SUMMARY

The work deals with the effect of heat on intact seeds of sunflower and canola, considered as strategic commercialized products and their treatment by heat is inevitably carried out, in industrial seed processing, for partial drying and improving both oil yield as well as the quality parameters of the oil the heated intact seeds. Simulated heat treatment proposed ,by this work, was conducted by traditional oven heating at 90°C, 105°C and 120°C for 60, 90, 120, 150 and 180 minutes, respectively. This was compared with the up-todate microwave method at 80°C, 100°C, 120°C, 140°C and 160°C for exposure times of 0.5, 1, 1.5, 2 and 2.5 minutes, was also carried out. It was found that, greatly affected by heat treatment. Comparison of the two heating methods revealed that microwave treatment ,based on internal heating, is more advantageous as a new hightceh rapid and process for oilseed processing in the future. Heating of seeds affects the fatty acid components in triglycerides ,as well as, the important minor components such as phospholipids fraction of oil . Quantitative determination of fatty acid components was conducted by using GLC to show any variation in their components . The effect of heat on their chemical structures can be controlled through measuring primary oxidation (PV) and secondary oxidation (P-AV) of the crude oil, as well as, totox values of the oil of heated seeds. Color index values were taken as

a guide for optimum heating preventing the oil from being overheated. In addition, oxidative stability by Rancimat method, was carried out to determine the induction period of the oil (shelf time) . The heat treatment of the intact seeds showed that phospholipids are greatly affected by this treatment. The heat treatment caused splitting of the phospholipid components leading to a decrease in their content. This was taken as a new trend of evaluating the seed quality parameters in which phosphatidic acid was followed by quantitative thin layer chromatography determination using phosphatidic acid standard. In addition, the phosphatidic acid generation in cracked seeds was also detected and determined to prove that phophatidic acid is formed not only by heat treatment but also through enzymatic reaction in the seeds.

Finally, optimum conditions of heating by oven and microwave treatment were investigated and it was concluded that microwave treatment is more advantageous than traditional oven heat treatment.

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ABSTRACT

In this investigation, the effect of heating canola and sunflower seeds on the characteristics of their oils is studied . Two methods of heating were performed : the conventional oven and microwave heating . The oils extracted from the heated seeds at different time intervals were subjected to complet analysis . Thus, the different parameters : acid value, iodine value, peroxide value, total oxidation and the extent of unsaturation were determined . Also, the stabilities of the oil samples were determined using the rancimat method . Additionally, phosphatidic acid released from the heated intact and cracked seeds was estimated.

The results obtained revealed that microwave treatment is more convenient and advantageous than the conventional method as it gave oils of more better characteristics .

Key words : Canola and sunflower seeds, different oil parameters, the rancimat method, phosphatidic acid .

Studies On Some Vegetable Oils Extracted From Thermally Treated Oilseeds

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List Abbreviations

AV : Acid value
CDO : Conjugated diene
CO : Corn oil
DSC : Differetial Scanning Colorimetry
FA : Fatty acid
FFA : Free fatty acid
GLC :Gas liquid chromatography
HDPE : High density polyethylene
HPLC : High performance liquid chromatography
IV : Iodine value
LLCO: Low-linolenic canola oil
LysoPA: Lysophospholipid
OV : Oxidation value
PV : Peroxide value
p-AV : para-anisidine
PET : Polyethylene terephthalate
PA : Phosphatidic acid
PC : Phosphotidylcholine
PE : Phosphotidylethanolamine
PL : Phospholipid
RCO: Regular canola oil
SO : Soyabean
TAG : Triacylglycerol
TBA : Thiobarbituric acid
TPC : Total polar compound
TLC : Thin layer chromatography

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