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SCIENCE AND ENVIRONMENT FORTNIGHTLY

Down To Earth

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**FRIED AND
UNTESTED**

**Companies claim their edible oils
are healthy. A lab study shows
their claims are baseless**

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What does 'healthy oil' really mean? It is difficult to tell.

The Centre for Science and Environment studied branded edible oils to understand what companies mean in their claims. It found the science to prove a cooking medium's healthiness just isn't there.

Consumers are largely unaware that cooking mediums used outside their kitchens, especially to make certain packaged foods, are chock-a-block with the unhealthy trans fats. The lab analysis of various brands of vanaspati, the semi-solid cooking medium sold in India, confirmed the presence of trans fats.

Consumers can be hoodwinked easily because of the confusion in regulating these cooking mediums. The government is going greasy on trans fats regulation.

And the government-approved nutrition labelling allows companies to make claims that do not stand the test of analysis

A DOWN TO EARTH primer to crack this matrix

Fat of the matter

In India, Dalda was the first brand of vanaspati, a partially hydrogenated form of oil. Its manufacturer, Hindustan Lever, now Hindustan Unilever Ltd, marketed it as vanaspati ghee (ghee from vegetable oil). The name has stuck. Today, in a growing business of branded edible oils, vanaspati still leads. Even with growing health concerns, the country has no regulation to check the content of trans fats in this oil (see box: *Making of trans fats*).

The vanaspati market is full of companies—mostly food multinationals—who make healthier options in their countries because of consumer pressure (see box: *The big guys who make our vanaspati*).

In 2007-2008, CSE's laboratory analyzed seven leading vanaspati brands. The results showed trans fats levels were five to 12 times higher than the world's only standard for trans fats in oil, set in Denmark, at 2 per cent of the total oil.

What the lab study did

Thirty samples of branded oil were bought in April 2007 and a selection was made based on their market position. The total fatty acid profile (saturated and unsaturated) comprising 37 components and nine trans fats were analyzed.

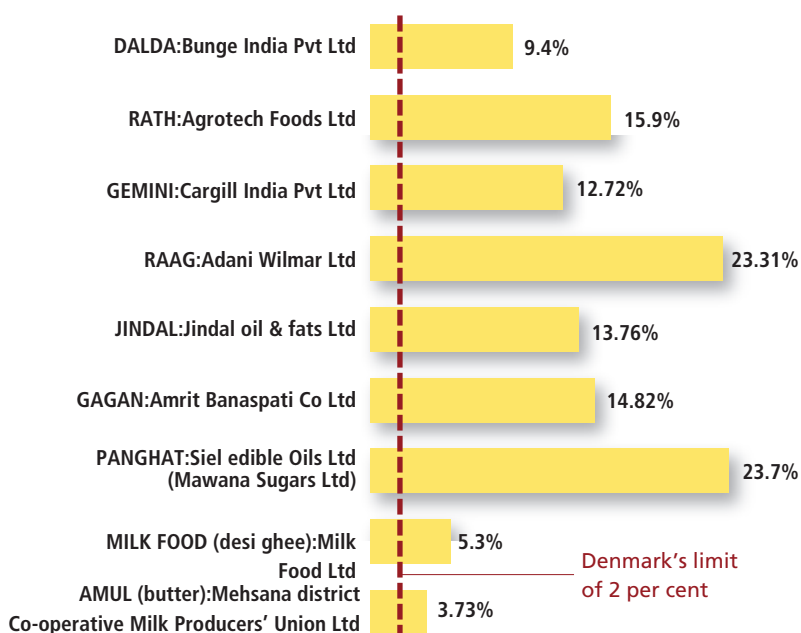
These samples comprised vegetable oils (21 samples)—soybean, sunflower, safflower, groundnut, mustard, coconut, olive, sesame oil, rice bran and palm oil; partially hydrogenated oil (seven samples),

desi ghee (one) and butter (one). Each sample was analyzed in duplicate. The refined edible oils, vanaspati, desi ghee and butter samples were tested according to the internationally used methodology of the Association of Official Analytical Chemists (AOAC) for fatty acids analysis (Method 969.33 Fatty acids in Oils and Fats).

The total fat content (g/100g of oil) of 30 oil samples was expressed as sum of saturated fatty acids, unsaturated fatty acids (mono and poly unsaturated) and trans fats.

