

ACCOUNTS OF CHEMICAL RESEARCH[®]

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VOLUME 17

NUMBER 2

FEBRUARY, 1984

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Carcinogens Acceptable in Food?

Recent research indicates that some traditional "wholesome" foods contain carcinogens or mutagens. Substances formed on the pyrolysis of protein, including certain heterocyclic nitrogen compounds, are carcinogenic in rodents. These findings imply that eating broiled beefsteak or fish may lead to cancer. Other methods for cooking meat appear to generate mutagens, again heterocyclic nitrogen compounds. Although mutagens are not necessarily carcinogens, mutagenicity and carcinogenicity are somewhat correlated.

These and related developments have been discussed in a number of recent reviews, notably by Sugimura¹ and Ames.² The experimental literature is abundant, and growing rapidly. Many findings are still preliminary or unconfirmed. A recent report by the Committee on Diet, Nutrition and Cancer of the National Academy of Sciences is conservative in its conclusions and in the advice it offers.³ That is appropriate in view of the huge significance of the topic to public health and to the food industry.

Among other foods implicated preliminarily as containing mutagens or carcinogens are bread crusts, black pepper, chocolate, common edible mushrooms, coffee, red wine, oil of sassafras (used to make natural sarsaparilla root beer), buckwheat, and dill.

As human beings, we are of course intensely interested in these continuing studies. But there is additional interest to us as chemists, for they are likely to create public and political pressure that will place special demands on our profession. It is however unclear which way the public and political interest will turn.

One possibility is that the public will insist that foods be absolutely carcinogen free. (We note, however, that occasional newspaper reports that carcinogens are normally present in common foods have as yet provoked little comment.) Conceivably products such as black pepper and mushrooms will be banned from sale, or signs will be required in steakhouses along the lines of: "The Surgeon General advises that eating broiled steak may lead to cancer". Chemists may be called upon, not only to identify carcinogens in foods, but to devise ways to remove or counteract them. Thus it has been suggested that adding a sulfite to coffee may suppress mutagens known to be present.¹ Also, chemists may be recruited into efforts to create novel food products, composites like some of the new breakfast foods, that will be delicious, nutritious, and yet carcinogen free.

A second possibility is that people may refuse to give up esteemed foods and continue to eat them despite knowledge of the carcinogens within. Precedent is the continuing popularity of sunbathing, although it is known that sunshine causes skin cancer. Also, many Japanese continue to eat bracken fern shoots, a traditional delicacy, despite public announcements that the food is carcinogenic. The popular American rejection of a ban on use of saccharin is another case in point.

Conceivably a decision to accept the risks of sunbathing, smoking, and/or eating charcoal-broiled steaks may be accompanied by a willingness to accept other risks, quantitatively smaller, such as those of exposure to small amounts of benzene. In that case the exceptionally high costs of the absolute elimination of carcinogens from products would be alleviated. On the other hand, the public may distinguish between unacceptable hazards presented by "toxic chemicals" and acceptable risks associated with familiar enjoyments. Were this last scenario to prevail, we would be deeply distressed by the philosophical inconsistency of public attitudes.

What should we chemists do about it? First, those who work on cancer-related problems have their normal obligation to be accurate in their reports and rigorous and objective in their interpretations. Beyond that, all chemists should strive to be well-informed and to present to members of the public a balanced view of the hazards associated with different products or life styles. One hopes that the public, when provided with good information, will avoid making irrational distinctions between "natural" materials and "toxic chemicals".

Joseph F. Bunnett

(1) Sugimura, T. *Cancer (Amsterdam)* 1982, 49, 1970.

(2) Ames, B. N. *Science (Washington D.C.)* 1983, 221, 1256.

(3) Report of Committee on Diet, Nutrition and Cancer, National Academy of Sciences Press: Washington, D.C., 1982. Summary: Palmer, S.; Bakshi, K. *JNCI, J. Natl. Cancer Inst.* 1983, 70, 1151.