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Title of Thesis: Studies on the contamination of some food protein sources with poly chlorinated biphenyl compounds
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ABSTRACT

Some animal protein sources like beef meat, chicken, bolti fish, chicken eggs and beef liver from local market were analyzed for their content of total poly chlorinated biphenyl (PCB) compounds. Cooking with different methods, e.g; blanching, frying and grilling were conducted. Considering the weight loss during cooking, all cooking methods reduced the PCBs concentration. The most effective cooking methods used for reducing PCBs concentration are grilling, blanching and frying, respectively. Biological studies showed that the experimental rats which fed on diets of animal food protein sources increased in their mean body weight. Positive control groups recorded the lowest body weight gain were 39.3g for low dose positive control (L.D) and 12.82g for high dose positive control (H.D), respectively. Organs weight percentage (%) of most groups were either equal or lower than the normal limits except for positive control (H.D) group which recorded the highest percentages of brain, liver, testis, pancreas. Blood picture of experimental rat groups were in the normal limits. It did not show any remarkable change of liver enzymes; Alanine Transaminase (ALT), Aspartate Transaminase (AST) and creatinine activity in serum during the experimental period. Histopathological examination of liver and kidney of rats fed on tested diets showed that control group was the best, then comes positive control (L.D), while the rat group fed on fried fish although the PCBs concentration was 55µg /rat /28days (1.5 times the former high dose rat group). Slight hemorrhage in different areas of liver cells could be noticed. The presence of PCBs conjugated with the diet components decrease its accumulation in liver and in parallel decrease its toxicity. The rat group fed on grilled liver (3.18µg/rat/28days), was more affected by the toxic PCB due to the accumulated storage of toxicity in the liver. This means that the poising effect is determined by its quality, not quantity (the PCBs was congener 195). Then grilling process, though to be the best process to decrease PCBs concentration, is not very effect in this case.

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عنوان الرسالة: : دراسات على تلوث بعض مصادر الأغذية البروتينية بمركبات ثنائية الفينيل عديدة التكلور
المشرفون: الأستاذ الدكتور / صلاح حسين أبو ريه
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قسم (الصناعات الغذائية) فرع تاريخ منح الدرجة:

الملخص العربي

تمت الدراسة على بعض مصادر البروتين الحيواني مثل اللحم البقري، الدواجن، السمك البلطى، بيض الدجاج و الكبد للتعرف على محتواها من المركبات ثنائية الفنيل عديدة التكلور (PCBs) و كان إجمالي تركيز هذه المركبات ٢٧٤٦,، ١٥٥٤,، ١٥٥ ,٢، ١٥١٧, و ٢٣٤١, جزء في المليون على أساس محتواها من الدهن على التوالى. تم طهى هذه المصادر المختبرة بطرق مختلفة مثل السلق و التحمير أو القلى و الشى. أظهرت النتائج انخفاض محتوى الأغذية المشوية المختبرة من ال PCBs بنسب تصل إلى ٦٧% ، ٣٥% ، ٤٤% و٧٢% بعد الطهي لكل من اللحم ، الدواجن و السمك و الكبد. و كانت هذه المعاملة (الشى) هى أكثر طرق الطهي خفضا لنسبة PCBs يليها المعاملة بالسلق ثم التحمير أو القلى فى الزيت.

لم يتجاوز تركيز ال PCBs في الأطعمة المطهية الحدود المسموح بها طبقا للمواصفات المصرية باستثناء اللحم الطازج و البيض الطازج أو المقلى.

أظهرت النتائج باستخدام فئران التجارب أن تركيز ال PCBs في صورة نقية أكثر ضررا منه في الأغذية من حيث تأثيره على معدل النمو أو الأعضاء الداخلية أو تركيب الدم.

أظهرت النتائج أيضا من الفحص الهستوباثولوجى أن تأثير مركبات ال PCBs على التركيب التشريحي لأنسجة الكبد و الكلى أكثر وضوحا فى المجموعات التي تغذت على كازين و التي أعطى لها تركيز عالي من المادة القياسية يليها المجموعة التي تغذت على السمك المقلي ثم البيض المقلي.

