Nutri Scene
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The trans in fats

Trans fats in the spotlight – scientists and regulators discuss trans fats in food.

TRANS fatty acids – also known as trans fats – have been shown to have harmful effects on human health, especially in increasing the risk of coronary heart disease.

Health authorities all over the world have been following scientific developments on these fatty acids and have been providing advice to the public. Some authorities have even taken regulatory measures to have these fatty acids labelled on packaged foods.

In Malaysia, nutritionists, dietitians, food scientists and technologists and other professionals discussed various aspects of trans fatty acids in a seminar in early September.

Over 200 participants attended this seminar, organised by the Malaysia Country Committee of the International Life Sciences Institute (ILSI), and co-organised by the Food Safety and Quality Division of the Ministry of Health Malaysia.

There were three presentations in the seminar covering the chemistry, occurrence and effects of trans fatty acids on human health; the occurrence of trans fatty acids in processed foods and approaches that the food industry has taken to reduce their presence; and a global overview of regulatory approaches towards trans fatty acids.

Following these updates, a panel of five representatives from the Ministry of Health Malaysia, the Federation of Malaysian Manufacturers, Federation of Malaysia Consumers Association, Consumer Association of Penang and the Nutrition Society of Malaysia provided input from their respective organisations on the topic.

Trans fatty acids and health effects

Some basic information regarding the chemistry of trans fatty acids and their health effects were provided by Dr Kalanithi Nesaretnam of the Malaysian Palm Oil Board.

There are four main types of fats in the foods we eat, namely: saturated fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids and trans fatty acids. Saturated fatty acids have all the carbon atoms saturated with hydrogen. Mono- and polyunsaturated fatty acids have one and more than one unsaturated double bond respectively.

The carbon/carbon double bonds of fatty acids can exist in either the *cis* or *trans* configuration. In nature most unsaturated fatty acids are *cis* fatty acids. This means that the hydrogen atoms are on the same side of the double carbon bond.

Trans fatty acids contain at least one double bond in the *trans* configuration. In *trans* fatty acids, the two hydrogen atoms are on opposite sides of the double bond. Trans double bonds can be formed in monounsaturated and polyunsaturated fatty acids. Fats containing trans unsaturated fatty acids are called trans fats.

Health authorities all over the world have taken cognizance that there is compelling evidence that trans fatty acids are harmful to health. Clinical studies carried out have showed that trans fatty acids found in hydrogenated fats and partially hydrogenated cooking oils tend to raise total blood cholesterol and LDL ("bad") cholesterol levels and lower HDL ("good") cholesterol levels when used instead of cis fatty acids or natural oils.

These changes tend to increase risk of heart disease and stroke. Some studies have also showed that a diet high in trans fatty acids may be linked to a greater risk of type 2 Diabetes.

Occurrence in foods and efforts in reducing presence

Ng Kieng Yii, representing the Federation of Malaysian Manufacturers, summarised the occurrence of trans fats in foods and the efforts taken by the industry to reduce their presence.

The main sources of trans fats is the use of partially hydrogenated vegetable oil (PHVO), which may result in a trans fat content of up to 50%. Another way in which trans fats may be formed is heat isomerisation during processing or use (i.e. frying) of oils. Trans fat content in such products may range from 1-3%.

Hydrogenation is a chemical process whereby hydrogen is added to oils, specifically to the double bonds found in polyunsaturated oils. It is actually an artificial way to "saturate" an unsaturated oil so that the oil formed is harder.

During this process, unsaturated fatty acids with their natural cis-configuration may be converted into the trans configuration at one or more carbon-carbon double bonds. Such resulting oils can be used in solid applications especially in the fat spread industry, e.g. in margarine manufacture. Hydrogenated oils are also more stable and can resist turning rancid for a longer period of time.

Most of the trans fat in a typical American diet comes from commercially baked and fried foods that are made with vegetable shortening, some margarine (especially hard margarines) or oils containing partially hydrogenated oils and fats.

French fries, donuts, pastries, muffins, croissants, cookies, crackers, chips and other snack foods are high in trans fatty acids. In fact, nearly all fried or baked goods have some trans fats. The trans fat content of these foods may be as high as 45–50% of the fat.

In our food-loving country, the important question for us is: how much trans fats are we consuming through our habitual diet? We do not have good estimates of this; we do not have good data on the levels of trans fats in local foods, and neither do we have good food consumption data.

