Editorial

Selecting the Right Cooking Medium

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There are few areas that are so riddled with confusion, contradictions, misinformation and conflicting opinions and recommendations than the issue of selecting the right cooking oil and fat for preparing one's food. It is imperative to understand the basic facts about fats and oils. While the chefs are fixated on an oil with a mild flavor and a high smoke point, the health experts are more concerned with the polyunsaturated versus saturated fat discussion. The issue is plagued with various misconceptions like Polyunsaturated Fatty Acids (PUFA) being always healthy, assumption that flax or apricot oil must be healthy since the source is healthy, and overemphasis on smoke point without considering the process that the oil might have gone through. For instance, flax seed oil may have beneficial Omega-3s and PUFA, but, the low smoke point damages these rendering them pro-inflammatory.

The saturated molecule is stable with all places on Hydrogen filled, but, more unsaturated it becomes the more unstable it gets due to vacant double bonds.

Apart from some oils like coconut, kernel and palm that are solid at room temperatures, most oils are liquid.

Plant and vegetable-based oils are many like palm, soybean, olive, canola, corn, peanut etc. While tallow, butter and ghee are animal-based oils.

Saturated fats are commonly used in small amounts in diets [1]. However, high consumption of saturated fats raises LDL levels [2]. Other studies point to the benefits of polyunsaturated fat [3]. But, the biggest downside is the damage and degradation of cooking oils during the vigorous industrial process of making them.

The traditional belief is that lesser quantities of saturated fats and higher of unsaturated (preferably omega-3) fats like olive oil, peanut oil, canola oil, soy and cottonseed oils are generally healthier. Cold pressed and extracted oils from whole seeds are healthier, but the commercially manufactured and processed and refined oils lose most of the benefits, and on the contrary may have negative health effects.

Contrary to common belief, flaxseed oil turns out to be of little good due its low saturated fat content (9%), MUFA are low and the vast majority are PUFAs making the oil very reactive and goes rancid as it gets oxidized at room temperature. In addition, low smoke point damages the Omega-3s and beneficial PUFAs easily. However, if cold pressed and kept in freezer, flaxseed oil may have some utility as a dietary supplement (Table **1**).

Table 1. Composition of Various Cooking Oil in Ascending Beneficial Order (MUFA- Monounsaturated Fatty Acid, PUFA- Polyunsaturated Fatty Acid).

Oil	Saturated Fat %	MUFA %	PUFA %	Smoke Point Centigrade
Flaxseed	9	18	68	107
Soybean	16	23	58	233
Sunflower	15	34	56	232
Corn	13	24	59	232
Safflower	8	75	13	232
Canola	7	63	28	204
Mustard	12	60	21	250
Avacado	12	74	14	270
Tallow	50	40	10	190
Olive	14	78	8	160
Coconut	92	6	2	177
Butter	68	28	4	150
Ghee	68	28	4	250

Similarly, the process of making seed oils needs to be examined [4]. In order to get as much of the oil from the seed or bean, method of solvent extraction is used usually using hexane. Hexane is in the petrochemical family like gasoline or diesel. After extraction the oil is desolventized using heat and steam along with pressure. At this point, the oil is not edible and the next phase is "refining" which involves further breaking down and removing substances form the oil. It is degummed, neutralized [5], bleached, deodorized [6], and in some cases winterized and dewaxed. The end product has a mild flavor and a high smoke point, making it popular with chefs. Though, there may still be some hexane residues present.

However, from the health point of view, things are not so rosy. Plant/seed oils are usually very high in Omeaga-6s. Omega-6 is a polyunsaturated oil that is essential in small quantities, but in large quantities it tends to feed into the pro-inflammatory pathway. This is unlike Omega-3s which when fresh, undamaged

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and whole can be potentially anti-inflammatory but once they are damaged, they become pro-inflammatory. The worst part is something called Reactive Oxygen Species (ROS). Whenever, a sensitive fatty acid is exposed to oxygen, heat, light and pressure, reactive oxygen species or ROS are formed that are very damaging to tissues. ROS are as bad as sugar in promoting insulin resistance, it promotes elevated glucose levels and most importantly it promotes inflammation - a type of chronic low-grade inflammation that is associated with virtually all degenerative disease.

Avocados are superb health food per se. If these are put in a spinner and oil extracted, it is unrefined extra virgin Avocado oil, and this form is acceptable, but, it is green and has a strong overriding flavor. However, avocado oil commercially available has been processed through all the steps listed above, like heating, refining etc. causing damage to the MUFAs and PUFAs that renders it unhealthy. This holds for all oils that undergo such processing [7]. The industry produced oils may have as much as 25-45% trans fats. These trans fats are deleterious for health, as against trans fats in natural foods where the content is much less and any negative affect on health not proven [8].

Fats and oils that are suitable from the health point of view are fats naturally occurring with a higher saturated content, sizeable MUFAs and very little PUFAs. To reiterate, saturated are most stable while PUFAs most unstable and sensitive, with MUFAs falling in the mid-zone. Tallow (beef fat), coconut, butter have just high enough smoke point to render them suitable for most medium to high heat cooking.

The long-standing myth of saturated fats being harmful needs to be busted. Recent research has established that more the fat is saturated, lesser is the risk of heart disease, diabetes and all-cause mortality. Lot of countries are changing the guidelines and removing the upper limits on saturated fats. It is time that the age-old concept that saturated fats and fats in the food directly increase cholesterol and fatty deposits must be abandoned. Culprits are carbohydrates, sugars and excess calories that get stored as fat.

Olive oil is widely used. It has low saturation, mostly MUFAs and low PUFAs. It does not have a very high smoke point (160 C), hence can be used for low and medium heat cooking, like making omelets, but not for high heat cooking.

Coconut oil is minimally processed, with a very high saturation but the smoke point is 177 C, not very high. Much better is butter, a natural product, excellent flavor but the smoke point is only 150 C, so not suitable for stir frying.

The best for cooking is ghee (sat 68, MUFA 28, PUFA4, smoke point of 250 C). It is suitable for high temperature cooking and totally natural and non-processed.

However, as a rule, deep frying should be as minimum as possible and cooking oil/fat be used in as little quantity s possible. Another issue is of repeatedly heating cooking oil (RHCO), common practice in fast food restaurants, which is very detrimental to health.

Mustard oil deserves a special mention. It has 60% monounsaturated fatty acids (42% erucic acid and 12% oleic acid). Due to high erucic acid, it has been banned by FDA for potential heart damage, though not established in humans. It has 21% polyunsaturated fats (6% omega-3 alpha-linolenic acid, 15% omega-6 linoleic acid) and 12% saturated fats. Oil can be extracted from black, brown or white mustard. With a smoke point of 250 C, it is widely used in Asia. However, if cold pressed, and for economic reasons, maybe used for medium heat vegetable cooking. It is also used externally for skin and hair.

THE TAKE-AWAYS

- As a rule, the use of oils and fats need to be kept at a minimum. Cooking processes like boiling in water, air frying, and frying and baking with minimum amounts should be adopted.
- Deep fried foods must be avoided as much as possible.
- Reusing or re-cycling is dangerous for health.
- For dressing cold pressed olive or flaxseed oil can be used.
- For medium heat cooking process like making omelet or vegetables, butter, cold pressed olive or more economical mustard oil can be used, with as small an amount as possible.
- For high temperature cooking Ghee should be preferred, again using as little as possible.

CONFLICT OF INTEREST

Declared none.

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