أثبتت الدراسة أن المجموعات التي تغذت على الكبد المشوي حدث لها بعض التغييرات في التركيب التشريحي بالرغم من انخفاض محتواها من PCBs وقد يرجع ذلك إلى نوع الملوث بالإضافة إلى تأثير التركيز.

CONTENTS

LIST OF ABBREVIATIONS

Symbol	Name
ADME	Absorption, Distribution, Metabolism and Excretion.
AhR	Aromatic hydrocarbon Receptor.
ALT	Alanine Transaminase.
A.O.A.C.	Association of Official method of Analytical Chemistries.
AOCs	Aromatic Organic Chemicals.
AST	Aspertate Transaminase.
ATSDR	Agency for Toxic Substances and Disease Registry.
BP	Boiling Point.
BW	Body Weight.
BZ	Ballschmiter system.
CACs	Chlorinated Aromatic Compounds.
CB	Chloro-Benzene.
CBC	Complete Blood Count.
Clophen A 60	Aroclor 1260
EDTA	Ethylen Diamine Tetra Acetic acid.
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FP	Flash Point.
GC / MS	GasChromatography / Mass Spectrometry.
HBBs	Hexa Brominated Biphenyls.
HCB	Hexa Cholro Benzene.
HCBPs	Hexa Chloro Biphenyls.
HCH	Hexa Chloro Hexane.
HG	Haemoglubin.
IARC	International Agency for Research on Cancer.
IUPAC	International Union for Pure and Applied Chemistry.

LC	Leathal Concentration.
LD	Leathal Dose.
LCBPs	Low Chlorinated Bi Phenyls.
MCH	Mean Corpuscular Haemoglobin.
MCHC	Mean Corpuscular Haemoglobin Concentration..
MCV	Mean Corpuscular Volume.
MFO	Mixed Function Oxidase.
MOE	Ontario Ministry Of the Environment.
MP	Milting Point.
MW	Molecular Weight.
NAS	National Academy of Seiences.
NCI	National Cancer Institute.
NIOSH	National Institute for Occupational Safety and Health.
OCCs	Organo Chlorine Compounds.
OCPs	Organo Chlorine Peastisides.
OSHA	Occupational Safety and Health Administration.
PAHs	Polycyclic Aromatic Hydrocarbon.
PBBs	Poly Brominated Biphenyls.
PCAs	Poly Chlorinated Anisoles.
PCBs	Poly Chlorinated Biphenyls.
PCDDs	Poly Chlorinated Dipenzo Dioxins.
PCDFs	Poly Chlorinated Dipenzo Furans.
PCTs	Poly Chlorinated triphenyls.
PCV	Packed CellVolume.
PCVs	Poly Chlorinated Veratroles.
RBCs	Red Blood Cells.
RBP	Retinyl Binding Protein.
REH	Retinyl Ester Hydrolase.
RP	Retinyl Palmitate

RTP	Regulatory Toxicology and Pharmacology.
SGOT	Serum Glutamate Oxaloacetate Transaminase.
SGPT	Serum Glutamate Pyruvate Transaminase.
SO_2	Sulpher dioxide.
Sp.gr	Specific Grafity.
SVOCs	Semi Volatile Organic Compounds.
TCDDs	Tetra Chloro Dipenzo Dioxins.
TEFs	Toxicity Equivalency Factors.
VOCs	Volatile Organic Compounds.
VP	Vapoir Preassure.
WBCs	White Blood Cells.

Symbol	**Name of Unit**
pg	Picogram
ng	Nanogram
µg	Microgram
mg	Milligram
g	Gram
kg	Kilogram
ppb	Part per billion.
ppm	Part per million.
µmol	Micro mole.
°C	Degree Celsius
dL	deci Litter
fL	femto Litter
L	Liter
M	Meter
I.U	International Unit