is a tropical tree in the Arecaceae family that has been cultivated for more than 5 000 years. The flesh of the fruit (pericarp) of the palm tree is used to produce palm oil, which is currently the most widely used vegetable oil in the world. However, it is not the only oil that is extracted from the oil palm. The fruit of the oil palm is the nut, which is also used to produce an oil known as palm kernel oil. Palm kernel oil is a highly debated food today. For the sake of this text, let us leave aside the ecological issue, i.e. that oil palm cultivation destroys natural forests, and focus only on the issue of the relationship between palm oil and a healthy diet. Given its widespread consumption, there are many half-truths and misleading information about the relationship between palm oil and human health. Here are three of the most common and frequent ones:

The first example: "According to studies, palm oil contains no beneficial unsaturated fatty acids, but only highly dangerous saturated ones" [1]. Facts: Palm oil contains 50% saturated fatty acids (SFA), mostly palmitic acid (44%) and a lower amount of stearic acid (5%), and 40% monounsaturated fatty acids (MUFA), mostly oleic acid, and 10% polyunsaturated fatty acids (PUFA), mostly linoleic acid [2-4]. Thus, it is not true that palm oil does not contain unsaturated fatty acids.

Example two: Since "palm oil contains about 50% saturated fatty acids, which are known to cause clogging of blood vessels, consumption of palm oil can lead to corrosion of the arteries or heart attacks" [5]. Facts: The current studies summarized in the systematic review of data on the relationship between palm oil consumption and the risk of cardiovascular disease and cardiovascular mortality did not provide relevant evidence for or against palm oil consumption [6]. Other meta-analyses of randomized and observational studies, which have a higher degree of confidence than single studies, found no beneficial effects on cardiovascular disease and overall mortality if SFA intake was reduced. To general surprise, these studies also found protective effects of SFA consumption against stroke [7]. Moreover, it is certainly worth mentioning that in terms of atherogenic effects, i.e. the influence on the development of atherosclerotic degenerative changes, there is no reason to prefer white meat (poultry meat with low saturated fatty acid content) over red meat with higher SFA content (pork, beef, mutton, but also veal or lamb with high saturated fatty acid content) [8]. The fact that palm fat is not extremely exceptional among food fats in terms of SFA content is shown in the table. However, palm oil dominates among vegetable oils in terms of SFA content, especially palm kernel oil. This may be one of the reasons for the half-truths.

Example 3: Although palm oil, unlike lard, does not contain cholesterol, its consumption increases cholesterol levels in the human body. Facts: This statement is only half true. Consumption of SFA in fats does increase the level of low density lipoproteins (LDL), which are referred to as bad cholesterol, but these are larger lipoprotein particles that do not seem to correlate with cardiovascular disease risk. This is consistent with the fact that full-fat dairy products, unprocessed meats and dark chocolate, foods that are rich in SFAs with a complex matrix, are not associated with an increased risk of cardiovascular disease [10]. Moreover, the structure of triacylglycerol, the main component of fats, matters. It is both the composition of SFAs in its molecule and the order of positions of their attachment to glycerol [11].

Additional comment: Oils and fats in general are esters of fatty acids with trisaturated glycerol. Depending on the presence or absence of double bonds in the fatty acid chain, which esterifies the glycerol, they are distinguished into saturated fatty acids (SFAs - have no double bonds in their carbon chain), monounsaturated fatty acids (MUFAs - have one double bond in the chain) and polyunsaturated fatty acids (PUFAs - have two or more double bonds in the chain). From a health point of view, vegetable oils are preferable to animal fats and oils because they contain more unsaturated fatty acids, which are more beneficial to health. However, there are exceptions, for example, coconut oil and palm kernel oil are dominated by SFAs, which are considered unhealthy [12-14]. However, it cannot be said in general that fats and oils containing a higher percentage of SFAs are harmful to health and are even labeled as killers, see palm oil [9]. Studies have shown that the main dietary SFAs that worsen total cholesterol and LDL cholesterol levels, which are hallmarks of existing or emerging cardiovascular disease, are mainly SFAs with shorter carbon chains, such as lauric (C12:0) and myristic (C14:0); SFAs with longer carbon chains, palmitic acid (C16:0) or stearic acid (C18:0), increase all cholesterol fractions, both LDL and HDL (high density lipoprotein), the cholesterol referred to as good cholesterol, and are therefore neutral from an atherogenic point of view [15, 16].

