

Evaluation of the Efficiency of Oryzanols as Antioxidants for Edible Oils by Differential Scanning Calorimetry

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It is known that oil oxidation is an exothermic process, so the rate of heat production during the oxidation of a lipid sample can be related with the rate of the oxidation process. Thus the differential scanning calorimetry (DSC) is a useful tool for the study of the kinetics of this process.

The aim of this study was to evaluate the antioxidant power of oryzanols (natural antioxidants characteristic of rice bran oil) in the protection of a vegetable oil subjected to accelerated oxidation by non-isothermal DSC and to compare it with that shown under similar conditions by BHT and δ -tocopherol.

Approximately 15 mg of purified oil (pure or additivated with the antioxidants of interest at a concentration of 3×10^{-3} M) was placed in an aluminium pan and subjected to oxidation under O_2 inside the DSC oven. The temperature was increased at a constant rate (β), between 7.5 and 20 °C/min. The oxidation temperature (OT) was determined as the on-set temperature in the corresponding thermogram.

Purified soybean oil showed OT of 425.5 and 448.3 K when it was heated at 7.5 and 20 °C/min, respectively. When this oil was additivated with oryzanols and the oxidation carried out using the same two values for β , the OT were 432.6 and 449.1 K, respectively. This demonstrates that the oryzanols have some positive effect on the stabilization of soybean oil under these conditions. At the same β the following OT were determined: 441.0 and 459.1 K for δ -tocopherol, 437.6 and 451.7 K for BHT. Therefore, the oryzanols showed an intermediate antioxidant power, higher than δ -tocopherol and less than BHT.

Results demonstrated that this method is useful for the evaluation of the protection efficiency of the different antioxidants tested. Additionally, some kinetic parameters of the accelerated oxidation of soybean oil under these conditions were determined.