

PALM OIL

– a possible health and environmental dilemma

New findings in health research are a primary driver in the change of nutritional content of composite foods, cooking methods and nutrient additions. Numerous examples from the last 20 years demonstrate the symbiotic relationship between science and the food industry, including a reduction of saturated fats in foods, limiting salt, reducing refined sugar and, more recently, reducing the use of trans-fatty acids.

At the beginning of the new millennium, research started to emerge on the negative impact of this fat on cardiovascular health, as well as its role in diabetes and cancer. Trans fat is a type of unsaturated vegetable fat that has a trans configuration – instead of the more common cis configuration – that occurs through an industrial process which adds hydrogen (H) to liquid vegetable oils to make them solid.

High levels of heat can also cause vegetable oils to isomerise into trans fats if applied for long enough, for instance in industrial fryers that can reach temperatures exceeding 200°C.

In 2007, the World Health Organisation (WHO) published a scientific report to advise countries to actively aim to reduce this fat in foods. In 2010, the South African Department of Health (DoH) drew up legislation that aimed to regulate the use of trans-fatty acid in foods, and guidelines by the country's Heart and Stroke Foundation (HSF) followed suit, promoting the reduction of intake of this fat.

The implication was that manufacturers of many foods and fast food outlets required a fat alternative that did not convert to trans fats with heating, still providing the same solid (smooth) texture

and taste in foods without the industrial addition of hydrogen. The panacea to this problem was found in palm oil (PO).

What it is

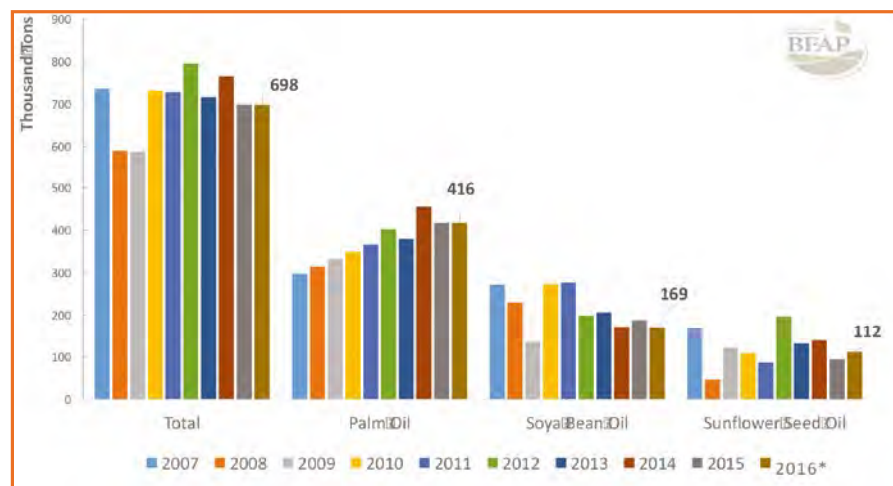
PO comes from the palm tree that is native to West Africa, South America and many Asian countries. In 2012, PO accounted for 32% of global fat and oil production and it has overtaken soya bean oil (SBO) as the main vegetable oil in the world.

PO consumption in South Africa has increased consistently and is now the most widely consumed vegetable oil. The country does not produce PO, and imports have increased from approximately 300 000 tons in 2007 to a peak of 455 000 tons in 2014, after which it seems to have settled at around 410 000 tons (Figure 1).



The nutritional analysis of palm oil's fat composition has indicated a high level of saturated fat, in particular palmitic acid, which amounts to 44% of the saturated fatty acid content.