All of the information that has accumulated through detailed structural studies of the triacylglycerol component of fats [17-21] contradicts all three of the above considerations regarding the relationship between palm oil and human health and essentially supports the concept that consumption of palm oil as part of a balanced diet carries a very low risk of cardiovascular [6, 22] or cancer [11].

And to make matters worse, crude palm oil, which is directly extracted from the palm pericarp (mesocarp), the flesh encasing the palm nut, is rich in carotenoids (precursors of vitamin A), tocopherols and tocotrienols (vitamin E), sterols, phospholipids, squalene, aliphatic hydrocarbons and aliphatic alcohols [23]. Due to its coloring with carotenoids and low free fatty acid content, it has a red color and hence it is called red palm oil. Similar to processed palm oil, this red palm oil contains unsaturated fatty acids (oleic, linoleic and linolenic acids) as well as saturated fatty acids (palmitic, stearic and myristic acids) [24, 25]. Red palm oil, although known for a very long time, is currently being intensively studied due to its very beneficial effects on human health. Its protective effects on the circulatory system and protection against coronary heart disease, overcoming vitamin A deficiency in children and pregnant women, improving ocular complications caused by vitamin A deficiency, promoting normal reproduction in men and women, supporting the treatment of diabetes, and anticancer effects including the alleviation of adverse effects of chemotherapy have been demonstrated [26-29].

From all that has been mentioned here, it is clear that oil palm products, not only oils but also palm oil phenols [30-32], should be further studied for their potential positive effects on human health, as there is not enough information yet. However, there is no need to label some of its products as a well-disguised killer out of ignorance [9].

References

1. <https://zdraveja.cz/2017/01/22/proc-je-palmovey-tuk-tak-skodlivy/>.
2. Sambanthamurthi R, Sundram K, Tan Y. Chemistry and biochemistry of palm oil. *Prog Lipid Res.* 2000 Nov;39(6):507-58. doi: 10.1016/s0163-7827(00)00015-1. PMID: 11106812.
3. Edem D.O. Palm Oil: Biochemical, physiological, nutritional, hematological, and toxicological aspects: A review. *Plant. Foods Hum. Nutr.* 2002;57:319–341. doi: 10.1023/A:1021828132707.