Trans fats of the land

Levels ranged 9-24 per cent—5-12 times the standard in Denmark



Making of trans fats

In the 1970s, when concern about the link between saturated fats (like butter, lard, tallow) and heart diseases started growing, experts suggested a shift to unsaturated fats, which are in the liquid form. But the food-processing industry needed semisolids, for products like cakes and biscuits, for which they partially hydrogenated oil. Hydrogenation is the addition of hydrogen atoms to break oil's double bond. In oils, the hydrogen atoms are on the same side of the double bond of the carbon chain—*cis* (from Latin: on the same side). During partial hydrogenation, the chain is twisted in a way that the hydrogen atoms end up on different sides of the chain—*trans* (from Latin: across). The product is a semisolid, which carries the unhealthy component, trans fats. Industry needed hydrogenation because its product is less likely to turn rancid, can withstand repeated heating and food cooked in it stays fresh.

How we are losing the battle

By not setting standards

It is not that the country's oil regulators have not accepted that trans fats need to be regulated since it impacts health. They just can't get their act together to set a standard (see box: *The five-year talk show*).

In January 2008, the Oils and Fats Sub-Committee of the Central Committee for Food Standards (CCFS) under the Union Ministry of Health and Family Welfare recommended a three-phase approach for setting the standard. In phase 1, by April 2008, the industry organization, CIFTI (Confederation of Indian Food Trade and Industry) and the directorate of vanaspati, vegetable oils and fats were to submit data on the capacity of manufacturers to meet a standard of 30 per cent trans fats in oil. In phase 2, by January 2009, the limit would be reduced to 15-20 per cent. In phase 3, in two to three years from then, the oil industry would be encouraged to bring down the limit further.

But this was not implemented because CCFS's members wanted more information on the health hazards of trans fats from industry groups before they could legislate.

Discussion on the standard started in early 2004, when the sub-committee

noted the growing health challenges of trans fats. In August 2006, Ghafoorunnissa, the chair of the sub-committee and former deputy director of the National Institute of Nutrition (NIN) in Hyderabad, submitted a note on the health effects of trans fats.

She noted in India there is no limit fixed for trans fats in partially hydrogenated oil. This oil is a major cooking ingredient in many states and is growing with changes in lifestyle and fast food. So even as the vast numbers in the country suffer from chronic under-nutrition, because there is not enough fat in their food, there is also a growing number, which is ill, because of what and how much they eat or overeat.

Ghafoorunnissa said studies to evaluate the effects of trans fats in vanaspati in India showed butter and ghee and trans fats increased insulin resistance. Trans fats were found to be worse because they inhibit metabolism of an essential fatty acid called omega 6, which helps the cell membrane function properly. Ghafoorunnissa's work also showed that intake of trans fats during maternity increased the risk of diet-related chronic diseases.

Based on the findings and world-

The big guys who make our vanaspati

RATH: Agro Tech Foods Ltd, Secunderabad, affiliated to ConAgra Foods Inc of USA, one of the world's largest food companies. It acquired Rath vanaspati brand from Siel Ltd

DALDA: Now made by Bunge Limited, a mega-food giant in the US. World leader in agribusiness, fertilizer and food products, the multinational bought Dalda from Hindustan Lever

GEMINI: By Cargill Inc in the US, which deal in seeds and genetic food, among other things. Largest selling edible oil brand in Maharashtra, according to Nielsen Company Retail audit data 2007

RAAG: Joint venture between the Adani group in Gujarat and the Wilmar International Limited in Singapore. The Adani-Wilmar owned Fortune brand was India's No 1 edible oil brand in 2006, said the A C Nielsen Retail Audit November 2006

JINDAL: Jindal group, with a wide manufacturing range, from steel to electric goods

GAGAN: Amrit Banaspati Company, Chandigarh; claims to be India's largest selling vanaspati

PANGHAT: Part of the Siel group, Mawana Sugars Ltd is its new name

The five-year talk show

SEPTEMBER 24, 2004: Union health ministry's Oil and Fats Sub-Committee takes up the matter of trans-fatty acid in vanaspati. The sub-committee notes the following: trans fatty acids are health hazards; more harmful than saturated fats; 10-15 per cent limit may be safe. Sub-committee requests chairperson to prepare a paper

NOVEMBER 3, 2004: Sub-committee meets, members requested to suggest the limit for trans fats in vanaspati

