Symposium on Feed Additives and Significance of Their Residues in Animal Tissues

INTRODUCTION

The decade 1948–58 marked the advent of medicated feeds in animal production. This development served as fitting climax to a century of progress which brought wide recognition of American leadership in methods of animal production.

Although billions of food animals had already received medicated feeds with no evidence of ill effects to consumers, strict interpretation of the Food Additives Amendment of 1958 de-emphasized the second purpose of the amendment—i.e., "to advance food technology by permitting the use of food additives at safe levels." Feed additives which leave a detectable residue in human food were interpreted to come under purview of the amendment.

The Food Additives Amendment neither expressly nor by implication requires review of feed additive combinations per se. The regulatory requirements, as now applied, nevertheless, call for residue and efficacy data on each new drug with every other drug with which it might be used. This interpretation threatens to restrict new product research even more than does the controversial cancer clause added to the amendment just before its final adoption.

The present symposium was devised in an attempt to define problems, both real and imaginary, which attend application of the 1958 amendment. Prior to inviting participants, Dr. Eldon Rice, co-organizer of the symposium, and I found no evidence that food animals can actually harbor enough of any feed additive to influence adversely other animals which consume them. Nor did we uncover any evidence indicating that useful combinations of drugs in feeds—i.e., combinations designed to improve health and/or feed efficiency in the "first animal—," interact in any way.

Specific points which appeared to demand attention in the symposium include:

History of the application of the Food Additives Amendment to feed additives;

The key questions—whether feed additive residues accumulate in the tissues of food animals and whether such residues pose any real hazards for consumers;

Problems associated with interpretation of "zero" residues—the need to set tolerances;

Problems in methodology of determining residues; what precision is needed; what is acceptable;

Data on metabolism and alleged carcinogenicity of compounds of arsenic and selenium.

It was hoped through this symposium to separate real from hypothetical problems regarding medicated feeds and public health. Viewpoints of leaders in nutrition, the AFMA Nutrition Council, chemical manufacturers, and the National Research Council Committees on Animal Nutrition and on Feed Adjuvants were presented. Dr. Boutwell's paper marks initial progress toward understanding between cancer research and animal production, a rapport much needed under the Delaney clause.

As pointed out by Rene Dubos, "Man, like the sea urchin, responds in a compulsive manner not only to actual threats or to the presence of enemies, but also, and even more strongly at times, to the many shadows which have come to symbolize danger." The regulatory attitude demanding ultimate safety may be invoked even where there is no measurable question of safety to the consuming public.

Until true causes of cancer in humans are better known, "spectral evidence" may be effectively cited. Because the problem has strong psychological and sociological overtones, a very large body of negative evidence clearly will be needed to lift the stigma from any element or compound which has been associated, no matter how obtusely, with cause of cancer. Unfortunately, we know the causes of less than 1% of human cancer. But once a chemical has been impugned, it seems as difficult to prove it not a carcinogen as it must have been in Salem in 1692 to prove oneself not a witch.

The Salem witch trials, in which a score of people were hanged as witches, marked the last use of spectral evidence against people in courts of law. Belief in witches in civilized countries soon ended.

If progress in public health, as through water fluoridation, and in animal health, as through safe use of arsenic and selenium in animal production, is to continue, there will have to be an end to invocation of spectral evidence against trace elements.

The greatest advances in applied nutrition in recent years, other than the permission and promotion of growth through use of drugs in feeds, have involved the elements fluorine, cobalt, zinc, molybdenum, and selenium.

Each of these elements, as well as arsenic, is almost ubiquitous in nature. Each is essential to, or an important aid to, animal nutrition. One of the most promising and exciting areas in nutritional research today concerns the ability of high tolerated levels of these and other trace elements to minimize disease and to improve total health and the useful life span.

In the quest for an operable approach to use of feed additives on a measurable-hazard basis, some of the issues are now fairly well established, and some require continued attention are.

- There has been no evidence of injury or ill effect to animals or man over 12 years' use of medications in feeds. Twelve different groups of compounds, numbering at least 50 individual compounds, have been used.
- The new labeling requirements offer greater protection than heretofore, suggesting the possibility of close control of drugs in feeds by each state.
- Each drug should be treated on the basis of its own merits and demerits. Feed additives and feed additive residues in tissues of food animals should not be equated with pesticides and pesticide residues. Feed additive residue tolerances should be invoked only where clearly needed to ensure public safety.
- Government and industry should continue to study and to correct inequities which may result from strict enforcement of the Delaney clause. Because most of the rulings under this clause must be based on attitudes, rather than scientific measurements, its scientific implications should be continually re-evaluated.

Demonstration of the utility of feed adjuvants is a logical requirement. But final judgments of the value of promising additives can be best provided through FDA, by the Department of Agriculture (as now is done with pesticides), by the state agricultural experiment stations, and in the market place. Because the nobility of freedom lies in individual responsibility for public good, voluntary compliance, based on mutually acceptable safety regulations, promises the ultimate for progress in a free economy.

Dr. Charles G. Durbin, Veterinary Medical Director of the Food and Drug Administration, and Dr. Herbert Haller, Deputy Administrator of the Agricultural Research Service of USDA, were invited to chair the morning and afternoon sessions of the symposium. In Dr. Haller's absence, due to illness, Dr. Stanley A. Hall acted as chairman.

DOUGLAS V. FROST, Symposium Co-organizer
Abbott Laboratories, North Chicago, Ill.

FEED ADDITIVES

A Broad View of the Problem of Additives in Feeds and Foods

C. GLEN KING
The Nutrition Foundation, Inc., New York, N. Y.

Anything that affects the safety, nutritive quality, cost, distribution, or attractiveness of food merits serious consideration. We cannot escape making choices between alternate courses of action. Choice of crop varieties, fertilizers, pesticides, processing, additives, packaging, storage, and distribution all require evaluation in terms of the consumer's interest in flavor, cost, nutritive content, safety, appearance, and convenience. Increased efficiency in meeting these requirements has been and will continue to be one of the greatest factors in permitting cultural progress in every part of the world. Public understanding of the way scientists contribute to such advances and the necessity of weighing advantages against disadvantages is essential to progress and survival.

THE QUESTIONS that arise from the presence of additives in feeds and foods cannot be dealt with adequately except in relation to the broader problems of making the best use of our agricultural resources and meeting the total requirements for human health. Although food is not the only essential requirement for health, it is certainly the most essential requirement next to air and water; and anything that affects the nutritive quality, cost, distribution, attractiveness, or safety of food requires serious consideration because directly or indirectly health will be involved.

In an ideal situation, no one would advocate unreasonable restrictions or economic penalties on our limited agricultural resources. Neither would they advocate unnecessary risks to human or animal health. However, the simple truth is, we cannot escape making choices between alternate courses of action, both in the use of our agricultural resources and in deciding what constitutes reasonable safety in protecting human health.

By conducting vigorous programs of research in plant nutrition and in animal nutrition, in parallel with genetic research to improve the basic potentialities of our farms, we have managed to keep our food production expanding fast enough to meet the needs of our growing population and to export many foodstuffs. This accomplishment would not have been possible, however, had we not