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Effect of some natural and synthetic food colorants on experimental rats

Samah, M. Ishmael¹, Sahar, S. Abdel Magied², Khaled, A. Selim³, Nada I. B. Ahmed²

1- Department of Home Economic, Faculty of Specific Education, Ain Shams Univ., Cairo, Egypt

2- Department of Home Economic, Faculty of Specific Education, Fayoum Univ., Fayoum, Egypt

3- Department of Food Science & Technology, Faculty of Agriculture, Fayoum Univ., Fayoum, Egypt

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Abstract

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 male albino rats. Natural and synthetic food colors were administered orally in two doses for 8 weeks in drink water. The absorption spectrum, pH stability of the tested colorants was investigated.

The results revealed that the maximum absorption wave lengths were 492 nm, 392 nm and 450 nm for Annatto, Caramel and Chlorophyll, respectively. While it was 515 nm, 482 nm and 468 nm for Sunset Yellow, Chocolate Brown and Fast Green as synthetic food colors, respectively. There were no significant differences in the body weight gain % of rats groups treated with either natural and synthetic colors when compared with control group except that for Sunset Yellow which led to body weight gain % lower than that of control group. Also, the groups treated with synthetic colorants recorded organs weight (liver, kidneys, heart, brain and spleen) higher than that of natural colorants and the control group. No significant ($p \leq 0.05$) differences in cholesterol values were observed when natural food used at low or high concentrations. While using of synthetic colorants at low or high concentrations led to significant increase in cholesterol values as compared with control. The results indicated a noticeable increase in ALT values in synthetic food colors groups especially at high doses. Low and high doses of natural and synthetic food colors could impair activities of serum creatinine as compared to the control group. Histopathology data of liver and kidney sections showed minor histopathological changes in rats fed on experimental diets treated by both natural and synthetic food colorants in drinking water.

It was concluded that colorants administration should not be used as additive in human's diet for large quantities and /or long time. 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.

Keywords: Food Colorants; Albino rats; Lipid Profile; Liver function; Kidney functions; Glutathione; Histopathology