BIOCHEMICAL STUDIES ON ACRYLAMIDE IN EGYPTIAN FOODS

By

NIVIN SAAD AHMED ELSAID NAIL
B.Sc. Agric. Sci. (Biochemistry), Fac. Agric., Cairo Univ., 1996
M.Sc. Agric. Sci. (Biochemistry), Fac. Agric., Cairo Univ., 2003

THESIS
Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Sciences
(Biochemistry)

Department of Biochemistry
Faculty of Agriculture
Cairo University
Egypt

2010

APPROVAL SHEET

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Title of Thesis: Biochemical studies on acrylamide in Egyptian foods.
Supervisors: Dr. Samir Abd Elmonem
Dr. Ebtesam Abd Elmonem
Department: Biochemistry **Approval:** / / 2010

ABSTRACT

The toxic acrylamide was determined in some traditionally commercial, and homemade Egyptian foods and mother milk. Some additives were used during preparation of home fried potatoes. Fried onions and eggplants contained very high amounts of acrylamide. Olive leaves prevented formation of acrylamide in home fried potatoes. Mother milk contained 482 µg/1000ml acrylamide.Arginine, lysine or valine was administrated into rats without or with acrylamide daily for 35 consecutive days as antidotes. Two groups of rats were administrated acrylamide and vehicle (control). Acrylamide decreased the initial weight of rats, serum and brain contents of total proteins, albumin and glutathione in addition to lactate dehydrogenase activity, while malonaldehyde content, glutathione-S-transferase, superoxide dismutase and lysosomal enzymes activities (Acid phosphatase, N-acetyl-β-glucosamidinase and β-galactosidase) were increased. Histopathological studies showed also a great damage in brain by acrylamide. Arginine ameliorated the harmful effects of acrylamide to great extent followed by lysine to lesser extent.

Key words: Acrylamide, arginine, lysine ,valine ,biochemical analysis, histopathological analysis.

DEDICATION

I dedicate this work whom my heart felt thanks;

TO MY PARENTS, MY SONS, MY HUSBAND AND MY WHOLE FAMILY.

Acknowledgements

First I am deeply thankful to ***Allah*** *,the most beneficent and merciful. I wish to express my deepest gratitude, everlasting appreciation and sincere appreciation to Dr.* ***Samir Abd-Elmonem****, Professor of Biochemistry, Faculty of Agriculture, Cairo University, for his supervision, valuable assistance, useful advice, guidance and his unlimited helps in writing this thesis. I am also greatly indebted to Dr.* ***Ebtesam Abd- Elmonem*** *Professor of Biochemistry, Faculty of Agriculture, Cairo University, for her supervision, help and advice in writing the thesis and encouragement. Special thanks to Dr.* ***Akila Saleh Hamza*** *Head Researcher of Food Science and Technology, Agricultural Research Center, Giza, for her help and great advice during this thesis. Deepest gratitude and many thanks to Dr.* ***Mahgoub M. Ahmed****, Researcher, Molecular Drug Evaluation, National Organization for Drug Control and Research, for his help in the analysis part of this study. Many thanks to Dr.****Saed Abd-Elkader*** *lecturer of Biochemistry, Faculty of Agriculture, Cairo University, for his help in the statistical part of this study. Last but not least, my thanks are dedicated to Dr.****Mohamed S.Masoud,*** *Dr.* ***Shahenda M.Elabe****,Dr.****Gehan M.Mostafa*** *and all staff members of Biochemistry Dep. and Regional Center for Food and Feed, Agric. Research Center for their help. I wish to express my deepest gratitude and everlasting appreciation to Dr.* ***Adel Bakeer Kholoussy****, Professor of Pathology, Faculty of veterinary, Cairo University, for his valuable assistance and his unlimited helps in the histopathological part of this work*

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دراسات كيميائية حيوية على الاكريلاميد فى الآغذية المصرية

رسالة مقدمة من

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درجـــــــــة دكتوراه الفلسفة

في

العلوم الزراعية
(كيمياء حيوية)

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كلـية الزراعـة
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التاريخ: / / 2010