

1978

## Consumption of Foods with Additives and Other Chemicals: Polychemical Use or Abuse?

Charles A. Frederick  
*California State University*

Follow this and additional works at: <https://scholarworks.uni.edu/istj>

 Part of the Science and Mathematics Education Commons

*Let us know how access to this document benefits you*

Copyright © Copyright 1978 by the Iowa Academy of Science

---

### Recommended Citation

Frederick, Charles A. (1978) "Consumption of Foods with Additives and Other Chemicals: Polychemical Use or Abuse?," *Iowa Science Teachers Journal*: Vol. 15: No. 2, Article 21.

Available at: <https://scholarworks.uni.edu/istj/vol15/iss2/21>

This Article is brought to you for free and open access by the IAS Journals & Newsletters at UNI ScholarWorks. It has been accepted for inclusion in Iowa Science Teachers Journal by an authorized editor of UNI ScholarWorks. For more information, please contact [scholarworks@uni.edu](mailto:scholarworks@uni.edu).

**Offensive Materials Statement:** Materials located in UNI ScholarWorks come from a broad range of sources and time periods. Some of these materials may contain offensive stereotypes, ideas, visuals, or language.

# CONSUMPTION OF FOODS WITH ADDITIVES AND OTHER CHEMICALS: POLYCHEMICAL USE OR ABUSE?

*Charles A. Frederick*  
*Ass't. Prof. of Health and Safety Studies*  
*California State University*  
*5151 State University Drive*  
*Los Angeles, California 90032*

## Introduction

The problem of providing an adequate food supply to feed the world's hungry is and has been a major concern among many scientists, politicians and other leaders representing many sectors of American society. As a result of such concern, every conceivable avenue is now being explored to find new ways whereby new crops and foodstuffs can be raised or developed to meet the world's demand. In Geneva, Switzerland in 1975, some members of the World Health Organization (WHO) indicated that "the continuing increases in the world population without a comparable increase in the available amount of conventional foodstuffs must stimulate further efforts to develop new sources of food,"<sup>(7)</sup> Without question, the task of developing new food sources is clear.

Developing new sources of food probably means that we will, of necessity, continue to utilize various chemicals and other agents for enhancing growth. This is to say nothing of the additives that we will use for the purpose of preserving the quality of the food for a longer period of time. The fact is that in order to meet the demands of feeding more and more people, we must also continue to utilize more and more chemicals for the purpose of warding off the many pests that destroy crops and impede crop growth. We also have a further need to find new ways to make foodstuffs more lasting and palatable for the consumer. In so doing, we will add to food various chemicals that will help to preserve, texturize, flavor and even color it. Using such additives and other chemicals raises many interesting questions when we think about the hazards that we have experienced and continue to experience while consuming plants which contain pesticides, herbicides and fungicides.

Several years ago who would have considered the hazards that mercury would cause to the living forms in our rivers and streams? Further, who would have thought that lead, PCN's, dieldrin, aldrin, DDT, or even asbestos would constitute major cause for alarm? In addition, the naturally occurring toxic substances may prove to be just as hazardous to the consumer. Naturally occurring substances can and have caused various human maladies such as cancer.<sup>(3)</sup> Though there are some regulations placed upon the kinds of chemicals that are added to foods, it is the author's opinion that the present regulations are, at best, cumbersome and therefore inadequate. Following are some of the regulations that presently exist to control the chemical additives.

## Safety

According to Oser, modern procedures for safety evaluation must provide "convincing evidence to establish with reasonable certainty that no harm will

result from the intended use of the food additive".<sup>(4)</sup> It must be said that such convincing evidence is extremely difficult to obtain when we think of the number of toxic materials that are present in the different foodstuffs that we consume every day not to mention the naturally occurring toxic substances. Spicer has indicated that "nature has introduced more toxic substances into food than has man".<sup>(5)</sup> Spicer does, however, go on to say that humans have discovered how to avoid the toxic substances. The author does not agree. It is his belief that we have been seeing only the tip of the iceberg of the potential hazardous effects of polychemical combinations. Therefore, it is virtually impossible to set regulatory standards if we review all of the toxic chemicals that are present in foodstuffs.

According to an Expert Panel on Food Safety and Nutrition, the toxic chemicals found in foods are those that are shown in the following Table I.<sup>(1)</sup>

**Table I**

**Toxic Chemicals in Foods**

**Natural**

1. Normal components of natural food products
2. Natural contaminants of natural food products
  - a. Microbiological origin: Toxins
  - b. Non-microbiological origin: Toxicants (e.g., mercury, selenium) consumed in feeds by animals used as food sources.

