

FOOD COLORANTS AND THEIR TOXICOLOGY: AN OVERVIEW

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Abstract

We are purchasing vegetables from a market, eating at home or in a hotel we always use color to express our taste, nutrition. This review considers the techniques that have, over the years, been employed to modify the color of our food, and the demand for colored food resulted in the in cooperation of some organic and inorganic chemistry being used in natural products. Artificial colorants is most used over natural ones .Adverse health effects related to many colorants are itching, urticaria, anaphylaxis, hypersensitivity carcinogenicity, genotoxicity, cytostaticity and cytotoxicity. There were authorized synthetic food colorants like quinoline yellow, carmoisine tartrazine have been prohibited as they are proved to be toxic. Plant is a huge source of natural colors like caretonoids, chlorophyll and betalains which is proved to be alternatives to synthetic colorants. Hence toxicology of attractive coloring agents might overlook the advantages of colorants. Therefore, food scientist and toxicologist need to come together and define the use of different color additives and their safety in future.

Key words: food , colorants , toxicology , health , natural.

INTRODUCTION

Color is the first impressive aspect in existing thing. Food additive is an dye, pigment or substance that imparts color when it is added to food or drink. They come in many forms like in liquids, powders, gels, and pastes. It can be of two types based on color (a) natural color and (b) synthetic or artificial color. Natural food color is excessively used and it's good for health. Food colors influence appetite.

Natural food colors are derived from variety of sources such as seeds, fruits, vegetables, insects, and microorganisms without any chemical treatment. In prehistoric times, natural colorants were usually obtained from sources like flowers, leaves, berries, blossoms, barks, and roots. Synthetic food colors are water-soluble chemical substances and can be used in foods .Ponceau 4R, Carmoisine , Erythrosine , Tartrazine , Sunset Yellow FCF are the examples of synthetic food colorants . In the middle of nineteenth century, introduction of synthetic color marked the decline in the use of natural colors to color foods, drugs, and cosmetics.

Synthetic colors are reliable for restoring the original shade of the foods and the natural colorants which are expensive and less stable. However, the synthetic food colorants showed adverse effects on human health. The synthetic food color additives could sometimes lead to toxic effects on liver, kidney, and testes. Nowadays, the use of natural colorants is reinforced by scientific findings on the health benefits of several groups of pigments such as anthocyanins and carotenoids. For example, hibiscus anthocyanin has

historically been used in reduce liver dysfunction and hypertension. The colorants like Sudan RED 1 were prohibited for food use in Europe. Not only specific colorants but also the impurities need to be taken into consideration for food colorants. The issues of using prohibited food colorings and malpractice on food trades are extremely serious in many regions. Hence, this review aims to give toxicology overview of food colorants.

Colorants make food elegant and fancy in appearance. The use of colorants makes the food popular day by day. Synthetic dyes are commonly used nowadays. Production of bacterial and fungal pigments is more in recent years. The carotenoid is a well-known as pro vitamin A and plays important role in immune system. Carotenoids extracted from tomato peels supplemented in ice cream have been reported

TOXICOLOGY OF FOOD COLORANTS.

One of the studies, published in 1978, found no changes in children's behavior when they were given a dose of artificial food dyes. One clinical study found that 73% of children with ADHD showed a decrease in symptoms when artificial food dyes and preservatives were eliminated. Another study found that food dyes, along with sodium benzoate, increased hyperactivity in both 3 year olds and a group of 8 and 9 years old. Tartarazine, also known as yellow 5, has been associated with behavioral changes including irritability, restless, depression and difficulty with sleeping. Most food dyes did not have adverse effects in toxicity studies; there is some concern about possible contaminants in the dyes. Red 40, yellow 5 and 6 may contain contaminants that are known cancer causing substances. Benzidine, 4 aminobiphenyl and aminoazobenzene are potential carcinogens that have been found in food dyes.

Green food dyes coloring or dye available at a neighborhood grocery store may contain the ingredients water, propylene glycol (is absorbs water and is used as a solvent for food colors and flavors), the FDA certified color additives FD and C YELLOW 5 FD and C BLUE 1 and propylparaben (a preservative). Long term carcinogenicity studies have demonstrated that there was no significant difference in the incidence of non-neoplastic lesions or malignant tumours observed in the control and treated groups of Charles River CD weanling rats of both genders that have been exposed in utero to the dye and subsequently fed erythrosine doses of 0.1, 0.5, or 1.0% for 30 months. In the high dose part of the same study, in which groups of mice were fed 0 or 4% erythrosine in their diet for 29 months following in utero exposure, no dose-related effects were found in blood chemistry parameters, physical behavior, urinalysis or mortality. One of the major reasons other countries have banned artificial food coloring is that some use the chemical benzene. Benzene is a carcinogen and is found in Red 40, Yellow 5, and Yellow 6. These dyes are in more than just candy. You can find artificial food coloring in everything from cheese to flavored corn chips certain artificial food coloring (Yellow 5 and 6) at the same way as estrogen in the body. High consumption of estrogen can cause breast cancer, a lowered male sex drive, and melasma.

CONCLUSION

Long term carcinogenicity studies have demonstrated that there was no significant difference in the incidence of non-neoplastic lesions or malignant tumours observed in the control and treated groups of Charles River CD weanling rats of both genders that have been exposed in utero to the dye and subsequently fed erythrosine doses of 0.1, 0.5, or 1.0% for 30 months. In the high dose part of the same study, in which groups of mice were fed 0 or 4% erythrosine in their diet for 29 months following in utero exposure, no dose-related effects were found in blood chemistry parameters, physical behavior, urinalysis or mortality. However, study on toxicological effect and production cost must be considered. Synthetic pigments might be cost effective over natural colors but health effects and consumer demands of natural colorants are important factors.

Optimization of the production cost and minimizations of health risk of consumers are challenging issues. Natural food colorants can also be produced in cost effective way. On the other hand, using colorants to make old and damaged food products fresh are forbidden. Despite making attractive looks; many synthetic colorants have been associated with allergy, hypersensitivity, mutagenicity, carcinogenicity and other toxicological effects. In contrast, natural food colorants are rarely associated with toxicological effects. Therefore, uses of color additive are still question mark in many food products and are directly related to consumers' health and safety. Some sources of natural colors have their own flavor which may affect the taste of the finished products. These colorants may cause allergic reactions. Natural food colors are costlier than artificial colorings. Hence, toxicological science of food colorants cannot overlook the positive functions of colorants. Hence food scientists and toxicologists need to come together to define the use of different color additives and their safety.

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