Figure 1: Data on South African palm, soya and sunflower oil imports 2007–2016. (Source: Bureau for Food and Agricultural Policy)

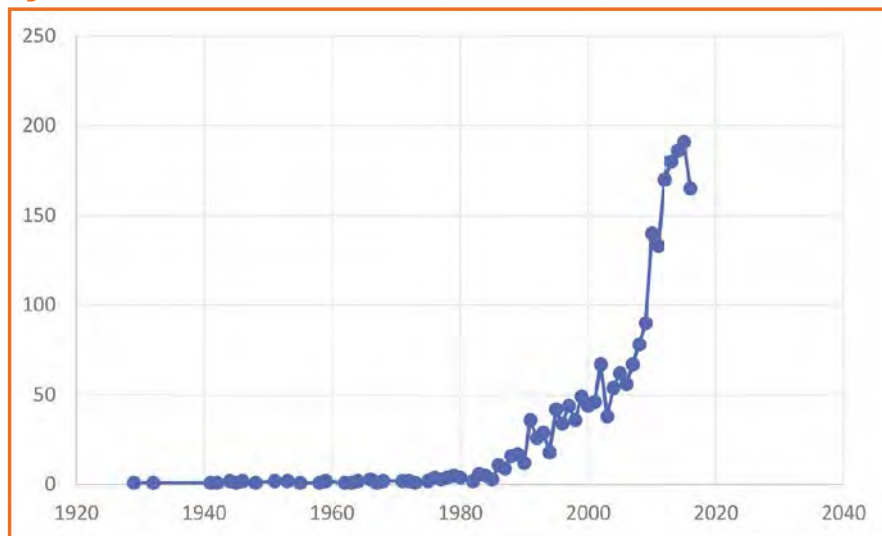


PO is not only a low-cost alternative to many other plant oils, but produces up to ten times more oil per unit area than other oilseed crops, and the fact that it is not genetically modified (GM) is attractive to the European market.

Two different types of oils are extracted from the palm fruit: palm kernel oil (PKO) from the seeds and PO from the mesocarp. The most commonly used in products is PO, which has a significantly different nutritional composition to PKO (Figure 2). Crude PO is naturally reddish in colour due to its high beta-carotene and vitamin E content. However, since a bland and pale coloured oil is required by industry, PO undergoes a chemical process which removes the majority of these useful micronutrients.

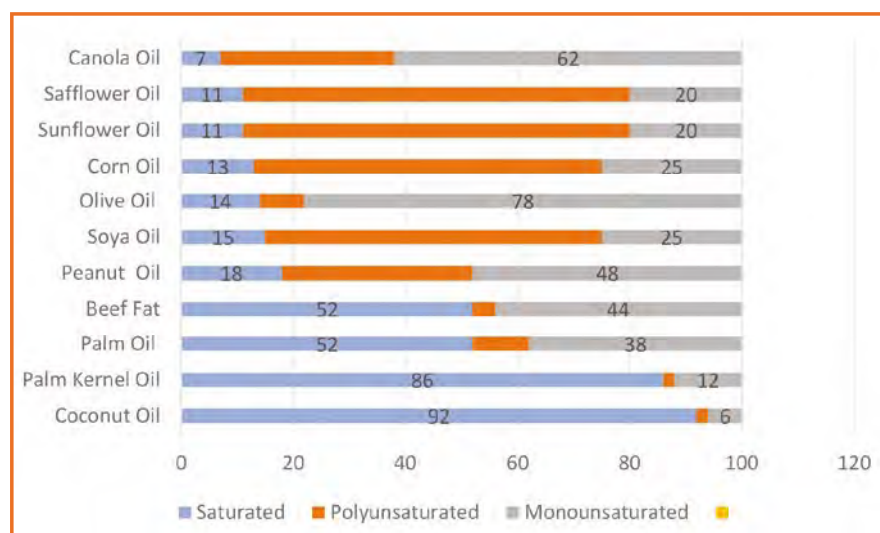
Although PO is classified as a vegetable oil, nutritional analysis of its fat composition has indicated a high level of saturated fat, in particular palmitic acid, which amounts to 44% of the saturated fatty acid content (Figure 2). In fact, its saturated fat content is similar to that of beef, something which has generated a significant amount of research with regard to implications to human health.

Figure 3: Publication on PO related to health. (Source: Pubmed)



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Figure 2: Nutritional content of common oils. (Source: British Nutrition Foundation)



Health research

Medical peer-reviewed articles on PO have followed the same trend in publications as its use in industry (Figure 3). In general health, there is agreement that fat per se – based on a moderate intake of 20 to 35% of total energy – plays a key role as nutrient.

