

## Dyes and Stains Used in Biology

Members sometimes write in to enquire about the possible carcinogenic properties of some of the dyes and stains used in school biology. There is so much biological information available on dyes - not all of it very sound - that it is difficult to arrive at an overall assessment of the risks. Moreover, dyes are commonly marketed much less pure than other chemicals.

No dyes have been identified as human carcinogens, industrial risks having been associated with the manufacture of some. A considerable number, however, are carcinogenic in animals - sometimes with good evidence, other times the evidence is much more dubious. Even with definite carcinogens the dyes have been administered in large doses over long periods, that is under much more severe conditions than any likely human exposure. In general, any carcinogenic risks from most dyes, under any reasonable conditions of use, should be virtually non-existent.

A few unusually potent carcinogenic dyes are known, but are probably not encountered outside cancer research. There is reason for anxiety of certain benzidine-based commercial dyes, about which warnings have been issued: Direct Blue 6, Direct Black 38, and Direct Brown 95. This does not necessarily apply to all dyes with a benzidine nucleus, such as Congo Red: the dimethyl derivative of this (Direct Red 2) at least was assessed by Longstaff<sup>1</sup> as showing no evidence of carcinogenic risks, and this is probably true of Congo Red also.

A recent article in *The School Science Review*<sup>2</sup> suggested the use of Remazol Brilliant Blue in assaying for cellulose, and some suppliers label this as a possible carcinogen. In fact, this dye has been tested in several ways, giving only the most marginal indication of carcinogenicity, and Longstaff assessed this as showing no evidence of carcinogenic risk to humans.

Similarly, some suppliers give the label "Cancer Suspect Agent" to Sudan I, II and IV. Sudan I was nevertheless assessed by Longstaff as "risk to man probably nil", and similar comments were applied to Sudan II, III, and IV, presumably with mainly industrial conditions in mind.

### References

<sup>1</sup> Longstaff, E., "An assessment and categorisation of the animal carcinogenicity data on selected dyestuffs and an extrapolation of those data to an evaluation of the relative carcinogenic risk to man", *Dyes and Pigments*, 1983, 4, 243-304.

<sup>2</sup> Brown, C. R. and D. V. Hillier, "Decomposition of cellulose in soil", *The School Science Review*, 1986, 24! [Note to Emma: please replace the '!' by the correct digit, if possible] 67, 733-735.

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<sup>1</sup> Longstaff, E., "An assessment and categorisation of the animal carcinogenicity data on selected dyestuffs and an extrapolation of those data to an evaluation of the relative carcinogenic risk to man", *Dyes and Pigments*, 1983, 4, 243-304.

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