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MARGARINE – A FAT LOF GOOD IT DID!

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A chameleon that has defied its checkered past – from cheap, to healthy, high trans fats, lowers cholesterol to now the most expensive spread on the market claiming everything from low fat, trans fat free to lowering cholesterol.

The following is all about margarine, which has a very checkered history. What is disturbing about this 'food' is, although it is called margarine, you really don't know how it is made and what has been put into it. Processes like interesterification, hydrogenation and fractionation, as well as many additives and colours, are used to make margarine. What is frightening is, the way margarine is made, the additives that are included and the man-made fats that are present, such as trans fats and interesterified fats, that have dire consequences for health.

The actual history of margarine paints a very different picture to today's reality. It talks about a French scientist in the mid-19th century discovering margarine, and its emergence onto the world market. And it may have been well and good for our health but for one company and one scientist that changed the face of margarine at the turn of the 20th century.

Procter and Gamble was the company and the scientist was Edwin C Kayser.

William Procter and James Gamble were brothers-in-law; one was a soap vendor the other a candle maker. Soap and Candles were the mainstay for Procter and Gamble for more than half a century. The company hired chemist Edwin C Kayser to find an alternative fat for making candles and soap. At the time animal fat was being used, which was expensive and had a tendency to go rancid quickly; then in 1911, the process of hydrogenating cottonseed oil was developed, which ensured the oil remained solid at room temperature. It also ensured candles and soap were now everlasting in storage.

With the development of electricity, the candle market began to diminish and since the oil/shortening product looked like lard, the company began selling the hydrogenated cottonseed oil as a food. The product became known as Crisco shortening with the name being derived from the expression 'crystallised cottonseed oil'. There were many states in America that asked for this new lard to be dyed pink as they didn't want any mix-up between butter and Crisco/margarine.

Success for this new fat was ensured with the marketing technique of giving away free cookbooks, with every recipe calling for the new fat – Crisco. Crisco was also marketed to vegans (who follow a no-animal product diet and lifestyle) and people who enjoyed a kosher diet.

What I find interesting, but perhaps not entirely relevant to this topic, is that Procter and Gamble (the soap and candle makers who made Crisco) were keen sponsors of radio shows that were dramas targeted at women. This is literally where the phrase 'soap opera' was coined.

The oil version of Crisco was not introduced until 1960. In 1976 Procter and Gamble introduced Puritan Oil, an oil made with sunflower oil, and in 1988 Puritan Oil became 100% canola oil. (Canola is now a genetically modified crop.) The company has since sold off its Crisco brand.

HYDROGENATION

Hydrogenation is a high tech process where vegetable seeds are cleaned and bleached to remove all colour, taste, smells and impurities, and the liquid extracted. The liquid vegetable oil is then heated to high temperatures and a catalyst (commonly nickel, but could be palladium, platinum or rhodium) is added. Hydrogen is bubbled through the liquid to add hydrogen to the oil. The mixture is then filtered to remove the metal and remove any rancid odour, leaving hydrogenated vegetable oil. This process creates a saturated fat from a polyunsaturated vegetable oil. Its texture is similar to lard.

Hydrogenated fats have a higher melting point than fats that are liquid at room temperature. They are less well utilised in your body. They do not circulate in the blood or move through the tissues as liquids. They may disrupt the permeability characteristics of the membranes of the body's cells and prevent the normal transport of nutrients into and out of cells. Hydrogenated fats produce a deficiency of essential fatty acids (EFAs) by destroying them, or producing abnormal toxic fatty acids. Deficiency of EFAs is a contributory cause in neurological diseases, heart disease, arteriosclerosis, skin disease, various degenerative conditions such as cataracts and arthritis, and cancer.

PARTIAL HYDROGENATION

Partial hydrogenation is similar to hydrogenation but the results are that while some saturated fats are created, so are trans fats. The texture of partially hydrogenated vegetable oil is a soft texture like margarine and has a very long shelf life. Whereas an hydrogenated vegetable oil becomes very hard and has to be mixed with liquid vegetable oils in order to make a margarine-like substance, it also has a very long shelf life, which is why it is so popular with food manufacturers like Uncle Toby's, White Wings, Nestlé, Sanitarium and the like. Other ingredients that are added to the hydrogenated or partially hydrogenated vegetable oil in order to make margarine are water, whey, salt, emulsifiers, and synthetic vitamins, colourings and flavourings.

