

Oxidative Stressed Frying Fats and Oils - Potential Role for Health

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Abstract

Fried foods are consumed worldwide and are quite popular due to their sensory characteristics. During frying, frying medium (either oils or fats) are deteriorated and deterioration products become part of our diet, since they are absorbed in frying foods together with the medium. The deterioration products (commonly known as total polar materials, TPM) have been summarized as follows: (a) mono- and diglycerides and free fatty acids, (b) dimeric and polymeric triglycerides and fatty acids and (c) oxidized triglyceride monomers (eg. triglyceride monohydroperoxides). Degradation of these products could lead to the formation of saturated and unsaturated aldehydes, ketones, oxidized cyclic fatty acids and "aldehydic" diglyceride by-products (containing oxo-, hydroxy-, epoxy-, etc, groups) as well as other polar compounds, still unidentified. TPM and several TPM fractions have been shown to be dangerous for health when administered in large doses to experimental animals, the aldehyde and ketone by-products being the most effective. Novel experimental data on acrylamide and heterocyclic aromatic amines in fried food or polycyclic aromatic hydrocarbons in fume of cooking oils indicate their possible activity on health damage.

The questions arising for a "healthy" household or commercial treatment of frying oils:

- (a) How many times (or hours) a frying oil could be used successively?
- (b) How dangerous for health could be TPM and TPM fractions under real consumption conditions?

will be discussed, by focusing on the findings 2002 – 2003:

- (a) toxicity, (b) microsome oxidative stress, (c) low density lipoprotein oxidation, (d) teratogenic action, (e) liver mitochondrial respiratory chain components, (f) endothelial function, and (g) glutathione reductase contribution

in experimental animal and humans, *in vivo* or *in vitro*, as well as by shortly reviewing the findings since 2000.