THE SIMULTANEOUS ANALYSIS OF THIRTEEN SYNTHETIC FOOD COLOURINGS BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Synthetic food colourings are widely used to modify the appearance of food by restoring original colours lost during processing, reinforcing weak natural colours or creating new colours. They also assist in product uniformity, product identification and can aid in the perception of flavour.

As part of an investigation examining the relationship between the intake of certain synthetic food colourings and behaviour in children, we required a method to assist in the identification and quantification of synthetic food colourings in dietary and challenge studies. In Australia, 13 synthetic colourings, comprising four structural types, are currently permitted for use in food (National Health and Medical Research Council 1990).

Using high performance liquid chromatography (HPLC), a system was devised which allowed the simultaneous determination of all 13 colourings. The method is an adaptation of other, less comprehensive, ion-pairing HPLC procedures (eg. Puttermans et al. 1982).

Elution of the colourings from a 12.5 cm reverse phase chromatographic column (Novapak C-18 RP; Waters Associates) was achieved using a sequence of four methanol/water solvents containing 50%, 60%, 70% and 90% methanol respectively. Ion pairing was accomplished with 0.005 M tetrabutyl ammonium phosphate in the eluting solvents. A flow rate of 1.0 ml/min was used and the food colourings were detected at 254 nm. Each of the 13 dyes was completely resolved and their retention times are given in the Table.

Synthetic food colouring	Elution solvent	Retention time (minutes)
Indigo carmine	50% methanol	1.85
Amaranth	"	2.52
Tartrazine	"	2.85
Sunset yellow	"	3.29
Green S	"	4.66
Allura red	"	7.46
Yellow 2G	"	9.45
Brilliant black BN	"	16.39
Ponceau 4R	"	19.51
Brilliant blue	60% methanol	23.76
Carmoisine	70% methanol	32.78
Erythrosine	90% methanol	41.2
Brown HT	"	> 45.0

This separation can be accomplished without the need for a gradient elution system. The method has the advantage of simplicity and, compared with other published methods, allows the simultaneous analysis of all synthetic food colourings currently permitted in Australia.

PUTTERMANS, M., DRYON, L. and MASSART, D. (1982). J. Assoc. Off. Anal. Chem. 65: 737.

NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL (1990). 'Food Standards Code' (Australian Government Publishing Service: Canberra).

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