UTILIZATION OF MORINGA SEEDS IN FOOD PROCESSING

By

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A thesis submitted in partial fulfillment
of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Agricultural Science
(Food Science and Technology)

Department of Food Science
Faculty of Agriculture
Ain Shams University

2012

الإستفاده من بذور المورينجا فى التصنيع الغذائي

رسالة مقدمة من

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للحصول على

درجة دكتور فلسفة في العلوم الزراعية

(علوم وتكنولوجيا الأغذية)

قسم علوم الاغذية

كلية الزراعة

جامعة عين شمس

2012

Approval sheet

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ABSTRACT

Amira Mohamed Shokry Riad Hassanen: Utilization of Moringa Seeds in Food Processing. Unpublished Ph. D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2012.

As the population grows, however, sources of food became more difficult to human. Also, recently, there has been an increasing interest and growing need for the search of new source of edible oil especially high-oleic vegetable oils, which have been demonstrated to reduce the risk of coronary heart disease. Therefore, the demand for high-oleic oils is increasing but there are only a few known sources available.

From such point of view this study was undertaken to evaluate the proximate analysis of *Moringa oleifera* L. seeds. The physical and chemical properties, the oxidative stability and fatty acid composition of *Moringa oleifera* L. (Moringa seed oil) were determined. The effect of adding Moringa seed oil concentration on the oxidative stability and sensory properties of cup cake and meatball manufacture during the storage period. The obtained data showed that:

Moringa seed was found to be rich in crude protein and fat which was 40.84% and 33.48%, respectively. Also *Moringa oleifera* L. seed contains crude fiber, ash and nitrogen free extract with 3.47%, 4.17% and 11.55%, respectively. *Moringa* seed oil had a very good physical quality including the refractive index, specific gravity, viscosity, smoke point and color represented in 1.4665, 0.9122 cm^3/gm, 11776 CP, 207˚C and 35Y, 3.6R, in respect. Also, *Moringa* seed oil was characterized with excellent chemical properties including acidity, sapnofication number, unsapnofication matter, total tocopherols and total phenols which found to be 1.4%, 194.7%, 0.54%, 71.0 ppm and 466.8 ppm, in respect.

Moringa seed oil exhibited a very higher good oxidative stability where the peroxide value, TBA value at 532 nm, rancimate at 100˚C and the specific extension at 232 and 270 nm were 5.44 meqO_2/kg, 0.874mg malonaldhyde/kg , 304.8 and 1.3720 and 0.1018, respectively.

Moringa seed oil was found to be contained a high content of oleic acid which represented 72.29% of the total fatty acid. Also, it contains 77.61% unsaturated fatty acid, 22.40% saturated fatty acid which it's considered to be a high ratio. The dominant saturated fatty acid was found to be Palmitic acid with 7.79% followed by Behenic acid with 6.87%.

The sensory evaluation of the prepared cup cakes proved that the replacement of shortening with 25% of *Moringa* seed oil have the highest overall acceptability scores and other sensory characteristics than the other replacement percentage.

Replacement of animal fat in preparing meatball samples with level of 25 and 50% of extracted *Moringa* seed oil caused a significant increase in the overall acceptability of the prepared meatball samples in comparison with the control samples containg100% animal fat.

Key words: Aqueous enzymatic extraction, Cup cake, Fatty acid composition, Meatballs, *Moringa oleifera* seed oil, Physico-chemical characteristics, Oxidative stability.

ACKNOWLGMENT

All praises due to Allah, who blessed me with kind professors and colleagues, and gave me the support to produce this thesis.

I would like to express my deepest gratitude to **Prof. Dr. A.Y. Gibriel**, Professor of Food science and technology, Food Science Department, Faculty of Agriculture, Ain Shams University, for his kind supervision, carefully guidance, and great help through the investigation courses and during the preparation of manuscript.

Sincere appreciation to **Prof. Dr. F. Abd El-Razik Ali,** Professor of Food Science, Agri-Industrialization Unit, Desert Research Centre, for his plentiful advice, valuable help during the investigation and provided endless effort for me to complete this work. Deep thanks and gratitude to **Dr. M.M.M Abd El-Razik,** Professor of Food Science and Technology, Food Science Associate Department, Faculty of Agriculture, Ain Shams University, for his supervision, carful guidance during the laboratory work and every possible help he kindly offered during this investigation. Also, I would like to express a Sincere thanks to **Dr. A.M.A. Hozayen** Researcher of Food Science, Agri-Industrialization Unit, Desert Research Centre, for his guidance, kindly advice, continuous support and valuable help he offer in this investigation.

My deepest thanks extended to my dearest **Prof. Dr. M.Sh. Riad** Professor of Agriculture Agronomy, Faculty of Agriculture, Ain Shams University, for his supporting, advice and provided endless effort for me to complete this work. I would like to express many thanks **Dr. Nasr El-Bordeny**, Associate Professor, Animal production Department, Faculty of Agriculture, Ain Shams University, for his plentiful advice and his kind help during the laboratory work.

Sincere thanks to **Dr. F.O.F. Abou-Zaid**, Researcher of Food Science, Agri-Industrialization Unit, Desert Research Centre, for his cooperation and advice.

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