

Oxidative Stability of Virgin Seed Oils Determined by the Rancimat Test under Different Conditions as Compared to Long Term Storage at 25°C.

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The oxidative stability (OS) of virgin seed oils is a quality property of great importance for their commercialization. Two procedures for the determination of the OS were applied to sesame, sunflower and grape seed virgin oils: (i) long term storage at 25°C and (ii) Rancimat test under different conditions (80-160°C at 10- 25 L h⁻¹ air-flow).

The oxidative stability index (OSI) as expected decreased at higher temperature, and a linear regression equations between Log₁₀ (OSI) and T(°C) was observed under Rancimat accelerated oxidation conditions. The activation energy (E_a) of the oxidation, assuming first order reactions and by applying the Arrhenius` law, was determined. E_a values were similar for sesame and sunflower oils (100.9 and 100.3kJ mol⁻¹) while it was lower for the grape seed oil (84.4 kJ mol⁻¹) showing its thermodynamic susceptibility to oxidation.

Under storage conditions at 25°C, the sesame virgin oil, with highest amounts of tocopherol isomers (66,102 mg Kg⁻¹), was the most stable, reaching a peroxide value (PV) of 15 meq O₂ Kg⁻¹, which is the maximum PV allowed for edible seed oils, after 360 days of storage, while sunflower virgin oil (tocopherols 529 mg Kg⁻¹) showed the same PV in 279 days. The grape seed virgin oil, despite of its high level of tocopherols and tocotrienols (929 mg Kg⁻¹), was the most unstable with a PV value of 15 in less than 9 days of storage.

A discussion on the predicted shelf-life under accelerated oxidation conditions and by the long term storage at 25°C is reported.

Keywords: Virgin seed oils; oxidative stability; shelf-life prediction