



CHEMICAL CHARACTERIZATION OF SUNFLOWER VEGETABLE OIL WITH DIFFERENT DEGREES OF OZONIZATION

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INTRODUCTION

In recent years, the use of ozone in the form of ozonized vegetable oils for topical treatments has increased (Martínez-Sanchez, 2021, Ozone Therapy Global Journal). Sunflower oil contains a low concentration of saturated fatty acids (palmitic and stearic) and a high concentration of unsaturated (oleic and linoleic), with linoleic being the majority (Gunstone et al. 1994, The Lipid Handbook). It is extremely important to characterize the compounds produced from the ozonation reaction, as well as to understand how their kinetics behaves at different times and ozonation process conditions (Almeida et al. 2016, Vegetable Oil: Properties, Uses and Benefit).

MATERIAL AND METHODS

The sunflower vegetable oil (Bunge, Gaspar), as well as the ozonized oils were supplied by the company Philozon, located in Camboriú/SC. Three samples of sunflower oil (SO) with different degrees of ozonation (low-OSO1, medium-OSO2 and high-OSO3) were analyzed. The samples were analyzed for their chemical characteristics, through tests of peroxide value (PV), acidity value (AV) and iodine value (IV), in addition to chromatographic techniques (GC-MS), after derivatization of the sample, and nuclear magnetic resonance (¹H NMR) analysis.

RESULTS

The PV for SO was 4 m_{eq} O₂/kg oil, while for the ozonized oils OSO1, OSO2 and OSO3 were 1829, 2449 and 2824 m_{eq} O₂/kg oil, respectively. The AV for SO was 0.08 mg NaOH/g oil, while for the ozonized oils OSO1, OSO2 and OSO3 were 1.54, 2.90 and 5.59 mg NaOH/g oil, respectively. The IV for vegetable oil was 126 g I₂/100 g oil, while for the ozonated oils OSO1, OSO2 and OSO3, were 83, 68 and 53 g I₂/100 g oil, respectively. By GC-MS, aldehydes (hexanal and nonanal) and carboxylic acids (hexanoic acid and nonanoic acid) were identified in the ozonized oils. It was observed a decrease in hydrogen signals related to double bonds and the emergence of hydrogen signals related to aldehydes by NMR.

CONCLUSIONS

The PV and AV were directly proportional to the degree of ozonation, whereas the IV was inversely proportional. The formation of oxygenated compounds, by the ozonation reaction, was identified by the GC-MS technique.

ACKNOWLEDGMENTS

To FAPESC (Edital 15 and 29/2021) for the financial support and to the company Philozon for the supply of ozonated and non-ozonated oils.