**Man-Made**

3. Agricultural chemicals (e.g., pesticides, fertilizers)
4. Food additives
5. Chemicals derived from food packaging materials
6. Chemicals produced in processing of foods (e.g., by heat, ionizing, radiation)
7. Inadvertent or accidental contaminants
  - a. Food preparation accidents or mistakes
  - b. Contamination from food utensils
  - c. Environmental pollution
  - d. Contamination during storage or transport

Spicer believes that on a world-wide basis, the substances in category (1) and (2a) have produced greater known injury than those substances in other categories. However, Spicer does admit that category (4), food additives, has also made a substantial, though lesser, contribution to the total incidence of foodborne illnesses. The problem posed by all of this is the fact that the "typical" American of today is a polychemical consumer. If we were to examine the number and types of chemicals we ingest each day, we would be astonished. Let us examine a "typical" day of food ingestion in a "typical" American life.

**Natural Toxins**

We Americans wake in the morning, and eat a cereal of some kind, drink

fruit juice or milk and perhaps even have bacon, eggs, and toast. We then have lunch and consume french fries, hamburgers, salads and something to drink. When we eat dinner in the evening, we sit down to a table where pork or beef, vegetables and potatoes will be served. How often do we think about the additives and pesticides and other toxins that are contained in the above mentioned foodstuffs? Moreover, can we ever really know? If we were to analyze the chemical composition of the common potato we had for our meal, (in addition to the seasoning and additives) we would be amazed. Foodstuffs such as the potato are much more complex than we would ever imagine.

The common potato, usually considered a simple food, is in reality a very complex form of food. According to Taubert, *et al.*, the potato contains approximately 150 distinct chemical substances. Among those chemical substances are the solanine alkaloids, oxalic acid, arsenic, tannins, nitrate and over a hundred other items.<sup>(6)</sup> Did anyone think of the possible adverse effects that we could experience as a result of ingesting some of the chemicals found in the potato? Did we ever consider not only the single effects of a given chemical, but the combined effects of many chemicals? I dare say that we have not begun to comprehend the potential adverse effects of the polychemical combination phenomenon. We all are, in effect, a "walking bag of chemicals" totally unaware of all the specific actions of specific chemicals, to say nothing of the combined effects. This in and of itself presents a real concern when we think of the narrow view that many of the so-called "experts" hold on the matter. In fact, many of the "experts" would have us believe that there is no problem.

According to an article entitled *A Scientific Status Summary* by the IFT Expert Panel, it is thought that "in spite of the multitude of toxic substances consumed by normal healthy individuals, there is little evident hazard involved"<sup>(2)</sup> The reasons given by the expert panel can be summarized in the following three statements:

First, toxic substances in any common food do not have high concentrations, therefore exaggerated consumption would be necessary to bring about toxicity to the point of it constituting a hazard.

Second, the toxicities of the thousands of different chemicals present in our diets are not additive, and therefore are not apt to be hazardous.

Third, antagonistic interactions occur such that the adverse effect of a given substance is cancelled as a result of the presence of some other chemical.

In my view, the assumptions made by the expert panel are untenable when we consider the enormity of the potential problems posed by polychemical mixing.

## Conclusion

It is virtually impossible to predict the adverse effect of numerous chemicals when they are taken in combination. Furthermore, we have not developed experimental testing to the level of sophistication that is necessary for making such determinations. Therefore, the development of policy statements such as those above are ill-advised. This fact becomes increasingly important when we consider some of the unexplained phenomena such as the "Legionnaires' Disease" of Philadelphia and the so-called "Swine Flu" deaths.

This is not to say that the "Legionnaires' Disease" or the "Swine Flu" deaths were caused by the combined effects of chemicals, but the fact is, we don't know the facts. Only through future scientific investigations can we hope to find the answer to these questions. Furthermore, in order to find the answers and insure against adverse effects of polychemical combinations, we must acquire much greater sophistication in experimental design and instrumentation than we presently have and until such time we do, we must, as consumers, be critical.

We must not be led to believe that there is nothing to fear simply because some experts take a simplistic view of the matter. We must insist that we know the potential hazards of foodstuffs and additives, and we must lobby to place pressure on those governmental agencies and scientific symposia that set and regulate policy. There are no experts in this field, and we must be wary of those who would consider themselves such.

## Literature Cited

1. Institute of Food Technologists Panel on Food Safety and Nutrition. 1975. *Journ. of Food Science* 40:215-222.
2. Journal of Food Science. 1975. Naturally occurring toxicants in foods. *Journ. of Food Science* 40:216.
3. Miller, J. A. and E. C. Miller. 1976. Toxicants occurring naturally in foods (ISBN; 0-309-02117-0). *Nat. Acad. of Sciences* 35:1316-1321.
4. Oser, B. L. 1968. Evaluation of novel protein products. *Proc. of International Biological Programme* 11-12:267-275.
5. Spicer, A. 1975. Toxicological assessment of new foods. *British Medical Bulletin* 31(3):220.
6. Taubert, W. F. and O. Smith. 1967. *Potato Processing*. Avi Publishing Co. (2nd ed.). Westport, Conn.
7. World Health Organization. 1975. Evaluation of certain food additives. *World Health Organization Technical Report No. 576; FAO Nutrition Meetings Report No. 55*, p. 6.

\* \* \*

When all think alike, no one is thinking very much.

Walter Lippman