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FOOD ADDITIVES AND PRESERVATIVES

The information explosion in the science of nutrition very often creates the impression that available information is contradictory. Consequently, it is no longer easy to distinguish between fact, misinformation and fiction. The Nutrition Information Centre of the University of Stellenbosch (NICUS) was established to act as a reliable and independent source of nutrition information.

A food additive is any substance added to food primarily for preservation purposes and the consumer demands for a variety of safe and tasty, convenient and colourful foods. Additives and preservatives have been used for a very long time and contributed significantly to product development by the food industry. Despite the advances in the field of product development, some consumers have real concerns about additives in general for many possible reasons such as safety, misinformation; misconceptions, self-reported or self-associated/experienced adverse reactions in themselves and their children or for a smaller segment of the of the consumer public diagnosed and confirmed allergies and intolerances to these substances.

It is important to realize, however, that food additives are extensively investigated and carefully regulated by various regulating bodies and various international organizations to ensure that their addition to foods is safe. Additionally, food products containing additives are labeled by law so as, in theory at least, to enable the consumer to avoid their consumption in case they experience any adverse effects.

Are food additives harmful?

Despite the fact that food additives are extensively investigated before they are allowed to be added to foods, scientific investigation is known to have its own limitations, which may probably explain the continued reports of adverse effects on an individual basis. Such reports frequently reach the lay media and contribute to the on-going controversy and/or debate on the safety of food additives. Such reports of course, when correctly documented, are of immense significance not only in leading to the reappraisal of the available evidence on safety and initiating new research opportunities, but they also form part of the continuing surveillance on the safety of food additives.

In the final analysis, however, the segment of the public which experiences any side effects, real or perceived or unsubstantiated on medical/scientific grounds, can only be advised on the basis of the balance of the available scientific evidence. The latter is the approach NICUS adopted over the years in dealing with such enquiries as part of its mandate to communicate reliable and independent information to the public of South Africa and abroad. In this regard, the Centre has always recognized individual susceptibilities and advised those consumers or their children who experienced side effects that could be associated with food additives to avoid the consumption of foods containing an offending additive in a particular consumer. The Centre also introduced continued surveillance of the scientific literature for new evidence, which would necessitate the reappraisal of the advice currently given to the public.

Recent developments

In the recent past, new evidence appears to confirm the findings of previous less definitive studies and indicate that some additives may indeed adversely impact on the behaviour of some children in the general population including children with a history of hyperactivity and related disorders.

In 2004, a population based screening study among 3-year-old children living on the Isle of Wight examined the impact of artificial colourings and benzoate preservatives on hyperactive behaviour. Children were subjected to a diet eliminating artificial colourings and benzoate preservatives for one week. In the subsequent three weeks children (double blind, crossover study design) were randomly assigned to periods of dietary challenge with a drink containing artificial colourings (active exposure period 20 mg daily total content consisting of sunset yellow 5 mg, tartrazine 7.5 mg, carmoisine 2.5 mg, and ponceau 4R 5 mg) and sodium benzoate (45 mg daily) or a placebo mixture, supplementary to their diet. The two drinks were indistinguishable in terms of appearance and taste.

The children's behaviour was assessed by an investigator blinded to the dietary interventions, and by parents' own ratings. The authors reported significant reductions in hyperactive behaviour during the withdrawal phase where artificial colourings and sodium benzoate were removed from the diet. Furthermore and based on parental reports only, there were significantly greater increases in hyperactive behaviour during the active treatment when compared with the placebo period. There was a general adverse effect of artificial food colouring and benzoate preservatives on the behaviour of 3-year-old children which was detectable by parents but not by a simple clinic assessment. The study showed that the effect of food additives on behaviour occurred independently of pre-existing hyperactive behaviour or atopic status.

In line with these findings and also in 2004, a meta analysis concluded that artificial food colourings promoted hyperactivity in hyperactive children, as measured on behavioral rating scales. The extent of adverse behavioral change induced by these colourings may be as much as a third to a half of the extent that might have been observed when hyperactive children were taken off their psychostimulants the authors claim.

In 2007, a community based, randomized, double-blinded, placebo-controlled food challenge crossover trial investigated the effect of artificial food colours and additives (AFCA) intake on children's behaviour. A total of 153 3-year-old and 144 8 or 9-year-old children were included in the trial. They were challenged with a drink containing sodium benzoate and one of two AFCA mixtures (A or B) or a placebo mix. For 3-year-old children mixture A had a total content of 20 mg of AFCA consisting of 5 mg sunset yellow (E110), 2·5 mg carmoisine (E122), 7·5 mg tartrazine (E102), and 5 mg ponceau 4R (E124), and 45 mg of sodium benzoate (E211)]. Mixture B had a total content of 30 mg of AFCA consisting of 7·5 mg sunset yellow, 7·5 mg carmoisine, 7·5 mg quinoline yellow (E110), and 7·5 mg allura red AC (E129) and 45 mg of sodium benzoate. The amounts of mixtures A and B for 8/9-year-olds were adjusted upwards by a factor of 1·25 to account for higher age related food consumption of the older children. The main outcome measure was a global hyperactivity aggregate (GHA), based on aggregated z-scores of observed behaviours and ratings by teachers and parents, plus, for 8/9-year-old children, an attention test (computerized). The authors noted ***"substantial"*** variability in the children's response to the additives and concluded that the inclusion in the diet of artificial colours or sodium benzoate or both in the form of mixture A only, resulted in increased hyperactivity in 3-year-old and 8/9-year-old children in the general population. The authors further alluded (data to be published) that the substantial variability in response might be associated with genotypic variability.

Summary

Artificial food colours and food additives (AFCA) have long been suggested to affect children's behaviour. The emerging evidence would appear to support, at least in part, individual experience(s) of adverse effects. It is important, however, to also note the ***variability in response*** reported in the current literature. As such, generalizations cannot be made and further conclusive research will be necessary in order to determine the type of dietary changes, if any, needed in order to treat children with ADHD.

Any decisions in the management of a ADHD child in the form of an additive free diet, i.e. free of colorants and preservatives, should only be taken by a health professional with due consideration to the necessary balance between the potential benefits of altering the child's diet and the harmful long-term educational impact of communicating to a child that his / her behaviour is controlled by what he / she eats, particularly when such an approach may not be effective or beneficial for ***all*** children. In this regard, it should also be borne in mind that the use of a "placebo" treatment does carry other risks, such as neglect of other beneficial treatments, loss of self-esteem, and the possibility that an ineffective diet may become a "punishment", since it 'deprives' the child of many foods enjoyed by peer groups and family.

NICUS, therefore, continues to advise that individuals who experience any adverse effects after consuming these or other substances in their diet should preferably seek professional advice or alternatively avoid consuming foods containing such additives. NICUS also recommends that the food industry notes the emerging evidence in relation to their products and ensures that the labeling of their products is accurate and complies with current regulations.

NICUS' Hyperactivity Hype fact sheet can be accessed at http://www.sun.ac.za/nicus for further details.

For further, personalized and more detailed information, please contact NICUS or a dietitian registered with the Health Professions Council of South Africa (HPCSA)

References from the scientific literature used to compile this document are available on request.

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