TRANS FATS

A trans fat is found in nature in small amounts in some animal and vegetable foods. In its natural form, it has anti-cancer properties. A naturally occurring trans fat is not the same as a trans fat created as a result of partial hydrogenation.

Polyunsaturated fats (PUFAs) and monounsaturated fats (MUFAs) have what is called a 'cis' configuration. When the partial hydrogenation process is performed on these fats then the cis configuration is changed into a 'trans' configuration, or trans fat, by changing the position of the hydrogen atom on the carbon atom. My research shows me that this process does not happen in nature; it only occurs in a chemical laboratory.

A trans fat produced as a result of partial hydrogenation of a vegetable oil has devastating effects on the body including: increase in cancer, diabetes, and obesity, and an increased chance of heart disease. It has also been implicated in the increase in multiple sclerosis, learning dysfunction in children, and macular degeneration.

The health risks of trans fats have been linked to the following body systems: brain and central nervous system, hormone production, immune system function and cell membrane function. When trans fats make up the bulk of the cell membrane, cell function is badly disrupted in ways that are not fully understood. What we do know is that it changes the permeability of the cell

membrane and disrupts the uptake of vital nutrients by the cell. Without the proper nutrients going into the cell, the cell is unable to make more cells (hair, healthy liver, heart and kidney cells), or create energy; it also affects many more processes vital for health and life.

The conversion of oils to the hydrogenated form also prevents the proper formation of bile in the liver from cholesterol, and therefore can elevate blood cholesterol and have adverse effects both directly and indirectly. In fact, elaborate statistical analysis of the incidence of heart disease and the consumption of hydrogenated fats in England has shown a dramatic and detailed correlation between the two. Where margarine and solid vegetable shortenings are used in significant quantities, the rate of heart attack is always higher than where they are not.

I have read that consuming partially hydrogenated oils is like inhaling cigarette smoke. They will both kill you slowly over time.

OUR HEALTH IN THE HANDS OF HEALTH AUTHORITIES

In 2008 I got two phone calls on the same day, one from Channel 9's Brisbane Extra and the other from Channel 10's 9AM program; they both wanted me to comment on the trans fat debacle. My assumption was that at last Australia had decided to completely ban these insidious fats. Of course, that was my conclusion, as for the previous eighteen months it had been public knowledge that trans fats are a very dangerous fat and that saturated fats were not, after all, the big ogre. In fact, we know if there is a 2% increase in trans fats in the diet, then the chances of heart disease increase by 23%. The latest evidence now points to the fact that there is no safe level of trans fats. So even if the Australian public, as deemed by Foods Standards Australia and New Zealand (FSANZ), is eating just a small amount of trans fats, in my opinion it is still too much.

Other countries have not been so ignorant. In 2003, Denmark banned trans fats in foods available for sale on their grocery shelves; other European countries are following suit. Then in 2006, New York restaurants banned the use of trans fats in their foods; and in mid-2008, Governor of California Arnold Schwarzenegger declared that by 2009 there will be no more trans fats allowed in the food supply in the state of California. And many other countries are being added to this ban. But our food authority in Australia and New Zealand, FSANZ, said they were more worried about the saturated fats in the diet and felt that the Australian public were only eating a very small percentage of trans fats over the total diet.

By 2017, FSANZ was still only monitoring the situation.

There have been rumblings in the scientific world since 1978 that there was something not right about hydrogenated fats (trans fats) and that they had repercussions to health. Mary Enig, a prominent nutritionist right up until her death at age 83, warned people about trans fats as far back as the late 1970s. Dr George V Mann was also making significant noise in the scientific literature about the health claims of margarine. By the 1980s, more people were questioning margarine. Books were written and papers were published but by then margarine was being marketed as the healthy alternative to butter and it became unstoppable. It takes ages to change a popular opinion. It was not until January 2007, 30 years after we knew something wasn't right with trans fats, that the general public learnt the dangers. And so, slowly but surely, there has been a realisation. But for many it's too late; their health has already been compromised.

