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Chemistry of Food Colouring

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Abstract: An abundance of colours available in nature are utilized as natural food colorants. The process of extraction of colurs from natural colours is a long process and yield is also very less. Also they have limited application and stability problems. Lot of research is still being carried out it to make these dye/pigments stabile and to increase their applications in different industries. These different dyes are used widely in food, cosmetics drugs and pharmaceutical industry. These synthetics being readily used and having vast application also have lots of side effects.

Keywords: Natural, dyes, pigments, pharmacy

Introduction

One of the most aspect that directly affects consumers' acceptance and food selection is colour, but food colouring pigments are generally unstable and become modified during processing, in order to maintain or restore product colour uniformity, colourants are added to food products around the world. Natural or Synthetic sources are used to make food look more appealing by giving coloring effect to the food. This coloring affects life because without food coloring things would look unappetizing and look just awful. There are basically two ways of making food colour or food dyes, naturally and synthetic. Very less food dyes are available from nature and the natural way of making food dye just consists of getting the item with the color they need and grinding it. This study aims to provide a simple approach to the chemical characteristics, properties, uses and side effects on health of those which are currently allowed and applied during food processing in order to further understand the implications of the use of synthetic and naturally derived food colourants,

But there are large number of ways by which synthetic food dyes can be prepare and more over it is less costly as compare to natural one, so mostly synthetic food dyes are used. Petroleum is the only main chemical in synthetic food dye. It is a crude oil product and consists of multiple large hydrocarbons and the most common are alkaline molecules most often with general formula of C_nH_{2n+2}. By adding the dye to color to petroleum is the synthetic way of producing food dye.

Chemistry's role in the making of synthetic food dye is that millions of years ago marine organisms would die and decompose. Then after they turned into oil through that process the oil is then mined. They use a special drill to mine the oil with and then get petroleum. The petroleum is taken to places for it to be filtered for safe consumption and for a clear color. They filter it roughly four times so that it's safe to eat then color it then use it to color food.

Mostly commonly used Artificial Dyes currently in Food are

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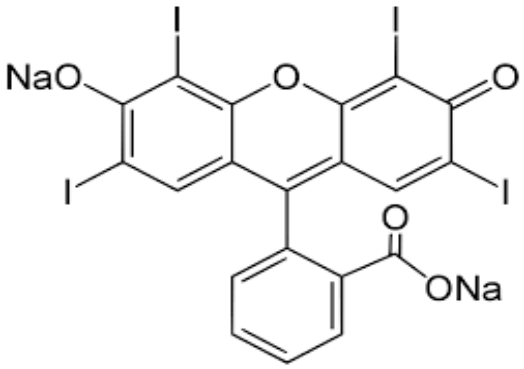
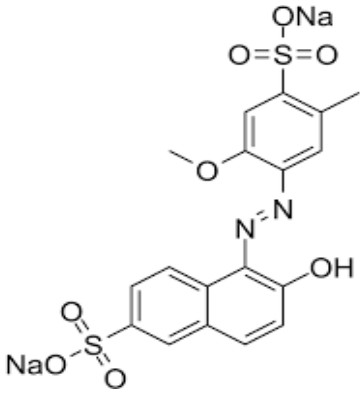
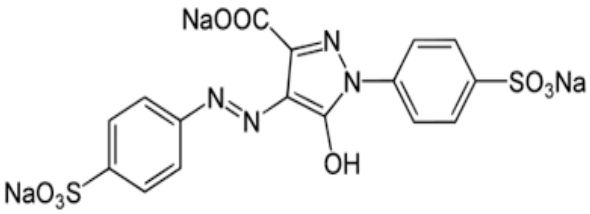
Erythrosine (Red 3)



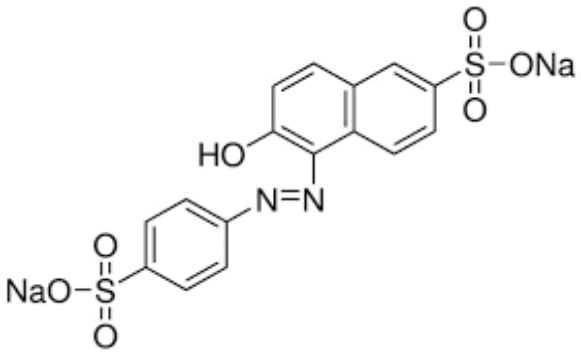
AlluraRed (Red 40)



Tartrazine (Yellow 5)



Sunset Yellow (Yellow 6)



