(قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ)

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Ain Shams University
Faculty of Specific Education
Home Economy Department

Chemical and Biological study on some natural and synthetic food colorants and their effects on experimental rats

By

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B.Sc. Specific Edu., Home Economic Dept., Fayoum University, 2010

A thesis Submitted for Partial Fulfillment of the Requirements of M.Sc. Degree in Home Economic Dept., (Nutrition & Food Science)

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ABSTRACT

Food colorants are used all over the world in great amount. It is an integral part of our culture and is also indispensable to the modern day consumer. During the past several decades, the technology of food processing has changed dramatically and the growth in the use of food colors has increased enormously. However, their use in food or drink is still controversial.

The present study was carried out to compare between the possible toxic effect of some natural (annatto E160 - caramel E150 - chlorophyll E140) and synthetic (sunset yellow E110-chocolate brown E155- fast green E143), food colorants on lipid profile, liver and kidney function and glutathione enzyme of sixty five male albino rats. Natural and synthetic food colors were administered orally in two doses, one low and other high dose for 8 weeks in drink water.

The results of this study revealed that the mean food intake and body weight gain % of rats groups treated with either natural and synthetic colors have been increased when compared with control group, serum cholesterol, HDL-c and (LDL-c in high dose only). Also organs weight

(kidneys, heart, brain and spleen) recorded a significant increase when compared with control. On the other hand the triglycerides were decreased in all investigated colors. The results indicated that a noticeable decrease in AST and glutathione. While ALT recorded an increase in natural food colors groups except fast green and sunset yellow at low doses. Low and high doses of natural and synthetic food colors could impair activities of serum creatinine as compared to the control group.

Analysis of microscopic Histopathology data of liver, kidney, testis and brain sections showed minor histopathological changes in rats fed on experimental diets treated by both natural and synthetic food colorants in drinking water.

Therefore, large quantities and /or long periods of colorants administration should not be used as additive in human's diet. Hence, these colorants should restrict be used in nutritional food and drugs. And more caring must be done to avoid using them as much as possible by children in foods for long time.

Key words: Natural Food Color; Synthetic Food Color; Albino rats; Lipid Profile; Liver enzymes; Kidney functions; Glutathione Enzyme; Histopathology.

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A/G	albumin/globulin
ACh	acetylcholine
AChR	acetylcholine receptor
ADHD	attention deficit/hyperactivity disorder
ADI	acceptable daily intake
AFCAs	artificial food colors and additives
ALAT	alanine aminotransferase
ALP	alkaline phosphatase
ALT	alanine transaminase
ASAT	aspartate aminotransferase
AST	Aspartate transaminase
BC	Before Christ
bw	Body weight
BWG	Body weight gain
°C	centigrade
CAs	chromosome aberrations
CCl_4	Carbon tetrachloride
CFR	Code of Federal Regulation
ChEs	cholinesterases
CNS	central nervous system
CO.,	company
CPK	creatine phosphokinase
DEN	diethylnitrosamine
DL	detection limit
DMH	dimethylhydrazine
DNA	deoxyribonucleic acid
DR2	Direct Red 2