Good and Bad Oils

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Food invites consumption for a variety of reason; including form, texture, flavour as well as a host of physiological factors. Foods and nutrients provide the energy and building material for the countless substances that are essential to growth and survival of living things. The manner in which the nutrients become integral part of the body and contributes to its function depends on the physiologic and biochemical processes that govern their actions.

Macronutrients: Proteins, carbohydrates, fats all contribute to the total energy pool.

Fat is an important component of diet and serve a number of functions in the body. Fat is a concentrated source of energy and it supplies per unit weight more than twice the energy furnished either by carbohydrate or protein.

Dietary fats are stored in adipose tissue, which is a ready source of energy when food is unavailable.

FUNCTIONS OF FATS

- They have high energy value
- Imparts palatability to diet
- Fats are precursors of biologically active compounds of the body
- Presence of fat is important for absorption of fat soluble vitamins like A, D, E
- Some fats called as essential fatty acids (EFA) have a vitamin like function in the body
- They are constituents of body fluids and cell membranes
- Subcutaneous layer of fat insulates the body
- Fat pads at buttocks and palms protect the bones.

DIETARY FATS

Dietary fats are derived from both plant and animal source and are classified as visible and invisible fats. Fats which are used at the table or for cooking e.g. ghee, butter, oil, vanaspati are termed as visible fats. The fats which are an integral part of food e.g. cereals and pulses contain 2-3% fats. Small amount of invisible fat present in different foods add up to a substantial level in our diet. Most of animal foods provide high animals of invisible fats e.g. one egg contains 6.5 g of fats.

Table 1: Invisible Fat and Fatty Acids in Plant Foods (g/100g Edible Portion)

	Fat	Linoleic Acid[a]	Alpha-Linolenic Acid[b]
Cereals			
Rice (polished)	2	0.5	0.01
Wheat	3	1.0	0.17
Millets			
Ragi	2	0.3	0.05
Jowar	3	1.5	0.05
Maize	5	2.0	0.05
Bajra	6	2.0	0.13
Legumes and Pulses			
Blackgram (urad)	2	0.1	0.70
Rajmah	2	0.4	0.70
Cowpea (lobia)	3	0.8	0.50
Greengram (mung)-- Lentil (masoor) |---	2	0.8	0.16
Redgram (tuar) --	7	3.5	0.2
Bengalgram (chana)	20	8.0	1.0
Soya			
Condiments and Spices			
Dry chillies ---------- Cumin seeds |------	16	5.0	0.2
Coriander seeds ------- Fenugreek seeds	10	3.5	2.0
Vegetables	0.4	0.04	0.15
Green leafy vegetables	0.2	0.06	0.03
Other vegetables			
Nuts and Oilseeds	40	10	<0.2
Groundnuts	40	16	0.4
Sesame	40	0.6	-
Coconut (fresh)	40	5	3.5
Mustard	56	14	0.3
Almonds	50	9	0.3
Cashewnuts			

[a]: Linoleic is a n-6 polyunsaturated fatty acid

[b]: alpha-linolenic is a n-3 polyunsaturated fatty acid

Ghafoorunissa 1989a, Ghafoorunissa and Pangrekar, 1993

Table 2 : Major Types of Fatty Acids in Fats and Oils

Saturated	Mono-Unsaturated	Polyunsaturated	
Coconut	Red palm oil	LINOLEIC	α-LINOLENIC
Palm kernel	Palmolein	(n-6)	(n-3)
Ghee/butter	Groundnut		
Vanaspati	Rice bran	Low: Red palm oil	Mustard
	Sesame	Palmolein	Soyabean
		Medium: Groundnut	
		Ricebran	
		Sesame	
		High: Safflower	
		Sunflower	
		Cottonseed	
		Corn	
		Soyabean	

Chemical Composition

All fats in foods are made up of small components called as fatty acids, which are the building blocks of fats. Fatty acids in turn are of 3 types viz. saturated, monounsaturated and polyunsaturated. Depending on the predominant fatty acid present, the fats are grouped as saturated, monounsaturated and polyunsaturated.

Saturated fatty acids

Fats from coconut, coconut oil, ghee, butter, milk and milk products, meat are mostly saturated type. Acid present in ghee, butter and coconut oil are easily digested and absorbed. However, high intake of these fatty acids increases risk of atherogensis. These fats raise the levels of total cholesterol and LDL cholesterol (bad cholesterol) and therefore are atherogenic. One way of reducing saturated fats in diet is by limiting consumption of animal foods such as meat, game and poultry and consumes low fat (skimmed) milk and milk products instead of whole milk.

Monounsaturated Fats

Fats such as mustard oil, groundnut oil, olive oil, rice bran oil, soyabean oil are rich in monounsaturated fats as compared to other oils. These oils when used in prescribed amounts lower total cholesterol and LDL cholesterol levels in the blood.

Polyunsaturated Fats

Oils such as sunflower oil, safflower oil, corn oil are polyunsaturated fats. Besides these all invisible fats present in cereals and pulses are also polyunsaturated. Although these fats lower cholesterol, they are not preferred to be used as visible fats. This is so because they are prone to oxidation in our body and secondly we consume them in large amounts as invisible fats in cereals and pulses. Polyunsaturated fats are of two types viz. omega-6 fats and omega-3 fats. Omega-6 fats are corn oil, kardi oil, sunflower oil and invisible fat in most of cereals and pulses. Omega-3 rich oils are mustard oil, flax seed oil, fish oil etc., and certain pulses like rajmah, urad and methi seeds. Omega-3 fatty acid is more beneficial for prevention of inflammation, accumulation of fatty material in blood vessels (atherosclerosis) and clotting of blood (thrombosis). These oils are shown to protect heart better than the omega-6 oils and therefore the ratio of omega-6/omega-3 oil is very important. Because omega-3 fatty acids are very fragile and more prone to oxidation, they are usually not heated at high temperatures. They are consumed either raw or in their native form of oil seeds.

Table 3 : Rice Brain Oil v/s Other Edible Oils Hypocholesterolemic Activity

Edible Oil	Linoleic Acid %	Cholesterol Level
Safflower	77.1	-16
Sunflower	61.4	-12
Cottonseed	58.0	0
Soybean	50.2	+3
Sesame	45.9	+2
Corn	43.0	-15
RICE BRAN	36.0	-17

- Rice Bran Oil is the 'Heart Friendly Oil' due to its remarkable Cholesterol lowering activity in comparison with other oils.

HOW TO CHOOSE AN OIL?

American Heart Association and National Cholesterol Education Programme recommend that the fat which should be predominant in our diets should be monounsaturated. There fore it is advisable to choose a MUFA rich oil like groundnut oil, olive oil, mustard oil, rice bran oil. The polyunsaturated fats are also available to some amount from above oils and to some extent from the invisible fats in cereals and pulses. Saturated fat is provided by dairy products and non-vegetarian foods. Therefore for grownups or adults, the oil which should be used should be a monounsaturated form. More important is the quantity of oil used is as important as the quality of oil. Recent recommendation are given in Table 3. Total visible fat should not be more than 750ml/person/month or 20-25 ml/per person/day or 4-5 tsp/day.

REFERENCES

1. Ghafoorunissa, Krishnaswamy K. Diet and Heart Disease, National Institute of Nutrition, 1998.
2. Dietary Guidelines for Indians – A Manual. National Institute of Nutrition 2003.