Journal of Experimental Food Chemistry
ISSN: 2472-0542

Boskou, J Exp Food Chem 2017, 3:1
DOI: 10.4172/2472-0542.1000e108

Editorial OMICS International

Edible Cold Pressed Oils and Their Biologically Active Components

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Received date: March 18, 2017; **Accepted date:** March 21, 2017; **Published date:** March 26, 2017

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Editorial

Edible cold pressed oils have specific characteristics and flavors and contain valuable bioactive substances such as polyunsaturated fatty acids, tocopherols and tocotrienols, free and esterified sterols, various phenols, lignans, squalene, triterpene alcohols, carotenoids and chlorophylls. They can be included in the category of functional products since their constituents are expected to offer additional health properties beyond basic nutritional needs. The bibliography for the biological activity of some minor compounds of pressed oils becomes more extensive every day but the published material has not yet been fully evaluated [1].

The best known cold pressed oils are briefly presented below:

Virgin olive oil: The health benefits of this oil, an important component of the Mediterranean diet, have been ascribed to the monounsaturated oleic acid and its minor constituents, mainly phenolic compounds, squalene and triterpenes. The bioactive phenolic compounds present in virgin olive belong to various chemical classes, phenolic acids, simple phenols such as tyrosol, hydroxytyrosol and their secoiridoid derivatives, flavonoids, lignans and hydroxy isochromans. Hydroxytyrosol, tyrosol, oleuropein and ligstroside have been broadly discussed. Emphasis is now given to two secoiridoids, the dialdehydic forms of elenolic acid linked to tyrosol and hydroxytyrosol. New research focuses on mechanisms by which olive oil minor exert their beneficial effects (cardiovascular, antioxidant anti-inflammatory, neuroprotective, chemotherapeutic) and especially on nutrigenomic mechanisms that modulates expression of disease-related genes [2].

Cold press sesame oil: It has a nutty flavor and plays a prominent role in Asian cuisine. A good source of polyunsaturated fatty acids. Vitamin E and phenols, mainly gamma-tocopherol and the lignans sesamin and sesamolin display an abundance of biological activities (suppressing oxidative stress *in vivo*, lowering of cholesterol level in blood, protection of liver from oxidative damage).

Flax seed oil: The pure oil is rich in α-linolenic acid, plastochromanol-8 (a tocochromanol), sterols and carotenoids. The oil enriched with particulates is rich in lignans broadly studied for the multiple physiological effects they offer (protection against breast, prostate, colon, and skin cancers in animals and humans). The oil falls outside of the category of "cooking oils". It has to be used just before serving.

Camelina seed oil: It is rich in alpha-linolenic acid, tocopherols (mainly gamma- tocopherol) and other antioxidants (polar phenolic compounds). Resistant to heat, it is suitable as health-promoting cooking oil. It can be also used for deep frying. Claimed properties: Antioxidant, anti-inflammatory, boosting of immune system effects.

Virgin argan oil: It is a pantry staple in Morocco. It may be used for cooking, frying, as a dip, and in salad dressings. It belongs to the Monounsaturated Fatty Acids (MUFA) group. The characteristic of the oil is the high levels of linoleic and oleic acids and minor constituents such as tocopherols (especially γ-tocopherol), schottenol (a bioactive sterol), spinasterol and squalene. Published scientific work indicates that virgin argan oil could be considered as a functional food but there is a need for further studies and more clinical data to draw conclusions regarding possible therapeutic effects [3].

Cold pressed coconut oil: Rich in medium chain triacylglycerols that are burned rapidly. It is a very special type of fat containing also antioxidants such as alpha-tocopherol and phenolic compounds, mainly phenolic acids.

Walnut oil: It has a high amount of Omega-6, but also a decent amount of Omega-3 Suitable for salads or as a gourmet condiment.

Rape seed oil: Rich in brassicasterol and plastochromanol-8. Produced from "poor in" or "free of" erucic acid seed varieties.

Pumpkin seed oil: This oil has a high level of linoleic and oleic acids. It contains also phenolic compounds (mainly phenolic acids) at a low level (25-50 mg/kg of oil, expressed in gallic acid). The main phenolics reported are tyrosol, vanillic acid, vanillin, luteolin and sinapic acid.

Stearidonic acid oils: Black currant, hemp, echium seed oils Stearidonic acid is an n-3 fatty acid, all cis-octadecatetraenoic acid (18:4, n-3) with potential health benefits.

Evening primrose seed and borage oils: Rich in gamma-linolenic acid and gamma- tocopherol. Evening primrose seed oil was found to contain lipophilic triterpenoidal esters such as 3-O-trans-caffeoyl derivatives of betulinic and oleanolic acid.

Macadamia seed oil: It belongs to the MUFA (Monounsaturated Fatty Acids) type. Rich in aplpha-tocopherol. It is highly shelf-stable and resistant to heat-induced oxidation.

Avocado oil: One of few edible oils not derived from seeds. It is pressed from the fleshy pulp surrounding the avocado pit. It has a monounsaturated fat profile and it is rich in tocopherols, chloroplylls and bioactive carotenoids. It can be used for cooking and frying.

Other seed oils: There is published and patented research for seeds such as amaranth, apple, blackberry, black caraway, black currant, blueberry, boysenberry, cardamom, carrot, coriander, cranberry, cumin, grape, hemp, marionberry, parsley, *pistacia atlantica*, poppy, rapeseed, raspberry, sea buckthorn (hippophae) and strawberry seeds. These oils have been studied for the presence and level of bioactives such as alpha-linolenic acid, tocopherols, carotenoids, squalene, phenolic antioxidants and anti-inflammatory activity [4-7].

The use of non-traditional cold pressed oils introduced to the market relatively recently is bound to rise in the near future due to the presence of compounds that may reduce the oxidative stress [8], trigger the inflame/anti-inflame healing process, boost the immune system or may have other beneficial properties such as chemopreventive and neuroprotective activity. There are, however, some concerns related to the properties, authenticity, safety and health claims. The health contributing effects and functionality is not yet fully documented and more scientific research is needed, especially in the areas of pharmacology and nutrition [9-11]. Additional solid and evidence-based data should be provided supported by controlled clinical trials. Oils should be carefully checked for their identity and the possible presence of contaminants. In the certification of grades vague terms should be avoided. Extra Virgin olive oil, for example, is a term of the legislation for olive oil. It is not clear, however, what is the meaning of this term for other cold pressed oils. Another concern is the problem of rancidity and susceptibility to damage by light and heat. Consumers should be educated how to store the bottles and how to select oils for cold cousine or oils suitable for cooking and frying.

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