AUGUST 25, 2006: Sub-committee meets to discuss the note submitted by the chair. The director (vanaspati) says if standards are set many manufacturing units would not be able to meet the requirements; also that the number of samples tested were too small to fix the level of trans fats content. It is agreed that directorate of vanaspati would collect more data and submit it to the sub-committee

APRIL 16, 2007: Sub-committee informs the Central Committee for Food Standards (CCFS) of its recommendation to set a limit of 15 per cent trans fats content in vanaspati. CCFS says there isn't enough data to lay down limits. "The matter should be thoroughly debated by the sub-committee and then specific recommendations made," it says

JANUARY 7, 2008: Sub-committee meets again. It discusses that the issue is gaining urgency, "in the light of growing presence of multinationals in the fast food business who have taken steps to limit trans fats in their products in western countries, but will take advantage of the lax regulatory control in the country". This will prove detrimental to our children, who are prone to obesity and their resultant diseases like diabetes and heart problems. A three-phase introduction of standards is recommended

FEBRUARY 18, 2008: CCFS meets and endorses the recommendation. Wants standards to be set urgently. Data awaited from industry groups

AUGUST 2008: CCFS meets again. Awaiting data

JANUARY 2009: Still awaiting data

Mix and match

Partially hydrogenated oils have an assured market in India. They are cheaper and easier to use in processed food industry and commercial eateries. The other reason for its popularity is Indian regulations do not spell the need to specify the oil used to make vanaspati.

This, when the business of oils is dependent on imports—according to the directorate of vanaspati, about two-thirds of the oil consumed (12 million tonnes) in 2008 was imported: palm oil from Malaysia, soya and corn oil from the US and (say oil industry representatives off the record) recycled oil from five star hotels in many countries, which have strict regulations about reuse.

This adds to the problem of trans fats, also dependent on the oil used to make vanaspati. Indian brands consequently can have trans fats content ranging from 4 per cent to 65 per cent based on its oil type. National Institute of Nutrition's officials recommend the use of oils with lower polyunsaturated fatty acids, such as palm oil and avoiding oils like soya to manufacture a product.

But such specification is not palatable to the oil industry, which likes to mix and match, depending on the price and availability. Industry insiders also said that to cut costs, the industry even bungs in stearine, waste product of palm oil, normally used in soaps, in oil. Stearine is solid at room temperature and doesn't need hydrogenation.

wide concern, it was urgent for the country to regulate the content of trans fats in oil, she concluded.

This was in August 2006.

Two years on

In its meeting in February 2008, CCFS concluded, "that by any stretch of imagination the issue of trans fats should not be lingered on... We should reach a standard of 5 per cent trans fats content, accepted globally, as these add to the health cost. People in the country are at increased risk of cardiovascular diseases." But Denmark, the first country to regulate trans fats in oil, has set the limit at 2 per cent.

"The government is not interested," said Anoop Misra who heads the department of diabetes and metabolic diseases at the Fortis Hospital, New Delhi. He is also one of the experts whom the CCFS identified in February 2008 to send material on the proposed standard for his recommendation. Misra is yet to receive the material.

The deadline is gone. The data is awaited. We are still at risk.

Limit or label

The question is what is safe amount of trans fats in our daily diet. Our diet comprises the oil we use in our kitchen and the oil a company or a restaurant uses to cook the food we buy—from packaged chips to cakes and *samosas*.

In January 2008, the US Food and Drug Administration decided to only label the quantity of trans fats in oil and

food. US states criticized the move because they wanted better regulations. Some of them had already decided to go trans fats-free voluntarily in 2005. All restaurants in California had gone trans fats-free. Montgomery county in Maryland also banned trans fats. In 2006, New York became the first city to limit trans fats in its restaurants. Now Philadelphia has joined the ban and many other states are working on it. In Europe too there is a growing concern and regulations are being worked upon.

