

Effect of Cold Pressing on Volatile Profile and Flavor of Virgin Sunflower Oils

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Virgin sunflower oil is one of the most used oils for salads, mayonnaises and other thermally non-processed foods in the Balkan region and East Europe due to the pleasant nutty flavor typical for sunflower seeds. Sunflower oil with high percentage of oleic acid is coming more into the focus since the fatty acid composition is more similar to rapeseed oil and olive oil.

The influence of cold pressing and quality of the seeds from *Helianthus annuus L.* on the volatile profile and flavor of virgin sunflower oils were examined. Dynamic Headspace (HS) gas chromatography equipped with mass spectrometry for identification and flame ionization detector for quantification was applied to study the volatile compounds of 15 samples of virgin sunflower oils. 13 samples of cold pressed sunflower oils were commercial available and additional two oils were screw pressed under laboratory conditions from low quality seeds with typical musty and fasty flavor. In addition, gas chromatography-olfactometry (GC-O) was used in order to estimate the aroma impact of particular volatile compounds.

The most abundant volatile compound in all 15 samples was α -pinene with percentage between 7 and 9 mg/kg. The other terpenes present in the oils were: β -pinene, camphene, limonene, α -phellandrene, terpinolene and sabinene. Monoterpene limonene was present in much lower quantity (0.5-1 mg/kg) and β -pinene was present in higher percentages between 1 - 4 mg/kg. In most virgin sunflower oils, percentages of α -phellandrene and champhene were lower than 5 mg/kg.

Sensorial analyses with experienced tasters were performed in order to estimate the most important flavor characteristic of the oils as sunflower seed like, nutty, fruity-sweet, woody like, astringent, bitter, rancid and sour. Additionally, the fatty acid profile of the samples was estimate in order to see relationship between fatty acid profile (especially oleic/ linoleic acid ratio) and volatile compounds.

Finally, the data were subjected to Principal Component Analyses to gain an overview of how the samples were correlated to each other with regard to equilibrium volatile headspace concentration.