2 Natural food colours

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2.1 Summary

Natural colours have always formed part of man’s normal diet and have, therefore, been safely consumed for countless generations. The desirability of retaining the natural colour of food is self-evident, but often the demands of industry are such that additional colour is required. Contrary to many reports, natural sources can provide a comprehensive range of attractive colours for use in the modern food industry. In particular, five natural colours—annatto, anthocyanins, beetroot, turmeric and carmine—are widely used in everyday foodstuffs. The factors affecting the stability of these and other permitted natural colours and their commercial applications are fully discussed.

2.2 The role of colour in food

The first characteristic of food that is noticed is its colour and this predetermines our expectation of both flavour and quality. Food quality is first judged on the basis of colour and we avoid wilting vegetables, bruised fruit, rotten meat and overcooked food.

Numerous tests have demonstrated how important colour is to our appreciation of food. When foods are coloured so that the colour and flavour are matched, for example yellow to lemon, green to lime, the flavour is correctly identified on most occasions. However, if the flavour does not correspond to the colour then it is unlikely to be identified correctly [1].

Colour level also affects the apparent level of sweetness; in one study Johnson et al. [2] showed that sweetness appeared to increase between 2 and 12% with increasing colour of a strawberry flavour drink. The colour of a food will therefore influence not only the perception of flavour, but also that of sweetness and quality. It is also important not to underestimate aesthetic value. The best food with a perfect balance of nutrients is useless if it is not consumed. Consequently, food needs to be attractive. Domestic cooking has traditionally attempted to enhance or preserve food colour. Pies are glazed with beaten eggs, and lemon juice is used to prevent...
browning of fruit. Recently, new varieties of peppers of different colours, yellow and purple, have become available.

Likewise, there is a need for processed foods to be visually appealing. Colour may be introduced in several ways. The raw materials—the fruit, vegetables, meat, eggs—have their own intrinsic colour, the processing conditions may generate colour or a colour may be added. Some food products have little or no inherent colour and rely on added colour for their visual appeal.

However, although the colour of fruits and vegetables can vary during the season and processing can cause colour loss, food manufacturers need to ensure uniformity of product appearance from week to week—a factor that does not concern the domestic cook where a slight variation in recipe or cooking time is usual. For the manufacturer, colour consistency is seen as visual proof of absolute consistency of the manufacturing process.

Colours may be added to foods for several reasons, which may be summarized as follows [3]:

1. To reinforce colours already present in food but less intense than the consumer would expect
2. To ensure uniformity of colour in food from batch to batch
3. To restore the original appearance of food whose colour has been affected by processing
4. To give colour to certain foods such as sugar confectionery, ice lollies and soft drinks, which would otherwise be virtually colourless

The continued use of colour in food is acknowledged by the Food Additives and Contaminants Committee (FACC) who concluded that ‘if consumers are to continue to have an adequate and varied diet, attractively presented, the responsible use of colouring matter, the safety-in-use of which has been fully evaluated, still has a valid part to play in the food industry’ [3].

2.3 Classification of food colours

It is only in the last 100 years or so, following the discovery of the first synthetic dye by Sir William Perkin in 1856 and the subsequent development of the dyestuffs industry, that synthetic colours have been added to food. For centuries prior to this, natural products in the form of spices, berries and herbs were used to enhance the colour and flavour of food. During this century, the use of synthetic colour has steadily increased at the expense of these products of natural origin, due principally to their ready availability and lower relative price. In the last 20 years following the delisting of several synthetic colours, notably that of amaranth in the USA in 1976 and that of all synthetic colours by Norway also in 1976, there has