سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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سامية محمد مصطفى

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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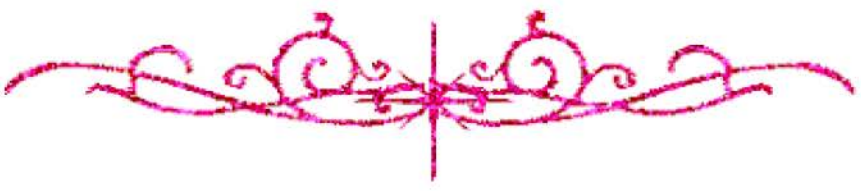

سامية محمد مصطفى

شبكة المعلومات الجامعية

بالرسالة صفحات لم ترد بالأصل

BIOCHEMICAL STUDIES ON SOME EGYPTIAN FOODS

BY

MOHAMED HASSAN HOSNY ALY HASSAN

B.Sc. Agric. (Food Science and Technology), Cairo University, 1995

THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

in

Agricultural Science

(Biochemistry)

Biochemistry Department

Faculty of Agriculture

Cairo University

2002

APPROVAL SHEET

BIOCHEMICAL STUDIES ON SOME EGYPTIAN FOODS

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ABSTRACT

This study was aimed to produce gluten-free bakery products for celiac patients, high gluten bakery products for obesity and diabetic people, and to prepare wheat or corn resistant starch. These resistant starches were used to produce some bakery products.

The chemical composition of raw materials showed that crude protein, hexane extract, ash, crude fiber, carbohydrates and total dietary fiber contents of wheat flour 72% extraction rate were 11.82%, 0.98%, 0.43%, 0.31%, 73.24% and 3.52%, respectively, 0.68%, 0.30%, 0.21, 0.08%, 90.76% and 0.89%, respectively, for wheat starch, and 0.42%, 0.10%, 0.11%, 0.06%, 92.47% and 0.96%, respectively, for corn starch.

The increasing of amylose content in raw materials (wheat or corn starch) was flowed by increasing resistant starch content. Resistant starch content of biscuit or balady bread products made from different levels of wheat or corn resistant starch was increased considerably as increasing of resistant starch added.

Sensory characteristics of biscuit products showed that the overall score category was very good for wheat flour biscuit, good for gluten-free biscuit. The scores of sensory characteristics which recorded with biscuits made from 25% gluten + 75% wheat bran or 75% defatted soybean flour were higher than that recorded with biscuits made from 50% gluten + 50% wheat bran or 50% defatted soybean flour. Biscuit products made using up to 25% levels of wheat or corn resistant starch had no significant difference by comparing with the control.

Sensory characteristics of balady bread products showed that the general appearance of high gluten balady bread made from 10% gluten + 90% wheat bran was the nearest product to the bread control and it had a good acceptance by the judged and had overall score (83.25). But there were no significant differences between balady bread products made from wheat or corn resistant starch up to 20% levels and ordinary bread (control).

The hypocholesterolemic effect of wheat or corn resistant starch in rats was investigated. Rats fed diet containing cholesterol and wheat or corn resistant starch had the lowest total body weight gain (109.4 and 106.4 g/60 days, respectively). The food efficiency showed the same line that observed with body weight (negative control groups > positive control groups > cholesterol + resistant starch groups). A significant difference of liver weight was found between different groups. There was no significant reduction in serum glucose level noticed in RS groups (wheat and corn) comparing with the other groups. Introducing resistant starch in the hypercholesterolemic diet was followed by significantly decrease in the levels of total cholesterol, triglycerides, LDL- and VLDL-cholesterol. In contrast, the level of HDL-cholesterol of rats fed hypercholesterolemic diet was lower than that of rats fed either normal diet (control group) or hypercholesterolemic diet containing resistant starch.

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Bothayna M. Abd El-Lateef

ACKNOWLEDGEMENT

THANKS TO ALLAH, THE MOST GRACIOUS AND MERCIFUL

My sincere appreciation and special word of thanks to ***Prof. ADEL SAYED AFIFY,*** *Professor of Biochemistry; Faculty of Agriculture; Cairo University, for his supervision, valuable assistance and suggestions, useful advise and guidance throughout this investigation.*

My deepest gratitude and appreciation are due to ***Prof. BOTHAYNA MOHAMED ABD EL-LATEEF,*** *Professor of Food Technology; Food Technology Research Institute; Agriculture Research Center; Ministry of Agriculture; Giza; Egypt, for her useful advise and guidance.*

Heartily thanks extended to my friends in Food Technology Research Institute for their encouragement.

Finally, thanks to all the staff members of the Bread and Pasta Technology Department, Food Technology Research Institute, Agricultural Research Center, Ministry of Agriculture, Giza, Egypt.

