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Original Article

**VITAMIN C REDUCES THE METANIL YELLOW
INDUCED OXIDATIVE STRESS IN OVARIAN
TISSUES OF RAT**

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Abstract


Metanil yellow (MY) is a banned synthetic azo dye that induces oxidative stress in rat ovarian tissue. To investigate the mitigating role of vitamin C in MY-induced oxidative stress in ovaries, the activity of antioxidant enzymes in ovarian tissue homogenates and cytoarchitectural changes in ovarian tissue sections of MY with vitamin C-treated rats were investigated. Female Charles Foster rats (age 90-120 days, weight 110-120 grams) bred in the laboratory were used in the study. The study found no significant changes in the production of superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase, glutathione-S-transferase and malondialdehyde (MDA) in groups of rats that received MY with vitamin C compared to control rats. In addition, we found no significant structural changes in ovarian tissue in rats that received MY with vitamin C compared to control rats. The results suggest that vitamin C exerts a protective effect against MY-induced oxidative stress in ovarian tissues, probably by antagonizing MY-induced reduction of antioxidant enzyme activity, MDA production through lipid peroxidation, and stress-induced damage of ovarian tissues.

Keywords: Metanil yellow, oxidative stress, lipid peroxidation, vitamin C.

Introduction

Food manufacturers often use the synthetic food color metanil yellow (MY) in many yellow or orange colored foods. It is mainly used as a dye in shops, paper, cotton, leather, dye, textile, and alcoholic beverage industries [1]. MY is a banned synthetic azo dye that is widely used to color various foods in many developing countries, including India. It is found in various yellow or orange colored foods like laddoo, papadum and spices like turmeric powder, sweets, ice cream etc. It is also found in prepared foods like biryani. It is chemically known as the sodium salt of 3-(4-anilinophenylazo)benzenesulfonic acid and has the chemical formula $C_{18}H_{15}N_3NaO_3S$. MY is a banned colorant in India under the Food Adulteration Act (FDA) 1954, but despite this, small rural belt producers continue to use MY in various foods because they are not under the direct control of government vigilance [2].

It has been shown that MY promotes the structural degeneration of the ovary and generates oxidative stress in the ovaries, most likely via producing oxidative stress in the tissues [3]. Vitamin C (ascorbic acid) is a very pronounced antioxidant that reduces the deleterious effect of oxidative damage by scavenging the free radicals. Vitamin C can donate hydrogen to free radical molecules and neutralize them. By contributing a hydrogen molecule, vitamin C not only neutralizes hydroxyl (O), alkoxyl (OL), and peroxy (LOO) radicals but also the radical forms of other


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