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Food Colours: Natural Vs Synthetic

Kavita Kumari Solanki[1], Arvind Kumawat[1] and Ashok Kumar[2]
[1] Assistant Manager-Jaipur Zila Dugdh Utpadak Sahakari Sangh Ltd, Jaipur, Rajasthan
[2] Assistant Manager-Rajasthan Cooperative Dairy Federation Ltd., Jaipur, Rajasthan

SUMMARY

Food colour is first factor of attraction towards food and it influence appetite and choice offood. Colour is added to food for one or more of the following reasons: to replace colour lostduring processing, to enhance colour already present, to minimize batch to batch variationsand to colour otherwise uncoloured food. Food colours can be divided into four categories:natural colours, nature-identical colours, synthetic colours and inorganic colours. Because ofhigh stability, low cost and ability to produce uniform colour, synthetic colours are moreeconomical as compared to natural colour. But demand for natural colours is increasinglygrowing owing to their potential health benefits and recognized profound toxicity of syntheticcolours. Natural food colours also have some limitations like they are costly, does notproduce uniform colour, required in large quantity and low stability during food processing,formulation and storage conditions. So there is need to formulate the natural, safe, less costly, more stable and environmental friendly plant and animal pigments.

INTRODUCTION

First factor of attraction towards foods is its colour and it is one of those important ingredients upon which the quality of food and flavour can be judged. According to FDA, "Any dye, pigment or substance which when added or applied to a food, drug or cosmetic, or to the human body, is capable (alone or through reactions with other substances) of imparting colour." These food colours are any ingredient that is added to food or drink to change its colour for acceptability. These are derived from both synthetic and natural sources in varied concentrations. Synthetic colours when added to food products possesses very bright and tempting effect, but very often are responsible for carcinogenic effects. Thus, the natural colour market is currently going twice as fast as that of synthetic colours. It has been observed that within last10–15 years, there has been a distinct move towards naturals, especially within flavours and colours. Natural food colours not only give an appealing and appetizing look but also possesses varied nutritional and health benefits. Different foods are associated with different colours by people. When this perception is altered it often has a detrimental effect on the psychology of how that food taste. So colour strongly influences the hospitality industry as colour attracts people. Colour is an important quality attribute of foods.

Why food colours

Colour is added to food for the following reasons:

- To replace and restore colour lost during processing
- To enhance colour that is already present
- To minimize batch variations in processing
- To colourthe uncoloured food
- To influence the consumer to buy a product through visual perception

Types of food colours

Food colours can be divided into four categories:

Natural colours - These are thepigments made by living organisms. Examples: Beetroot extract, luetin, annatto.
Nature-identical colours -These colours are man-made pigments which are also found in nature. Example: Betacarotene and canthaxanthin.
Synthetic colours - Synthetic colours are purely man-made colours.
Inorganic colours – These are made up of mineral compounds. Example: Titanium dioxide, gold, silver.

Natural colours

It can be defined as any dye, pigment or any other substance obtained from plant, animal, insect, algae, mineral or other sources capable of colouring food etc. Being biological in origin, they are often called as 'bio colours.'

Natural food colourant (Their colours)	Major sources	Applications
Chlorophylls/ Chlorophyllin(Green)	Green leafy vegetables and herbs	Pasta, ice-cream, processed foods
Carotenoids and xanthophyll (Red, orange, yellow to brown and greenish yellow to yellow)	Carrots, fruits and vegetables	Beverages, candy, confectionary, ice-cream
Betalains/Betanines (Red)	Beetroot	Beverages, frozen foods, condiment sauces
Flavonoid/Anthocyanin (Orange, red, blue, violet, magenta)	Red cabbage, grapes, other fruits and vegetables	Alcoholic beverages, chewing gum, bakery products, soft drinks
Lutein and lycopene (Yellow to orange, red)	Green vegetables, corn and tomato products	Ice creams, dairyproducts, sugar, flour
Curcumin (Yellow)	Turmeric	Beverages, baked products, yellow cakes, biscuits, popcorn, sweets, cereals, sauces
Crocin and crocetin(Yellow to orange)	Saffron	Baked goods, rice dishesmeat dishes, soups
Bixin, norbixin and carotenoids (Yellow/orange and red)	Annatto plant	Dairy & fat products anddesserts
Carmine (Bluish red)	Cochineal insect	Soft drinks, sugar & flavour confectionary, pickles, sausages
Paprika (Orange–red)	Capsicum annum plant	Meat products, snacksoups, salad
Curcumin (Yellow)	Turmeric	Beverages, baked products, yellow cakes, biscuits, popcorn, sweets, cereals, sauces

Synthetic colours

These do not occur in nature and are produced by chemical synthesis.

Colourant	INS No. & E code	ADI (mg/kg B.W.)	Uses
Brilliant blue FCF	133, E 133	10	Dairy powders, beverages, jellies, candies, condiments, icings, syrups, extracts
Carmoisine	122, E 122	4	Swiss rolls, jams, jellies, yoghurt, bread-crumbs, and cheesecakes
Erythrosine	127, E 127	0.1	Cocktails and candied cherries
Ponceau 4R	124, E 124	4	Non-alcoholic drinks, sweets, jellies
SunsetyellowFCF	110, E 110	2.5	Non-alcoholic drinks,sweets, jellies
Tartrazine	102, E 102	7.5	Non-alcoholic drinks,sweets, jellies

Risk assessment of natural and synthetic food colours

Natural colours also have some limitations. Some sources of natural colours have their own flavor which may affect the taste of the finished product and they can cause allergic reactions. Actual colour may not retain as such when subjected to high temperatures. Natural food colour are costlier than syntheticcolourings. At times raw ingredients remains scarce and require in large quantities when compared to synthetic dyes.

Synthetic colours are dangerous to health. A number of studies have been published on the issue of synthetic colourants binding to human serum albumin (HSA).Studies have shown the association of some azo dyes such as Tartrazine, Amaranth with allergic responses including contact utricaria, angionuroticedema and immunosuppression.Erythrosine has been demonstrated to have a toxic potential to human lymphocytes in vitro (cytotoxic effect).

CONCLUSION

Objective of adding colour to foods is to make them appealing and it influence the consumer to buy a product.The demand for natural dyes is increasing worldwide due to the increased awareness on the health and recognized profound toxicity of synthetic colours.The limitations to the use of natural food colourants are their higher cost and their low stability in the food processing procedures, formulation and storage conditions.Synthetic food colours cause carcinogenicity, toxicity, allergenicity and may other adverse effects on human health when consumed above their ADI level.So there is need of development of pharmaceutical industry to formulate the natural, safe, environmental friendly plant and animal pigments

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