In addition, a balanced intake of saturated, polyunsaturated and monounsaturated fats is advised, and avoiding excessive saturated fats (<10% of total energy intake) and trans fats is recommended by most health authorities, including the WHO and the Food and Agriculture Organisation (FAO).

The three main areas of concern that research has focused on with regard to PO is its impact on cardiovascular disease (CVD), cancer as well as obesity and type 2 diabetes. A recent systematic review of 30 publications has found that PO greatly increases low-density lipoprotein (LDL) cholesterol in comparison to vegetable oils. However, the findings concerning its negative impact on CVD is not universal and it is therefore acknowledged that further research is required.

It is known that dietary fat intake plays a key role in determining cancer risk. A



Palm oil is not only a low-cost alternative to many other plant oils, but the fruit produces up to ten times more oil per unit area than other oilseed crops.

meta-analysis revealed that a high level of palmitic acid, the major saturated fatty acid in PO, is associated with an 89% increased risk of postmenopausal breast cancer. Moreover, another study has linked this fat to colorectal cancers.

Increased fat intake

However, as with the impact of PO on CVD, there are certain studies that found no impact related to patient population, dose exposure and lack of control for other dietary factors. Therefore, further studies are also required in this area.

The putative impact of PO on obesity and type 2 diabetes is related to the evidence that increased fat intake, in particular saturated fat as the main ingredient in PO, leads to inflammatory and oxidative stress, may impact negatively on gut microflora and lead to insulin resistance. All the aforementioned have been implicated in the pathogenesis of obesity and diabetes. However, numerous studies are based on mice models, and conflicting findings have been found in human subjects.

Although many questions remain with regard to PO and its health impact, it is important to consider the products that PO is generally found in. These include baked goods, sweets, cakes, cheese replacements, chips, chocolate, confectionary fats (i.e. chocolate spreads), biscuits, cooking oil, crackers, doughnuts, frozen meals (pancakes, pies, pizza), ice cream, industrial frying fats, instant

noodles, margarines, microwave popcorn, non-dairy creamers, peanut butter, salad dressings, snacks and soups.

The vast majority of the abovementioned foods are classified as energy-dense, high-fat, high-sugar foods and would not be recommended as part of a healthy diet. It is therefore important to note that the replacement of trans fats with PO in these products, have not made these foods 'healthier' or less harmful for humans.

Environmental impact

Even though countless questions still remain regarding the health impact of PO, the environmental impact of this oil is irrefutable. In particular, deforestation of rain forests in Indonesia, Malaysia and the Amazon has been blamed on the increasing demand for PO.

The United Nations Environment Programme (UNEP) estimates that most of the Indonesian forests will be decimated by 2022, and similar concerns exist with regard to the Amazon. The latter contains approximately 40% of the world's remaining tropical forests, along with its biodiversity and ecosystem services. Brazil has 29 million hectares of land suitable for PO cultivation in the Amazon, and 2,8 million hectares are available outside of this region.

In the Brazilian Amazon rainforest, more carbon dioxide (CO₂) is stored in trees than in any other country (47,9 billion tons in

3,3 million square metres). The loss of rain forests has devastating effects on the global environment, and efforts are made to ethically source PO and also to modify vegetable oils not to produce trans fats in a bid to ensure that more sustainable sources are used.

Public awareness, in particular among the younger generation, of this environmental impact in Europe has led to a reduction of PO use in products, customers increasingly avoiding the purchase of

products containing PO and fast food outlets sourcing modified oils that do not convert to trans fats when heated to high temperatures.

Conclusion

The increased use of PO has been driven by concerns over the effect of trans fats on health. While the use of PO in South African products has made it possible to abide by national legislation and international guidance to reduce trans fats and may have calmed consumer concern, it does bring with it two real ethical dilemmas.

The first is related to the paucity of data on the human health impact of PO in the long term, and whether its use in lieu of trans fats may, in fact, have negative health consequences for future generations. The second is related to PO having a significant negative impact on the environment.

Industry has no choice but to alter food ingredients based on current guidelines and PO is at present a cost-effective and simple way to achieve this. However, it is still the individual's decision whether he/she wishes to consume products containing PO or not. This choice should be influenced by current scientific data on the impact on both the health and environmental aspects.

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