CONTENTS

INTRODUCTION

I. INTRODUCTION

During the last five decades or more, the attention was paid to use the special foods. Hospitalized persons, for example, often need special foods, which are prepared by the hospital's dietetics department. In addition, many people suffer of health problems and often need special foods. These foods should be prescribed by a physician. Many doctors refer patients to a dietitian, who draws up an individuals diet plan. Dietetics, for example, need sugar-free, balanced diet, while heart patients, especially persons with high blood pressure, need low-salt diets. Diabetes mellitus is another disease that requires careful meal planning. At present time in Egypt, special interest attaches to people with health problems which are required special foods included patients with celiac disease and diabetes as well as obesity.

Celiac disease is a malabsorption syndrome characterized by marked atrophy and loss of function of the villi of the jejunum (and rarely, the cecum). It is an uncommon disorder seen mainly in young children. The word celiac (or coeliac) referring to the abdomen. In this disease, the cells that line the small intestine are damaged and therefore unable to absorb foods normally, especially fats. Patients with this condition are very sensitive to gluten. Celiac disease also called celiac sprue, non-tropical sprue, gluten intolerant, gluten sensitive enteropathy (GSE), and adult childhood, or infantile celiac disease. Patients with celiac disease are very sensitive to all grains contained gluten, such as wheat, rye, oats and barley **(Baker and Read, 1976)**. Because the small intestine, or bowel, normally digests and absorbs the food and drink that is ingested, celiac disease can have far-reaching effects. Just how gluten harms the lining of the small bowel is not clear, but a protein fraction of gluten called gliadin seems to actually cause the damage. Celiac disease

is a partly inherited disorder, but it sometimes because obvious only in the adult years especially following pregnancy, surgery, severe emotional stress, or a viral infection. The prevalence of celiac disease in Europe is high: 1.8 cases/1000 individuals in a sample of 2237 Italian subjects aged 25 – 87 years **(Corazza *et al.*, 1997)** and 2.7 cases/1000 individuals in a Finnish population aged ≥ 15 years. In the United States, a prevalence of 4.0 cases/1000 individuals in a large sample of healthy adult blood donors was reported. In North America, about 1 in 5,000 persons has the disease, but in southwestern Ireland 1 in 300 are affected **(Collin *et al.*, 1997)**. Generally, celiac syndromes are diarrhea, underdevelopment, weakness, and anemia in infants, due to improper absorbtion of fats. The abdomen is swollen and stools are large and foul-smelling. The syndromes of celiac disease usually start by age 2 years. Infant become ill when foods containing gluten are first introduced. Diarrhea is common because food is passed out of the body instead of being absorbed. At first the infant may seen to have merely an upset stomach. The condition becomes more obvious when normal weight gain slows; the child's abdomen becomes painfully bloated after eating, greasy-looking, foul-smelling stools containing fat are passed. Anemia, due to two little dietary iron being absorbed, is common, and serious dehydration can result if too little liquid is absorbed. In time the muscles of the arms, legs, and buttocks may become thin and weak, giving the child a wasted appearance; at the same time the abdomen is very distended. The disease effects both sexes, and it can begin at any age from infancy (as soon as cereal grains are introduced) to later life even though the individuals has consumed cereal grains along **(Hallert *et al.*, 1983)**.

Wheat, on the other hand, is a crop essential to the making of bread, pastry, and pasta. Wheat products are eaten by many people, especially Egyptians, at every meal. Wheat products are valued for their

taste and for their nutritional benefit. Wheat flour has a substance called gluten. Gluten aids in baking uniformly light bread that rises (swells) properly. Wheat gluten is extremely versatile because it provides the strong foundation for the leaving action of yeast. For this reason, wheat gluten or wheat flour is frequently used in the baked products rather than made from other grains. The other flours than wheat flour, particularly soybean flour, may equal wheat nutritionally, but none can match wheat for creating light, even-textured bread. Flours made from soft wheat, containing less than 12% of gluten are used to make tender products such as cakes and crackers. Flours made from hard wheat containing more than 12% gluten are used for bread and roll production. Starch, on the other side, makes almost three fourths of wheat, rye, and corn.

Starch is quantitatively the most important component of diets and a major source of dietary carbohydrates **(Gallant *et al.*, 1992)**. Starch that is resistant to the action of amylolytic enzymes, either *in vivo* or *in vitro* is known resistant starch (RS). Resistant starch is a natural component that is present in many foods (e.g. bread, breakfast cereals and biscuits). Certain food processing methods (heat treatment process), such as retorting, baking, or drying at high temperatures, are known to slightly increase resistant starch levels. However, in other procedures, such as boiling, starch may lose its resistance. At present, resistant starches have drawn broad interest worldwide for both their potential health benefits and functional properties. Initial clinical studies demonstrated that resistant starches have properties similar to fiber and show promising physiological benefits in humans, which may result in disease prevention **(Gordon *et al.*, 1997)**. Resistant starch prompted as a unique ingredient that can yield high-quality foods. For example, application tests of resistant starch show improved crispness and expansion in certain products and better mouthfeel, color, and flavor over