There is increasing evidence of how trans fats impact the body (see box: *Six reasons you should not have trans fats*). The question then arises: why is the Indian government dragging its feet on this health matter, particularly, when experts point out that all studies show that trans fats found in Indian vanaspati exceeds the safe level. But many samples tested by CSE lab had below 15 per cent trans fats, which means companies, if

Current labelling norms don't work

NUTRITIONAL INFORMATION	
Approx. Composition# (when packed)	
	Qty per 100 g
Energy (Kcal)	900
Protein (g)	0
Carbohydrate (g)	0
Total Fatty Acids (g)	100
- Saturated Fatty Acids (g)	16 - 54
- Mono Unsaturated Fatty Acids (g)	36 - 65
- Poly Unsaturated Fatty Acids (g)	3-44
- Trans Fatty Acids (g)	8-33
Cholesterol (g)	0
Added Vitamin A (mc g % I.U.**)	Min. 750/2500
Added Vitamin B (mc g % I.U.**) (Min. 5/200	

regulated, can meet this standard, to begin with.

The minutes of the sub-committee meeting also corroborate this by quoting a study of 100 samples of vanaspati ghee by the Central Food Laboratory in Mysore, that said levels could be less than 8 per cent. So setting standards for this increasing global industry should be a piece of (trans fats-free) cake.

In September 2008, the health ministry issued a notification for labelling of food, including trans fats, but with many loopholes. It said companies that made nutrition and health related claims must include the quantity of trans fats on their package. But without a standard, this amounts to nothing. For instance, Rath vanaspati label says its trans fats are in the range of 8-33 per cent. The CSE analysis found that this brand had 16 per cent trans fats—eight times above the Denmark standard.

According to the Prevention of Food Adulteration Act, 1954, if the food, which uses hydrogenated vegetable fats, must declare on the label: “contains trans fats”. If a company says it is “trans fats free”, it would mean that the product contains less than 0.2 g of trans fats per serving of food. Since there is little clarity on how the servings are determined, the rule too means little. The government, however, has given companies one more claim to market their product—trans fats free.

The industry would like to prevaricate. “If you remove vanaspati from the market, there would be acute shortage of edible oils. There is no need to control trans fats now,” said Velayutham Muthu, adviser with Bunge India Private Limited, producers of Dalda.

Melting point

The vanaspati industry wants an increase in melting point of its final product to reduce trans fats. To understand melting point, we need to go back to the process of hydrogenation. In complete hydrogenation trans fats are not formed and the product is a solid, the melting point is high. In partial hydrogenation, the product is a semi-solid, forms trans fats and has a lower melting point.

The industry wants an increase in melting point because it will reduce trans fats levels, they say. But it is not so simple. Studies by the National Institute

Six reasons you should not have trans fats



HEART DISEASES

Trans fats in the hydrogenated oils are worse than saturated fats. They decrease the amount of good cholesterol (HDL). This makes consumption of hydrogenated fats especially bad for the heart. For example, increase of five grammes of trans fats per day could lead to a 25 per cent increase in the risk of cardiovascular disease



DIABETES

Trans fats interfere with cell membrane's functions and could increase the risk of diabetes. Studies by National Institute of Nutrition in Hyderabad showed trans fats altered the glucose transport. It found effects of trans fats on insulin sensitivity through changes in gene expression



INFANT AND CHILD HEALTH

Trans fats can move across the placenta from the mother to the child and is dependent on the concentration in the mother's plasma. For example, in Canada a mean concentration of 4 per cent in the mother's plasma correlated to 2.9 per cent trans fats in the newborn's plasma



WOMEN

When diet of married premenopausal women, without a history of infertility, was assessed using a food-frequency questionnaire, the results showed that each 2 per cent increase in the intake of energy from trans unsaturated fats was associated with 73 per cent greater risk of ovulatory infertility



CANCER

When researchers from France assessed the link between fatty acid intake and breast cancer, they found increased risk of breast cancer

GERIATRICS

In a clinical evaluation in 815 people aged 65 years and older who were unaffected by Alzheimer's disease, it was found that the disease increased with increased consumption of trans fats

of Nutrition in Hyderabad have shown that a higher melting point increases the level of cholesterol in serum. Other studies have said vanaspati at a high melting point is difficult to digest. Also, there is a standard for the melting point, set by Agmark, at 31-41°C. “A manufacturer will not be prosecuted for high trans fats but will go to jail if he violates the melting point limit,” said Biprabuddha Chatterjee of Adani-Wilmar Ltd.

It is this standard that Bunge, supported by CIFTI, wants removed. Bunge has proposed that the melting

point of vanaspati should be increased to 44°C to carry out complete hydrogenation to reduce trans fats content. In January last year, the CII (Confederation of Indian Industry) argued if the melting point was increased to 45°C, trans fats level of 1 per cent was possible.

