

# Frying Oil

## Safety of Frying Oils and Oil Fried Products

### What Can Happen To Oils During the Frying Process?

Frying oils are reactive substances that can undergo chemical changes during storage, heating or exposure to light. These chemical changes can lead to “breakdown products” in the oil, some which are potentially harmful substances.

The common, obvious, sensory, changes of the oil are a darkening of colour, a thickening, a rancid odour, and sometimes a rancid taste. However, some breakdown products can only be detected by sophisticated chemical laboratory analysis. The publication by Grootveld et al (2014) supplies valuable information on degradation products, including those that are potentially harmful.

Oxidation is a major cause of the chemical breakdown of oil, but there are several other causes of degradation with potentially toxic effects. When oil contains more than specific levels of breakdown products, it is classified as “abused oil” or ‘over-used oil’.

The speed and level of breakdown products formed depend on the type of oil - the higher the amount of unsaturated fatty acids (polyunsaturates and monounsaturates), the higher the rate of breakdown. Also, polyunsaturated oils, including soy, sunflower and canola, may have lower stability than monounsaturated oils like olive and palm oils.

### Can Harmful Substances be Prevented?

While the type of oil used makes some difference to the formation of breakdown products, it is proper oil management that is the key to preventing or minimizing this degradation and so prolonging the life of the oil or fried product. Effective **oil management** means the rigid control of frying temperature and frying time, and minimizing the presence of compounds that can trigger breakdown (such as food particles and minerals like copper, iron and zinc). Antioxidants permitted by law also enhance protection against oxidative breakdown. The use of natural anti-oxidants is an alternative.

### Managing Oil in the Home

Oil management is important in restaurants, fast food outlets, and in other industrial processes, as well in the home, where the proper handling of used oil for repeated use will make a significant difference to the useful lifespan of the oil.

For the consumer who is cooking at home, effective oil management means:

- Using stainless steel frying vessels, and not iron, copper or galvanized zinc
- Cooling oil after frying, and not leaving it hot or idle
- Storing used oil, preferably filtered, in glass or stainless steel, in the dark
- As far as possible, removing all traces of old oil (which forms a brown sticky varnish type substance) from the cooking vessel surfaces that come in contact with hot oil. This “varnish” is an oxidation product which catalyses degradation.

It should be pointed out that Grootveld et al found that shallow frying conditions are more conducive to oil oxidation.

## **Concerns About Harmful Compounds in Oil which has undergone frying**

There is concern about the formation of harmful oil breakdown compounds and their effect on human health.

Although studies have shown a negative impact of these breakdown products on animal health, including growth retardation, enzyme imbalances and increased liver and kidney weights, no conclusive results on the effect on human health have been published in scientific literature. It is not clear at what level of intake the breakdown compounds may become a health hazard.

Another concern is that abused oil is more readily absorbed by foods than fresh oil during food preparation. This increases the level of potentially unhealthy breakdown compounds in the food and also increases the energy (kilojoules) consumed.

A third concern is that there have been reported instances of unscrupulous food processors selling abused oil to low-income consumers for household use. This is an irresponsible and unacceptable practice; used frying oil should be taken out of the food chain and only be used for industrial purposes.

### **Risk**

The question may be asked: Does the consumption of overused oil at normal intake levels pose a health risk? There is enough evidence to show that, in excess, most compounds are toxic, but that the level of intake in normal diets, does not mean that consumption must be restricted. The benefits of fats and oils in the diet, especially in lower income groups, must also be weighed up against the potential risk of poisoning by “indicators of toxicity”. Risk assessment is thus an important consideration in this debate.

### **Reducing the Risk of Consuming Potentially Harmful Breakdown Products**

Consumers should only buy oil from reputable suppliers and practice good oil management. But, a seal or logo of quality certification can create a false security if the oil is abused by the user, whether industrial, catering or household.

### **Reference**

Martin Grootveld et al: Detection, monitoring, and deleterious health effects of lipid oxidation products generated in culinary oils during thermal stressing episodes; *INFORM*, November/December 2014, Vol. 25 (10), pp 614-624

*Updated for FACS by PvTw (2016)*