Mutagenicity testing of certified food colors and related azo, xanthene and triphenylmethane dyes with the Salmonella/microsome system.

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Abstract
Thirty-seven azo, xanthene and triphenylmethane dyes including FD and C colors currently approved for use in the U.S.A. and a number of delisted food colors, were tested in the Salmonella/microsome system. In addition to direct plate tests with five tester strains (TA1535, TA100, TA1537, TA1538, TA98), the azo dyes were also assayed after chemical reduction to their component amines. Also, a selected group of azo dyes was subjected to liquid tests (both aerobic with microsomes and anaerobic) and to plate tests involving initial 16 h anaerobic incubations to facilitate microbial reduction of the azo bond. None of the presently listed FD and C colors was mutagenic in any of the test modifications. Among formerly listed colors only Butter Yellow (p-dimethylaminoazobenzene), a recognized animal carcinogen, was mutagenic in the aerobic liquid test. Several other azo dyes were either directly mutagenic, viz. Acid Alizarin Yellow R and Alizarin Yellow GG; required microsomal activation, viz. Acid Alizarin Red B and Methyl Red; or required chemical reduction and microsomal activation, viz. Acid Alizarin Violet N and Sudan IV. Of the non-azo dyes tested only two xanthene dyes appeared to be mutagenic, viz. 9-(2-sulfophenyl)-6-hydroxy-3-isoxanthene and its 2,4,5,7-tetrabromo derivative.

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