Alternatives to hydrogenation

There are options to reduce trans fats. Some of them are expensive, industry-patented and require a different technology. For example, Cargill has a line of all-purpose, semi-solid fats,



Happy meals

In 2002, fast-food giant McDonald's announced in the US it would phase out trans fats from its food. When it failed to comply, a non-profit, Ban Trans Fats, filed a case in 2003.

Succumbing to pressure, McDonald's agreed to place notices in all its restaurants that it had not changed to the lower trans fats cooking oil. It also agreed to pay US \$7 million to the American Heart Association for a trans fats programme. Ban Trans Fat also filed a suit against Kraft Foods for marketing trans fats-rich Oreo cookies to children. Kraft agreed to eliminate trans fats in all its products.

In 2007, another US non-profit, the Center for Science in the Public Interest, filed suits against KFC and Burger King. KFC agreed and reduced its trans fats but Burger King did not. The non-profit found that a regular-size order of chicken tenders with a large order of French fries has eight grammes of trans fats, more than what someone should consume in four days.

AGNINIRH BASU/CFI

TransEnd, which are made of a blend of canola oil and fully hydrogenated soybean oil, with less than 2 per cent trans fats. Bunge Oils has developed a proprietary method to hydrogenate edible oils with the production of less than 10 per cent trans fats during the process. But these are not available in India. The other option is to use catalytic methods at relatively low temperatures.

Another industrial way is to manipulate the fatty acid composition of oil seed using plant breeding and genetic engineering.

A simpler way is to change the oil for hydrogenation: to use palm oil, which has lower trans fats potential. Or to move towards naturally saturated oils like coconut. Denmark, for example, found that 70 per cent of the products had substituted partially hydrogenated products with coconut and palm oil.

The problem is the Indian oil industry remains poorly regulated. It is allowed to mix oils. Technology allows it to get away, as it is possible to refine the oil and then doubly refine it so that we lose its feel and taste.

If we don't know what oil we consume, how can we regulate its quality?

What is healthy oil for our healthy bodies

Commercial interests determine content

The oil we eat is essential for our body to function. We cannot do without it. Thus it is important to understand its chemistry. It is agreed that healthy oil is one which has less saturated fat, more monounsaturated fat (MUFA) and polyunsaturated fats (PUFA) is balanced between the two. It should also be rich in omega 3, 6 and 9 fatty acids (see box: MUFA, PUFA and omega).

But what does this mean to us, when we go out to buy our oil?

Which one is the best?

It is impossible to say with certainty, which oil is the best. The reason is partly to do with commercial interests, which makes some oils bad and some good.

While sunflower and safflower oils are considered the best for the heart, because they are rich in PUFA, recent research suggests it is omega 3, a part of

PUFA, which is the best for preventing ischemic heart diseases. Both sunflower and safflower are low on omega 3. Mustard oil is high on omega 3.

The marketing of good and bad

Certain good oils have been given a bad name. For example, coconut oil was considered unhealthy because it has high amount of saturated fats. But studies found that the oil is healthy because its carbon chains are shorter in length than other saturated fats. A study in Kerala in 1995 on 64 volunteers showed that adding coconut kernel to the diet did not bring about any change in the total cholesterol, HDL cholesterol or LDL cholesterol, in the serum.

Research has also found that coconut oil has antimicrobial components and leads to normalization of body lipids, protects against alcohol damage to the liver and improves the

immune system's anti-inflammatory response.

But it is still not the preferred medium for the market because coconut oil is expensive; it is shunned by the food industry. The industry prefers oils like canola (rapeseed), says Mary Enig, a nutritionist in the US, who writes on fats and their impacts on human bodies.

She says this industry-friendly oil was marketed as being "as healthy as olive oil" because it is similarly rich in MUFA. But then research found that about two-third of the MUFA in rapeseed is erucic acid, which was associated with fibrotic lesions in the heart. To fix this Canadian plant breeders developed a variety of rapeseed, low on erucic acid and high on omega 3 and oleic acid, which is an omega 9 fatty acid.

This new oil, sold as LEAR oil, bombed in the US as farmers and consumers shunned it. Industry then went to town to sell and decided to change the name—from 'rape', 'lear' to canola, to give a healthy image for what Enig calls the Cinderella oil.