The Heart Foundation, which is a health authority that most people trust, has given margarine and other foods with partially hydrogenated vegetable oil the tick of approval for many decades. Then when the controversy surrounding trans fats emerged, in order for the manufacturers of margarine to keep the Heart Foundation's tick of approval they had to reduce the trans fat

content in margarine to one percent or less. In late 2006, margarine had a 13–17% content of trans fats here in Australia; in the US it was up to 35%. Remember, just a 2% increase of trans fats in the diet increases heart disease by 23%.

After this bungle of allowing an unsafe food into the Australian diet, how can we trust the Heart Foundation again, or, for that matter, the FSANZ? We trust these health authorities to protect us from unsafe additives and foods, and to make sure that what we are eating is safe and good for us. I'm just a nutritionist, not an organisation with millions and perhaps billions of dollars and an army of people to research, and I was writing and talking publicly about the dangers of partially hydrogenated vegetable oil back in the early 1990s. In fact, in 1991, I was writing a weekly column for The Sunshine Coast Daily and one week I wrote on the dangers of margarine. The margarine manufacturers asked for a total retraction of what I had said or they would sue the paper. The paper folded and gave the manufacturers a one page spread on the benefits of margarine. I was not prepared to change my story.

After all, margarine is a perfect example of a fabricated food, the earliest nondairy substitute. Producers invested large sums of money for research to perfect margarine and to increase the public's acceptance of the product. A survey has shown that advertisements have influenced consumers' choices for margarine over butter.

The advertising campaign launched by margarine manufacturers was termed "one of the most unprincipled food promotions in the past quarter of a century", with TV commercials described as "noisy, ubiquitous, and shameless." They have promoted a staple food as though it were a drug. Margarine advertisements were directed especially to doctors, who, lacking information about how the hydrogenation process affects human health, or about the hazards of too much processed polyunsaturated fat, began switching patients from butter to margarine and from animal fats to vegetable oils.

MARGARINE TODAY

Instead of margarine and many of our vegetable oils being partially hydrogenated, they are now completely hydrogenated, which means they are high in saturated fat rather than trans fats. If I can rightly recall the reason why margarine became the big seller as opposed to butter, it was because it had no saturated fat – that was way it was marketed. I don't have a problem with saturated fat from nature, such as coconut oil, butter, cream, meat and the like, but I do have a problem with saturated fat made as a result of a chemical reaction in a laboratory. I do not for one minute believe these fats played with by technology to be a safe product and would not recommend them for people to consume.

NB: The majority of margarine is now probably manufactured with GM soy, cotton or canola and some of the additives. For more info on GM see [Lab To Table](#).

ANOTHER WAY TO MAKE MARGARINE – INTERESTERIFIED FAT (IFS)

Around 30 years ago, a new technology was discovered: How to make an oil solid at room temperature. I'm not sure why the discovery came about but my guess is that there was evidence that partial hydrogenation was not a safe option and they needed to find a new way to make margarine; after all, margarine is a booming industry and so is the food industry that needs fats and oils that will not go rancid. This new way of making a liquid oil solid at room temperature and giving it longer shelf life is called 'Interesterification' of fat and the new fat formed is called an interesterified fat (IF) and this fat is not found in nature.

Interesterified fat is a modified fat that includes hydrogenation followed by rearrangement of fat molecules by the process of interesterification, which is the process of rearranging the fatty acids in triglyceride molecules. Triglycerides form the basic structure of most fats and oils; they are composed of glycerol and three chains of fatty acids. This process creates IFs. There are two types of interesterification: one that uses chemical catalysts, usually metals or salts, and another that uses enzymic catalysts. Use of chemical catalysts is less expensive than using enzymatic catalysts, but the chemical catalysts require manufacturing steps to purify and deodorise the finished products. The fat is then enriched with saturated stearic acid. This process, which unnaturally rearranges the position of individual fatty acids on the fat molecule, can alter metabolism in humans.

IFs are now used in shortening for baked goods, fat for frying, and butter substitutes, such as margarine. This class of fats provides one of the least expensive options for fats used in baking and frying.

