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Technological study of the quality frying oils treatment with antioxidants extracted from plant sources on the activity of some antioxidant enzymes in rats.

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THESIS

*Submitted in Partial Fulfillment of the
Requirements for Doctor of Philosophy Ph.D. in Specific Education
" Nutrition and Food Science "*

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كلية التربية النوعية
قسم الاقتصاد المنزلي

دراسة تكنولوجية لجودة زيوت التحمير المعاملة بمضادات الأكسدة
المستخلصة من مصادر نباتية على نشاط بعض الأنزيمات المضادة
للأكسدة في فئران التجارب .

رسالة مقدمة من الباحثة

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ABSTRACT

"Technological study of the quality frying oils treatment with antioxidants extracted from plant sources on the activity of some antioxidant enzymes in rats."

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Specific Education" Nutrition and Food Science"**

Frying oils (sunflower75% & soybean25%) are extensively used in Egypt with low economic level. The process of frying gives rise to harmful agents of which formation free radicals. Polyphenols which found in natural sources such as broccoli, red beet and kiwi have antioxidant and anti-inflammatory properties.

The aim of the present work was to investigate the effectiveness of using polyphenols extract from (broccoli, red beet and kiwi) as a natural antioxidant against oxidation of frying oil and increase the antioxidant enzyme activities as Glutathione peroxidase (GPx), Catalase (CAT) and Superoxide dismutase (SOD) in plasma of rats. Six groups of rats were fed on frying oil sample (10 gm oil/100 gm of basil diet), control group fed on normal food and water as for 30 days .The results showed change in physicochemical characteristics like peroxide value and acid value in frying oils samples.

The result revealed HPLC analysis of the polyphenols extract contained catechol, pyrogallol, catechin, caffiec and gallic acid as major compounds present a high proportion in addition to other compounds. Significant increase in the level of lipid profile and a decrease in the level of activity of antioxidant enzymes (SOD and CAT) in group fed frying oil without antioxidant, compared with the control. While feeding rats with frying oil treated with polyphenols extract from broccoli occur significant increase at $P<0.01$ in the level of activity of antioxidant enzymes (SOD, CAT, GPx) and a decrease in the level of lipid profile compared with group which fed on the frying oil without the extract. In histopathological study we find out change in cells liver and kidney in rats.

**Key word: Polyphenols, antioxidant enzymes, Frying oil,
Broccoli, Red beet, kiwi.**

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Approval Sheet

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**Degree : Ph.D. in Specific Education
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1- INTRODUCTION

Frying oil represents an important method of food preparation of daily dishes in different countries, including Egypt, either in home or in restaurants. During frying, several changes physical and chemical occur in the frying oil. These changes include oxidation, which produce a great number of potential toxic and development of free fatty acid. Oxidation of frying oil result primary products of lipid oxidation is hydro peroxides which referred to as peroxides (**El-Noamany, 2000**).

Antioxidants nutrients found in fruits, vegetables, and other foods are thought that help protect the body from free radical that may cause damage to the cells and weakening of the immune system (**James *et al.*, 2007**).

Recently, considerable attention has been focused on natural foods that inhibit, or retard diseases caused by oxidative processes because natural food ingredients are safer than synthetic ones. The effects of polyphenols are mainly due to their antioxidant properties. These compounds present they can improve the lipid profile and lessen the oxidation of low-density lipoproteins (LDL). **Quinones *et al.*, (2012)**.

Jette *et al.*, (1999) reported that (broccoli) rich with polyphenoles reduce the severity of liver injury in association with lower concentrations of lipid peroxidation. **Hilde *et al.*, (2009)** found that the highest levels of antioxidants measured were detected in whole kiwi fruit.

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▲▲▲▲▲▲▲▲
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RECOMMENDATIONS

1. Study recommends that contain frying oils amount of natural anti oxidation to reduce the oxidation of oil during frying because natural food ingredients are safer than those synthetic.
2. We need to educate housewives for seriousness of the use of frying oils for long periods more than two hours so as not to cause health problems for members of the family. The study emphasizes the potential risk of dietary oxidized lipids
3. Should be consumed (broccoli, red beet and kiwi) regularly in our daily diet to improve public health because they contain a high percentage of polyphenols which have antioxidant and anti-inflammatory properties.
4. Take advantage of the phenolic extracts of some vegetables and fruits in Egypt, such as broccoli, red beet and kiwi as natural anti oxidation important used in food and industrial applications.

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