However, it has been suggested that since our diets are generally palm-oil based and locally produced processed foods generally make use of palm oil, the amounts of trans fats consumed is expected to be low.

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Palm oil itself does not contain trans fats and with its semi-solid properties, it does not need to be hydrogenated prior to use in food applications.

Trans fatty acids are formed during the partially hydrogenation process but are not present in a fully hydrogenated oil. Recognising this, new technologies have been developed in the processing of fats and oils that can replace PHVO. Three processes have been in use:

- Fractionations – solid fat molecules in fat mixtures are crystallised and separated from the liquid molecules.
- Interesterifications – chemical process of rearranging the structure of fat molecules to make the fat more solid.
- Hydrogenation – fully hydrogenated oils.

The use of palm oil is another suitable alternative that will eliminate presence of trans fats. Palm oil does not contain trans fatty acids and it does need to be hydrogenated to be used.

The food industry is fully cognizant of the importance of reducing the amount of trans fats in food products. Major investments have been made in technology and production, all aimed at producing foods low or free of trans fatty acids.

Regulatory control of trans fatty acids

During this seminar, I provided an overview of the regulations in some countries in relation to control of labelling and/or the amount of trans fatty acids in processed foods.

In Malaysia, it is currently not compulsory to label the amount of trans fatty acids on food packages. Nutrition labelling is compulsory for a wide variety of processed foods and the nutrients that must be declared are the "big four", namely energy, protein, carbohydrate and fat. It is therefore not compulsory to declare the amount of trans fats on a food label.

However, when the product makes a claim regarding the amount and/or type of fatty acids or the amount of cholesterol, the amount of trans fatty acids in the food must be declared, together with the other types of fatty acids, namely the saturated fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids, as well as the amount of cholesterol. Trans fats labelling is therefore conditional.

Malaysian Food Regulations also permit making a nutrient content claim related to trans fats. If a food meets the prescribed maximum amount of trans fat contained in it, it may declare that it is "low" or "free" of trans fatty acids. These are amongst the nutrition claims permitted under these regulations (details given in *NutriScene* of December17).

Denmark is probably the first country to regulate the maximum amount of trans fats permitted in a food. With effect from June 1, 2003, the country prohibited the sale of oils and fats having trans fatty acids exceeding 2g per 100 g of oil or fat. The law also provided for a claim of "free of trans fatty acids" if the product meets the prescribed criteria for the claim.

Diverse actions have been taken by countries on labelling and claims of trans fats. Only a few countries have made it compulsory to label trans fats in foods whereas only two countries (Denmark and Canada) have prohibited the sale of foods exceeding a prescribed amount of trans fats.

Trans fats in animal foods may have beneficial effects

The trans fat story is not that straight forward. It is now known that not all trans fatty acids are harmful to health.

A type of fatty acid called conjugated linoleic acid (CLA) is formed during the incomplete biohydrogenation of unsaturated fatty acids by bacteria in the rumen of ruminants such as cattle and sheep. Such CLAs may occur at a concentration of about 3-5% in dairy and meat products.

A large number of research studies have been conducted and data obtained suggest that CLAs are not harmful to health and may even possess health benefits, e.g. towards chronic diseases such as obesity, diabetes and cancers.

In view of the presence of CLAs in dairy products and foods containing dairy products and their totally different physiological properties, some countries have acknowledged this difference in their definition of trans fatty acids.

The regulations of Canada and Denmark mentioned above have specifically stated that CLAs are not included in the label declaration of trans fats. In the other regulations, including the Codex Alimentarius, the definition of trans fatty acids is worded such that it excludes CLA.

The challenge is of course to have the ability to differentiate between the two types of trans fatty acids during analysis of foods.

Regulatory approaches in the future

The main question asked in the seminar was: is Malaysia going to have mandatory labelling of trans fats in pre-packaged foods? Is there going to be a ceiling for the amount of trans fats permitted in foods?

These are not easy questions to be answered. The Ministry of Health has been monitoring the topic for some time and will certainly address the issue. Thorough consultation will be carried out with all stakeholders before a decision is made regarding the regulatory approaches related to trans fatty acids in food.

■ *NutriScene is a fortnightly column by Dr Tee E Siong, who pens his thoughts as a nutritionist with over 30 years of experience in the research and public health arena. For further information, e-mail starhealth@thestar.com.my.*

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