Studies have been conducted on these fats and it appears that the actual structure of the individual fat molecule is critical; that is, the specific location of individual fatty acids, particularly saturated fatty acids, on the glycerol molecule as consumed seems to make a difference on downstream metabolism of fat and glucose. A joint study by Dr Kalyana Sundram, nutrition director for palm oil research at the Malaysian Palm Oil Board in Malaysia, and Biologist and nutritionist KC Hayes from Brandeis University in Massachusetts, indicated that changing and rearranging the molecules of fats (or a combination of fats) during the interesterification process, may affect how the fats are metabolised in the human body.

Both Hayes and Sundram are experts on human lipid metabolism. It was found that not only did IFs adversely depress beneficial HDL cholesterol, it appeared to raise blood glucose levels and decrease insulin production.

Elevation of blood glucose and suppression of insulin production are precursors to diabetes. In addition, further elevation of blood glucose and reduction in insulin levels could be dangerous to those who already have diabetes. Further studies are needed but this has raised real concerns about the use of IFs to replace trans fats, especially if they are used widely and without the knowledge of consumers. When will the scientific community learn that playing around with nature is usually fraught with complications and danger.

The Malaysian-Brandeis collaboration compared trans-rich and interesterified fats with an unmodified saturated fat, palm olein, for their relative impact on blood lipids and plasma glucose. Thirty human volunteers participated in the study, which strictly controlled total fat and fatty acid composition in the subjects' diet. Each subject consumed all three diets in random rotation during four-week diet periods. This study further confirmed previous studies in animals and humans, indicating once again that trans fats negatively affect LDL and HDL cholesterol. Surprisingly, the interesterified fat had a similar, though weaker, impact on cholesterol.

In this study, it was discovered that trans fat also has a weak negative influence on blood glucose. The interesterified fat appears even worse in that regard, raising glucose 20 per cent in a month. This is the first human study to examine simultaneously the metabolic effects of the two most common replacement fats for a natural saturated fat widely incorporated in foods. As such, it is somewhat alarming that both modified fats failed to pass the test for metabolic performance.

HOW TO AVOID TRANS FATS (TFS) AND INTERESTERIFIED FATS (IFS)

If you go to the supermarket and are diligent in reading your food labels, you will notice that the following foods (this is not a complete list) will contain some sort of fat: most baked foods, salad dressings, fried foods, pie crusts of sweet and savoury pies, bread, cake mixes, peanut butter, cakes, crackers, biscuits, sweets, chocolate and cookies. The fat will be called by the following names: shortening, vegetable fat, vegetable oil, hydrogenated vegetable oil, partially hydrogenated vegetable oil, margarine, vegetable oil spread.

Basically, they are all the same; they all have a degree of hydrogenation or interesterification. Recently I called as many manufacturers as I could and every one of them told me that the vegetable oil they used had been hydrogenated in some way.

The key to avoiding IFs and TFs is to read your food labels. When eating out, ask your restaurant what type of fat they are using; ask your baker what type of fat is used. Avoid the additive 471 mono-diglycerides; although it is in minute amounts in the foods it has been added to, it has been hydrogenated and it is still best avoided.

I am asked so many times about so many margarines – the ones made with olive oil; the ones that decrease your cholesterol; the ones that say they're GM free; the ones that say they're healthy; the ones with the star rating – it seems never ending. My answer is always the same. All margarine has been processed and has additives not fit for human consumption and health. There is not one on the market that I recommend.

There is one last way in which margarine is made and that is by fractionation. There are two ways that fractionation is done: by a heat method and by a chemical method. The heat method is safe and very expensive; the chemical method is a cheap process and, in my opinion, not safe. So you can imagine if a margarine manufacturer is using fractionation to make margarine you can bet the chemical method will be used.

IN SUMMARY

Fat is important for our health but we must eat the right type – the good fat. It's really easy. All fats from nature, like nuts, seeds, avocado, olive, egg, butter fat, coconut and anything extracted from these foods in a healthy way, is a good fat. A bad fat is a fat that has been manipulated, changed, and contorted in some way in a chemical laboratory.

Happy Changing Habits.

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