

SYNTHETIC FOOD COLOURING AND BEHAVIOURAL CHANGE IN CHILDREN WITH ATTENTION DEFICIT DISORDER: A DOUBLE-BLIND, PLACEBO CONTROLLED, REPEATED MEASURES STUDY

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The aim of this study was to investigate the relationship between the ingestion of two synthetic food colourings, tartrazine (Colour 102) and sunset yellow (Colour 110), and its effect on the behaviour of children who had previously been diagnosed with attention deficit disorder according to the diagnostic criteria elaborated by the American Psychiatric Association (1987). The study group comprised 13 children (one female and 12 males) aged between four and 14 years who had previously been placed on a diet free of synthetic food colouring as part of their overall management. Anecdotally, the parents of nine children considered that the behaviour of their child had improved after being placed on the diet, whilst the parents of four children were "uncertain" that any improvement had taken place.

After at least six weeks on the synthetic colouring-free diet, the children were assigned to one of two groups and randomly challenged with either tartrazine or tartrazine and sunset yellow over a 28 day period in a double blind, placebo controlled, repeated measures study. One group of children was subjected to six challenges with tartrazine (10 mg) and the other group to three challenges with sunset yellow (10 mg) and three challenges with tartrazine (10 mg). Each child acted as their own control. For challenge, the synthetic food colouring was mixed with orange juice and then consumed directly from an opaque pack using a straw. A two or three day 'washout' period was allowed between challenges. On non-challenge days during the 28 day test period the children received orange juice only.

Behaviour was assessed daily by parents using both the Conners' Abbreviated Parent Scale (Conners 1973) and a Behavioural Rating Inventory developed by Rowe and Rowe (1989). Two children displayed a significant change in behaviour with irritability, impulsivity, restlessness and sleep disturbance associated with the ingestion of both tartrazine and sunset yellow (repeated measures analysis of variance, $P < 0.05$). Both children were atopic. The mother of one of these children could identify correctly whether her child had received placebo or the synthetic food colouring in 25 out of a total of 28 occasions. The changes in behaviour observed were significant on both the Conners' Abbreviated Parent Scale and the Behavioural Rating Inventory ratings. One child was excluded because insufficient data was provided for analysis. Four children, including one child who reacted to the synthetic colouring challenge, had a history of intolerance to some foods, for example, milk, wheat flour and legumes. Two children were reported to have improved behaviour when orange juice was excluded from their diet. None of the children whose parents prior to the trial were "uncertain" as to whether their child's behaviour improved when on the synthetic colouring-free diet, showed a positive response on the rating scales to challenge with tartrazine and sunset yellow.

As part of their overall management, a diet excluding synthetic food colourings may be of benefit in modifying the behaviour of a small number of children with attention deficit disorder.

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