All of a sudden canola oil began to appear in recipe books, which was perfect for Mediterranean diets, replacing olive. Research and recipes were pushed, this time extolling omega 3, which suited canola, because it was high on this fatty acid as well.

Enig notes that this hard-sell was not right. A large numbers of studies point to the "fact that canola oil is definitely not healthy for the cardiovascular system". She points out that these studies also find that the use of this oil retards growth, which is why the US Food and Drug Administration does not allow it in infant formula.

But then how were people in China, Japan and India, where rapeseed oil has been traditionally used, coping? Research has found that these adverse impacts of rapeseed oil can be mitigated if it is combined with butter or ghee. The problem is not with the content of the erucic acid but with the high levels of omega-3 in the absence of saturated fats. In other words, explains Enig, the advice to Indian housewives not to use

butter and ghee, which was previously used in combination with rapeseed oil, is the real problem. Also, it concerns the processing of the oil. In the past, rapeseed oil was cold pressed in thousands of small neighbourhood mills and it was consumed fresh. This, she says, gave it its added benefits.

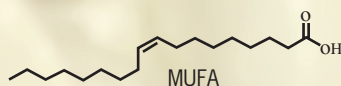
Cold pressed is hot

This is another debate in the science of oil and nutrition. Olive oil is considered the best for the heart, only when it is cold pressed. Research published in the open-source journal *BMC Cancer* done by Spanish researchers found that the major complex phenols present in extra-virgin olive oil also prevent cancer. These are not present when the oil is extracted through solvents.

In India, there is a similar perception that the cold-pressed mustard oil is better for health. "In the last year, the sales of mustard oil has increased suggesting that people are more health conscious," said S K Shukla, director, Data Group, a company specializing in mus-

MUFA, PUFA and omega

We know that fats and oils are made up of chains of carbon atoms. The bonds between the carbon atoms classify the oil into saturated and unsaturated fats.



Saturated fats have a single bond between carbon atoms (they have more hydrogen atoms).

Unsaturated fats have double bonds between the carbon atoms. Where double bonds are formed, hydrogen atoms are eliminated and energy is released.

The unsaturated fats are further classified into monounsaturated fats (MUFA), containing one double bond and polyunsaturated fats (PUFA) containing more than one double bond.

MUFA includes omega 9. PUFA includes omega-6 and omega-3.

The body needs these essential

fatty acids to manufacture and repair cell membranes, to enable the cells to obtain optimum nutrition and expel harmful waste products. It is now accepted that omega-9 found in MUFA, could be the best.

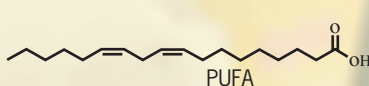
In relation to our health, it is broadly accepted that PUFA protects

against cardiovascular disease by providing more membrane fluidity than MUFA.

On the other hand, it is also found that foods with MUFA lower LDL (bad) cholesterol, while possibly raising the HDL (good) cholesterol.

Trans fats are produced when unsaturated fats are partially hydrogenated. These hydrogen atoms saturate the double bonds and also change the configuration to trans.

While both MUFA and PUFA oils can give rise to trans fats, oils rich in PUFA have more double bonds and result in fats rich in trans-fats.



tard oil. It is because of these reasons that the interest is growing in traditional oils like rice bran, coconut and mustard, shunned by the modern oil industry.

Diet of essential fatty acids

There is increased attention on the omega factors in oil. But researchers cannot agree on what works best in which circumstance. It is accepted that the human body needs a ratio of 5-10: 1 of omega 6 to omega 3.

A P Simopoulos from the Center for Genetics, Nutrition and Health, Washington DC, in the September 1999 issue of *American Journal of Clinical Nutrition* found that over the past years there has been an enormous increase in the consumption of omega 6 fatty acids due to the increased intake of vegetable oils from corn, sunflower seeds, safflower seeds, cottonseed and soybeans.

As a result, today's western diet has a ratio of omega 6 to omega 3 of 30:1.

Mahtab S Bamji, one of India's most eminent nutrition scientists, suggests

this ratio should not exceed 10:1.

Then what should we buy?

There are no straight answers. In spite of all the hard sell for one type of oil being best, nutritionists are of the view that the best oil is an oil used in moderation and switched frequently to get the maximum nutrition value.