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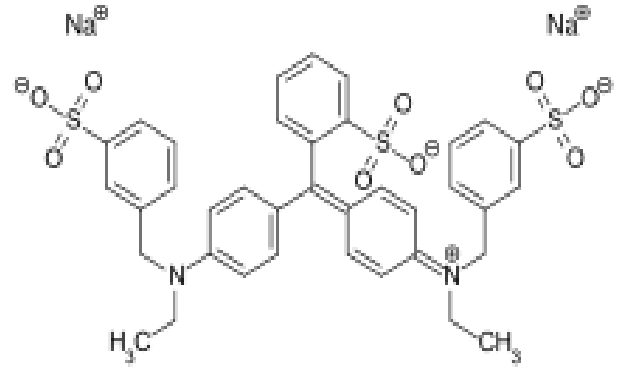
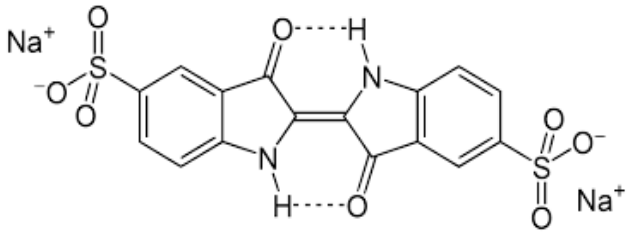
Brilliant Blue (Blue 1)



Indigo Carmine (Blue 2)



These colouring agents are used in various types of food as well as for colouring other day to day daily use materials and paints. Since they are also used for food items, hence these are not found suitable for human being. **Erythrosine (Red 3) is a** cherry-red coloring commonly used in candy, popsicles and cake-decorating gels. **Allura Red (Red 40) is as** dark red dye that is used in sports drinks, candy, condiments beverages, fruit snacks, candy and cosmetics and it can cause allergic reactions in some people, like facial swelling and hives. It also effect immune system cells that are spread throughout the liver, spleen, and lymphatic system.It was also found to cause hypersensitivity in children. **Erythrosine (Red 3) and Allura Red (Red 40) are** Red 3 and 40 are animal carcinogens, genotoxic and promote tumors. **Tatrazine (Yellow 5) is a** lemon-yellow dye that is found in candy, soft drinks, chips, popcorn and cereals. It is mutagenic and has random contaminants (1) and causes hyperactivity as well as hypersensitivity,. It causes and other unfavorable behavioral effects in children. **Sunset Yellow (Yellow 6) Yellow No. 6 (Sunset Yellow):** An orange-yellow dye that is used in candy, sauces, baked goods and preserved fruits.Cereals,drugs,gelatin,candies,sausage,cosmetics,bakery goods. It may cause adrenal and testicular tumors in rats and in some instances anaphylactic shock, stomach cramps, skin lesions, and hives.Yellow 5 and 6 have similar connections to hypersensitivity. **Brilliant Blue (Blue 1) is a** greenish-blue dye used in ice cream, canned peas, packaged soups, popsicles and icings.**Indigo Carmine (Blue 2)** A royal blue dye found in candy, ice cream, cereal and snacks. It can led to face swelling as well as swelling in lips, tongue, or throat. It also cause difficulty breathing. **Brilliant Blue (Blue 1) and Indigo Carmine (Blue 2) are** absorbed into the Gastrointestinal Tract and can go into the bloodstream and cause damage.Carcinogens or cancer-causing substances, such as 4-aminobiphenyl, 4-aminoazobenzene, and benzidine are found in most commonly used food dyes, Red 40, Yellow 5, and Yellow 6, where as Red 3 is found to be an animal carcinogen. Elimination of artificial food dyes from children's diets studies have shown may help to reduce symptoms of attention-related disorders and other behavioral problems in children.

Evaluation the toxicological evaluation of food additives and colorants is of considerable now a days. Food dye/colorant or additive is any pigment or dye that exhibits its color when added into the soft drink, food and/or any non-food item such as drugs or pharmaceuticals (2) (3). Tartrazine is considered as very toxic to the human beings among the six classes of food colorants, if consumed in excess amount (4), (5), (6), (7). Toxicological on human beings have shown that ingestion of tartrazine may cause several behavioral changes, sleep disturbance and endocrine disruptions in children (8) whereas, toxicological studies conducted on experimental animals indicate that tartrazine (both higher and lower doses) alters various biochemical markers

of vital organs (1), (9). Recently it has have found that tartrazine has the ability to bind with albumin and cease the normal physiological functions of this protein (10), (11) (12).

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