

## Unit IV

Edible Dyes

Edible dyes, food colouring, or colour additive, is any dye, pigment or substance that imparts colour when it is added to food or drink. They come in many forms consisting of liquids, powders, gels and pastes. Food colouring is used both in commercial food production and in domestic cooking. Food colorants are also used in a variety of non-food applications including cosmetics, pharmaceuticals, home craft projects and medical devices.

History The addition of colorants to foods is thought to have occurred in Egyptian cities as early as 1500 BC, when candy makers added natural extracts and wine to improve the products' appearance.

Purpose of food colouring People associate certain colours with certain flavours and the colour of food can influence the perceived flavour in anything from candy to wine. Sometimes the aim is to simulate a colour that is perceived by the consumer as natural, such as adding red colouring to glacé cherries (which would otherwise be beige). Colour additives are used in foods for many reasons including:

- To make food more attractive, appealing, appetizing, and informative.
- Offset colour loss due to exposure to light, air, temperature extremes, moisture and storage conditions
- Correct natural variations in colour
- Enhance colours that occur naturally
- Provide colour to colourless and "fun" foods
- Allow consumers to identify products on sight, like

candy flavours or medicines dosages.

Natural food dyes Carotenoids (E160, E161, E164), chlorophyllin (E140, E141), anthocyanins (E163), and betanin (E162) comprise four main categories of plant pigments grown to colour food products. Other colorants or specialized derivatives of these core groups include:

- Annatto (E160b), a reddish-orange dye made from the seed of the achiote
- Caramel colouring (E150 a-d), made from caramelised sugar
- Carmine (E120), a red dye derived from the cochineal insect, *Dactylopius coccus*
- Elderberry juice (E163)
- Lycopene (E160d)
- Paprika (E160c)
- Turmeric (E100)

One feasible blue dye currently in use is derived from spirulina.

Synthetic/Artificial food colorants - With the onset of the industrial revolution, people became dependent on food produced by others. These new urban dwellers demanded food at low cost. Heavy metals and other inorganic element-containing compounds turned out to be cheap and suitable to restore the colour of ~~the~~ watered down milk and other foodstuffs, for example

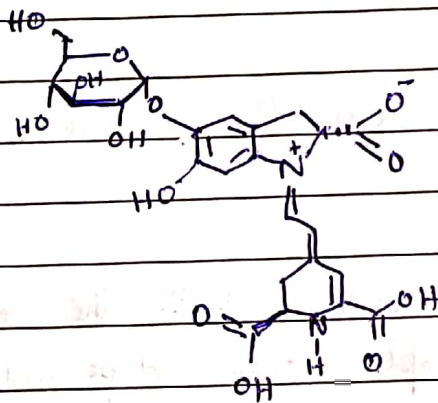
- Red lead ( $Pb_3O_4$ ) and vermilion ( $HgS$ ) were routinely used to colour cheese and confectionery.
- Copper arsenite ( $CuHASO_3$ ) was used to recolor used tea leaves for resale. It also caused two deaths when used to colour a dessert in 1860.



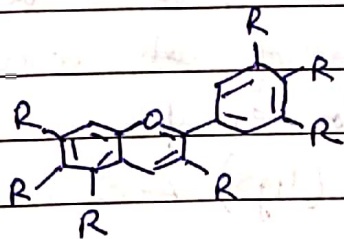
As per the Food Safety and Standard Act, 2006 in India, the following eight artificial colourings are generally permitted in food

S.no.	Colour	Common Name	INS No.	Chemical Class
1.	Red	Ponceau 4R	124	Azo
		Carmoisine	122	Azo
		Erythrosine	127	Xanthene
2.	Yellow	Tartrazine	102	Pyrazolone
		Sunset Yellow FCF	110	Azo
3.	Blue	Indigo Carmine	132	Indigoid
		Brilliant Blue FCF	133	Triarylmethane
4.	Green	Fast Green FCF	143	Triarylamine

Chemical Structures of representative colorants



Betanin, a magenta dye, mainly produced from beets (natural)



Anthocyanin, a red to blue depending on functional groups and pH (natural)

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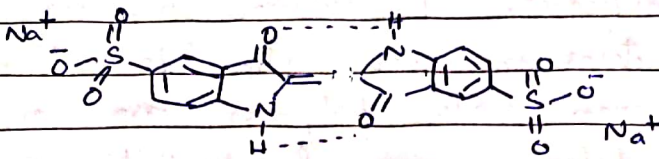
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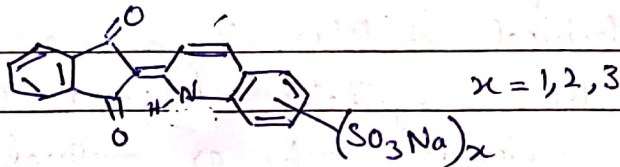
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beta-carotene, yellow to orange colorant  
(natural)



Indigo Carmine, which is blue  
(synthetic)



Quinoline yellow WS, which is yellow  
(synthetic)

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