D Prabhakaran, executive director of the Centre for Chronic Disease Control in Delhi suggests combining mustard, canola and peanut oil. Swati Bhardwaj, nutritionist and diet consultant with the Diabetes Foundation (India), says canola, olive and rice bran oils are the best options available in the market for Indians.

S K Kalia, general manager, quality control of Dhara (manufacturer of many refined oils), said the best option would be to use oils rich in MUFA, like olive, mustard and groundnut as well as those rich in PUFA, like soyabean and sunflower.

But the choice must be yours (and not the company's) to make.

Who controls

The oil brand ambassadors

CSE's laboratory study found variations, often wide, in fat composition in different brands of the same type of oil.

That made it clear that there is no check or standardization on the quality of the oils being sold. Following are some examples:

- The MUFA in sunflower varies from 23 per cent (NatureFresh of Cargil) to 48 per cent (Sundrop of Agrotech).
- In soyabean oil, omega 6 varies from 28 per cent (Dalda of Bunge) to 54 per cent (Fortune of Adani-Wilmar). The ratio of omega 6 to omega 3 varies from 2 to 8.6.
- In vanaspati, PUFA varies from 1 per cent (Jindal of Jindal) to 40 per cent (Dalda of Bunge)
- In mustard oil, MUFA varies from 27 per cent (Panghat of Mawana) to 68 per cent (Fortune of Adani-Wilmar)



Should we be eating what we are eating?

Anoop Misra, director, department of diabetes and metabolic diseases, Fortis Hospital, New Delhi, and his colleagues recently reviewed the oils and fats that South Asians are consuming and the linkage with human health. They found several studies had reported diets, which had higher intake of carbohydrate, high saturated fatty acid and high omega 6 in India. These studies also found low intake of MUFA, omega 3 and fibre. Intervention studies, which added omega 3 to the diet, improved the lipid profile, but did not show a beneficial effect on insulin resistance. The problem, the study points, is that South Asians, particularly Indians, are prone to develop insulin resistance and the metabolic syndrome. Therefore, current diet is contributing to the development of metabolic syndrome and diabetes. The doctors advise it is critical for Indians to replace unhealthy fast food with healthy options.

Rules, but as good as not

Prevention of Food Adulteration Act, 1954 includes specific standards on edible oils giving broad specification for different oils.

The act allows two different oils to be blended and sold. The specifications do not lay down guidelines on fatty acid composition of different oils.

There are specifications for vanaspati. Companies can mix any quantity of any "harmless", vegetable oil in their brand. In September 2008, the health ministry issued notification for labelling of food—for nutrition and health claims—under the act.

The Bureau of Indian Standards (different specifications for each edible oil) includes limits for aflatoxin, pesticides and heavy metals. No standard for fatty acid.

Directorate of Marketing and Inspection (Union Ministry of Agriculture) formulates grade and quality standards called Agmark for different products. There are Agmark standards for vegetable oils and vanaspati—only blended vegetable oil and fat spread require mandatory certification.

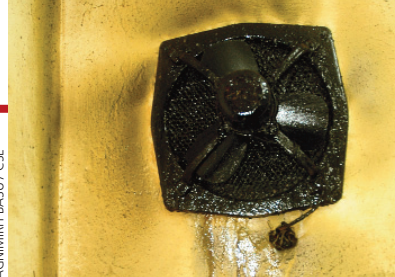
No standards for fatty acids or trans fats exist.

Who checks our oils?

The question is how is the oil we consume regulated. There are a number of players—from the Union Ministry of Health and Family Welfare, which enforces the Prevention of Food Adulteration Act, 1954 (PFA); the Bureau of Indian Standards, which has a voluntary standard for oil; Agmark—the Agricultural Produce Grading and Marking Act—that set guidelines for its sale. In September 2008, the government revised its labelling requirements for food, which include provision for companies to publish nutritional information (see box: *Rules, but as good as not*). Under this notification, companies have to publish information on the different fatty acids, including trans fat, MUFA and PUFA in their product.

The regulation leaves much room for manoeuvre. As a result, companies can give the composition in a range—Rath vanaspati says its package has saturated fatty acid in the range of 16-54 per cent; MUFA 36-65 per cent; PUFA 3-44 per cent and trans fats 8-33 per cent. Others print values that are standard compositions of oil found in academic literature. The CSE laboratory study detected differences between the labelling claims and its analytical study. It is not clear who checks the companies' claims.

