NUTRITIONAL EVALUATION OF RED PALM OIL AND ITS UTILIZATION IN SOME FOODS

By

HUDA HASSAN IBRAHIM MOHAMMED

B.Sc. Agric. Sc. (Food Technology), Cairo University, 2003

M.Sc. Agric. Sc. (Food Science and Technology), Ain Shams University, 2012

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This thesis for Ph.D. degree has been approved by:

Dr. Adel Zaki Mohamed Badee ----------

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Cairo University

Dr. Mohamed Magdy Mostafa ----------

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Nessrien Mohamed Nabih Yasin ----------

Prof. of Food Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Magda Habib Allam ----------

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Ain Shams University.

Date of Examination: / / 2018

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Under the supervision of:

Dr. Magda Habib Allam
Prof. Emeritus of Food Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Nessrien Mohamed Nabih Yasin
Prof. of Food Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University

Dr. Saeb Abd El Monaim Hafiz
Head of Research of Special Food and Nutration, Food Technology Research Institute, Agricultural Research Center

ABSTRACT

Huda Hassan Ibrahim Mohammed: Nutritional Evaluation of Red Palm Oil and Its Utilization in Some Foods. Unpublished PhD. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2018.

This work was carried out to study the physical and chemical properties, fatty acid composition, oxidative stability and minor components of red palm oil (RPO) and its prepared fractions super red palm olein (SRPOL) and soft palm mild fraction (PMF). Supplementation the diets of normal Albino rats with RPO or SRPOL, besides commercial shortening (C.Sh.) and palm olein (POL) which located in Egyptian market as well as their blends with RPO and SRPOL was carried out to study the effect of these oils on rats plasma analysis and the histopathology of their internal organs in order to perform an attempt to hold back the dangerous which has been proved of C.Sh. and POL in raising cholesterol level and their harmful effect on liver and kidney. Biological evaluation was also conducted to study the protective effect of RPO and SRPOL on hypercholesterolemic rats compared to Lipitor drug. Additionally, RPO and its fractions were utilized in some food products such as cake, mayonnaise and chocolate spread as fat replacers at 25, 50, 75 and 100% levels.

SRPOL had the highest refractive index, red color value, and the lowest melting point and viscosity; it also exhibited the highest iodine value, unsaponifable matter and the lowest saponifable value followed by RPO then PMF. While, RPO had superior induction period (78.0 hr) followed by PMF (61.2 hr.) then SRPOL (44.0 hr.) Palmetic acid was the most prevalent saturated acid, and oleic was the most widespread unsaturated acid in all the tested oils.

Diets containing C.Sh. or POL significantly increased rats serum TC, LDL-C, TG and decreased plasma HDL-C, thereby decreased VLDL-

C, TC/HDL-C and LDL-C/HDL-C risk ratios. Diets supplemented with RPO or SRPOL in feeding normal or hypercholesterolemic rats decreased plasma TC, LDL-C and TG, while increased HDL-C, by means they were most effected in lowering the risk ratios. Blending each of RPO and SRPOL with C.Sh. and POL declined the excess levels of TC, LDL-C, TG, VLDL-C and risk ratios, as well as retarded the drop in HDL-C reaching their levels to be equal to those in control serum rats. Supplementation of RPO or SRPOL in diets of normal or hypercholesterolemic rats maintain liver and kidney functions within the normal levels, they proved their potency to depress the injurious effect of C.Sh. and POL. Also when hypercholesterolemic rats fed on RPO or SRPOL diets they hold bake the detrimental effect of hypercholesterolemia.

The histopathological examination of liver, kidney, heart and aorta of normal rats fed on C.Sh. or POL diets as well as hypercholesterolemic rats showed sever alteration in their internal organs. While, feeding normal rats containing RPO, SRPOL or POL blended with SRPOL showed normal histological structure of their organs. On the other hand, feeding hypercholesterolemic rats on RPO or SRPOL diets induced some mild alteration in the studied organs.

RPO and its fractions SRPOL and PMF were used successfully in some foods as fat replacers at different levels reached to 100% without any detrimental effect on their quality attributes such as the utilization of RPO in cake, and the soft PMF in chocolate spread. However, when SRPOL was incorporated in mayonnaise, its used also was accepted.

Key words: Red palm oil, Super red palm olein, Soft palm mild fraction, Physical and chemical characteristics of oils, Oxidative stability, Vitamins E,A,D,K, β- carotene, liver and kidney function, Biological evaluations, Plasma lipid profile, Cake, Mayonnaise, Chocolate spread.

AKNOLEDGMENT

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