4. Gee P.T. Analytical characteristics of crude and refined Palm Oil and fractions. *Eur. J. Lipid Sci. Technol.* 2007;109:373–379. doi: 10.1002/ejlt.200600264.
5. <https://www.slimming.cz/palmovy-olej/>
6. Ismail SR, Maarof SK, Siedar Ali S, Ali A. Systematic review of palm oil consumption and the risk of cardiovascular disease. *PLoS One.* 2018 Feb 28;13(2):e0193533. doi: 10.1371/journal.pone.0193533. PMID: 29489910; PMCID: PMC5831100.
7. Astrup A, Magkos F, Bier DM, Brenna JT, de Oliveira Otto MC, Hill JO, King JC, Mente A, Ordovas JM, Volek JS, Yusuf S, Krauss RM. Saturated Fats and Health: A Reassessment and Proposal for Food-Based Recommendations: JACC State-of-the-Art Review. *J Am Coll Cardiol.* 2020 Aug 18;76(7):844-857. doi: 10.1016/j.jacc.2020.05.077. Epub 2020 Jun 17. PMID: 32562735.
8. Bergeron N, Chiu S, Williams PT, M King S, Krauss RM. Effects of red meat, white meat, and nonmeat protein sources on atherogenic lipoprotein measures in the context of low compared with high saturated fat intake: a randomized controlled trial. *Am J Clin Nutr.* 2019 Jul 1;110(1):24-33. doi: 10.1093/ajcn/nqz035. Erratum in: *Am J Clin Nutr.* 2019 Sep 1;110(3):783. PMID: 31161217; PMCID: PMC6599736.
9. <https://www.dtest.cz/clanek-2520/palmovy-olej-dobre-utajeny-zabijak>.
10. Astrup A, Magkos F, Bier DM, Brenna JT, de Oliveira Otto MC, Hill JO, King JC, Mente A, Ordovas JM, Volek JS, Yusuf S, Krauss RM. Saturated Fats and Health: A Reassessment and Proposal for Food-Based Recommendations: JACC State-of-the-Art Review. *J Am Coll Cardiol.* 2020 Aug 18;76(7):844-857. doi: 10.1016/j.jacc.2020.05.077. Epub 2020 Jun 17. PMID: 32562735.
11. Fattore E, Fanelli R. Palm oil and palmitic acid: a review on cardiovascular effects and carcinogenicity. *Int J Food Sci Nutr.* 2013 Aug;64(5):648-59. doi: 10.3109/09637486.2013.768213. Epub 2013 Feb 14. PMID: 23406428.
12. Deen A, Visvanathan R, Wickramarachchi D, Marikkar N, Nammi S, Jayawardana BC, Liyanage R. Chemical composition and health benefits of coconut oil: an overview. *J Sci Food Agric.* 2021 Apr;101(6):2182-2193. doi: 10.1002/jsfa.10870. Epub 2020 Oct 29. PMID: 33022082.
13. Maki KC, Dicklin MR, Kirkpatrick CF. Saturated fats and cardiovascular health: Current evidence and controversies. *J Clin Lipidol.* 2021 Nov-Dec;15(6):765-772. doi: 10.1016/j.jacl.2021.09.049. Epub 2021 Oct 1. PMID: 34649831.
14. Rogero MM, Calder PC. Obesity, Inflammation, Toll-Like Receptor 4 and Fatty Acids. *Nutrients.* 2018 Mar 30;10(4):432. doi: 10.3390/nu10040432. PMID: 29601492; PMCID: PMC5946217.
15. Kromhout D., Menotti A., Bloemberg B., Aravanis A., Blackburn H., Buzina R., Dontas A.S., Fidanza F., Giampaoli S., Jansen A. Dietary saturated and trans fatty acids and cholesterol and 25-year mortality from coronary heart disease: The Seven Countries Study. *Prev. Med.* 1995;24:308–315.
16. Clarke R, Frost C, Collins R, Appleby P, Peto R. Dietary lipids and blood cholesterol: Quantitative meta-analysis of metabolic ward studies. *BMJ.* 1997;314:112–117. doi: 10.1136/bmj.314.7074.112.].
17. [Renaud S.C., Ruf J.C., Petithory D. The positional distribution of fatty acids in palm oil and lard influences their biologic effects in rats. *J. Nutr.* 1995;125:229–237. Kritchevsky D., Tepper S.A., Kuksis A., Eghtedary K., Klurfeld D.M. Cholesterol vehicle in experimental atherosclerosis. Native and randomized lard and tallow. *J. Nutr. Biochem.* 1998;9:582–585. doi: 10.1016/S0955-2863(98)00053-9.].
18. Kritchevsky D., Tepper S.A., Kuksis A., Eghtedary K., Klurfeld D.M. Cholesterol vehicle in experimental atherosclerosis. Native and randomized lard and tallow. *J. Nutr. Biochem.* 1998;9:582–585. doi: 10.1016/S0955-2863(98)00053-9
19. Favé G., Coste T.C., Armand M. Physicochemical properties of lipids: New strategies to manage fatty acid bioavailability. *Cell. Mol. Biol.* 2004;50:815–831.
20. Karupaiah T., Sundram K. Effects of stereospecific positioning of fatty acids in triacylglycerol structures in native and randomized fats: A review of their nutritional implications. *Nutr. Metab.* 2007;4:16–32. doi: 10.1186/1743-7075-4-16.
21. López-López A., Castellote-Bargalló A.I., Campoy-Folgozo C., Rivero-Urgel M., Tormo-Carnicé R., Infante-Pina D., López-Sabater M.C. The influence of dietary palmitic acid triacylglyceride position on the fatty acid, calcium and magnesium contents of at term newborn faeces. *Early Hum. Dev.* 2001;65:S83–S94. doi: 10.1016/S0378-3782(01)00210-9.