AGNINIRH BASU / CSE



So, do we have MUFA-PUFA inspectors? The directorate of vanaspati, vegetable oils and fats has supposedly got inspectors to check quality of oil. In addition, the food and drug administration of different state governments are required to inspect food that is sold to us to enforce the provision of PFA. There are also inspectors of the directorate of marketing and inspection to check grade, quality and packaging. Seems there is no shortage of inspectors. But are they checking?

As there are no mandatory standards, these sellers of our oil have to meet, it is anybody's guess what is checked and what is bottled. In mid-2008, the UK Food Standards Agency wrote to its public saying it had found significant amounts of mineral oil mixed in the sunflower oil being sold in the country. It asked for this brand to be recalled.

So is our health at risk? Probably, but who cares. ■

Lab study by Sapna Johnson, Nirmali Saikia, H B Mathur and H C Agarwal. Reporting by Vibha Varshney

Your guidebook to oils

On the basis of results on the fatty acid profile of different oils in the market, CSE presented a matrix which you could use to figure out what to cook your food with. The matrix ranks the oils on the basis of saturated fats—the lesser the better—and unsaturated fats like MUFA, PUFA and essential fatty acids like omega 3, 6 and 9—the more the better. The laboratory study also provided classification of the oils on the basis of WHO's recommendations. These are based on the ratio of PUFA and saturated fats—the ratio should be between 0.8 and 1. Another ranking is on the basis of ratio of omega 6 and omega 3—this should be between 5 and 10.

Saturated fatty acids		Monounsaturated fatty acids		Polyunsaturated fatty acids		Omega 9		Omega 6		Omega 3		PUFA/SFA		Omega6/Omega3	
Mustard	4.45	Olive	66.97	Soybean	53.21	Olive	65.56	Safflower	49.37	Soybean	10.89	Mustard	6.82	Blend	117.3
Safflower	8.53	Mustard	49.99	Safflower	50.09	Groundnut	40.60	Soybean	39.07	Mustard	7.09	Safflower	5.88	Sesame	88.49
Sunflower	13.46	Groundnut	43.08	Sesame	39.18	Sesame	38.99	Sesame	38.05	Ricebran	6.20	Soybean	3.43	Safflower	88.20
Olive	14.15	Sesame	38.99	Blend	34.57	Ricebran	36.43	Sunflower	33.06	Groundnut	3.31	Sunflower	2.50	Sunflower	65.66
Soybean	15.51	Ricebran	36.58	Sunflower	33.63	Sunflower	35.23	Blend	30.50	Butter	2.43	Sesame	2.34	Palm	23.89
Blend	15.78	Sunflower	35.32	Ricebran	31.37	Palm	33.70	Groundnut	24.74	Desi ghee	1.03	Blend	2.20	Vanaspati	13.27
Groundnut	16.09	Palm	33.70	Mustard	30.33	Blend	24.91	Ricebran	24.69	Safflower	0.56	Groundnut	1.78	Groundnut	7.54
Sesame	16.77	Blend	25.33	Groundnut	28.60	Vanaspati	18.30	Mustard	9.98	Sunflower	0.50	Rice bran	1.24	Desi ghee	6.71
Rice bran	25.38	Desi ghee	21.10	Desi ghee	10.63	Soybean	18.11	Palm	9.92	Sesame	0.43	Olive	0.56	Rice bran	3.98
Vanaspati	41.26	Butter	18.96	Palm	10.52	Desi Ghee	17.77	Olive	6.91	Palm	0.42	Palm	0.23	Soybean	3.59
Palm	45.82	Vanaspati	18.66	Vanaspati	8.18	Butter	15.23	Desi ghee	6.91	Blend	0.26	Vanaspati	0.20	Mustard	1.41
Desi Ghee	55.94	Soybean	18.18	Olive	7.94	Safflower	11.44	Vanaspati	2.37	Vanaspati	0.18	Desi ghee	0.19	Butter	0.52
Butter	59.44	Safflower	11.44	Butter	4.07	Mustard	7.62	Butter	1.26	Olive	0.00	Butter	0.07	Olive	0.00
Coconut	88.89	Coconut	6.74	Coconut	1.04	Coconut	6.74	Coconut	1.04	Coconut	0.00	Coconut	0.01	Coconut	0.00

Blend — Blended Safflower + Rice bran oil; Average value of different oils tested by CSE lab