22. Ong A.S., Goh S.H. Palm Oil: A healthful and cost-effective dietary component. *Food Nutr. Bull.* 2002;23:11–22.
23. Goh, S.H.; Choo, Y.M.; Ong, A.S.H. Minor components of palm oil. *J. Am. Oil Chem. Soc.* 62, 41-45 (1985).
24. Cassidy, L. Red palm oil. *INFORM* 28, 6–10 (2017).
25. Delisle, H. The nutritional value of red palm oil. in *Series in Agricultural Science* (France; Rival, A). Burleigh Dodds Science Publishing, Cambridge, UK, pp. 217-232 (2018).
26. Tan CH, Lee CJ, Tan SN, Poon DTS, Chong CYE, Pui LP. Red Palm Oil: A Review on Processing, Health Benefits and Its Application in Food. *J Oleo Sci.* 2021 Sep 4;70(9):1201-1210. doi: 10.5650/jos.ess21108. Epub 2021 Aug 6. PMID: 34373407.
27. Loganathan R, Subramaniam KM, Radhakrishnan AK, Choo YM, Teng KT. Health-promoting effects of red palm oil: evidence from animal and human studies. *Nutr Rev.* 2017 Feb 1;75(2):98-113. doi: 10.1093/nutrit/nuw054. PMID: 28158744.
28. Kritchevsky D, Tepper SA, Czarnecki SK, Sundram K. Red palm oil in experimental atherosclerosis. *Asia Pac J Clin Nutr.* 2002;11 Suppl 7:S433-7. doi: 10.1046/j.1440-6047.11.s.7.5.x. PMID: 12492630.
29. Radhika MS, Bhaskaram P, Balakrishna N, Ramalakshmi BA. Red palm oil supplementation: a feasible diet-based approach to improve the vitamin A status of pregnant women and their infants. *Food Nutr Bull.* 2003 Jun;24(2):208-17. doi: 10.1177/156482650302400207. PMID: 12891825.
30. Ibrahim N', Fairus S, Mohamed IN. The Effects and Potential Mechanism of Oil Palm Phenolics in Cardiovascular Health: A Review on Current Evidence. *Nutrients.* 2020 Jul 10;12(7):2055. doi: 10.3390/nu12072055. PMID: 32664390; PMCID: PMC7400923.
31. Ji X, Usman A, Razalli NH, Sambanthamurthi R, Gupta SV. Oil palm phenolics (OPP) inhibit pancreatic cancer cell proliferation via suppression of NF- κ B pathway. *Anticancer Res.* 2015 Jan;35(1):97-106. PMID: 25550539.
32. Sambanthamurthi R, Tan Y, Sundram K, Hayes KC, Abeywardena M, Leow SS, Sekaran SD, Sambandan TG, Rha C, Sinskey AJ, Subramaniam K, Fairus S, Wahid MB. Positive outcomes of oil palm phenolics on degenerative diseases in animal models. *Br J Nutr.* 2011 Dec;106(11):1664-75. doi: 10.1017/S0007114511002133. Epub 2011 Jun 7. PMID: 21736778; PMCID: PMC4179496.



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