# FOOD CHEMICAL NEWS

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## NAS-NRC REPORT ON PERSISTENT PESTICIDES OK'S PRD

Current government regulation of pesticides was endorsed by the long-awaited report of a National Academy of Sciences-National Research Council Committee on Persistent Pesticides which was released last week (See FOOD CHEMICAL NEWS, April 28, Page 3 and May 19, Page 22).

While the approval of current regulatory efforts was undoubtedly directed primarily towards the Agriculture Department's Pesticides Regulations Division, it also implied approval of the Food and Drug Administration's work in establishment of tolerances.

The kind words of the Committee chairmanned by Oregon State University President James H. Jensen for PRD constitute something of a contrast to a report last year by the General Accounting Office which was sharply critical of the agency's efforts (See FOOD CHEMICAL NEWS, Sept. 16, Page 16).

Regarding regulation of pesticides, the Jensen Committee recommended, "That the present system of regulation, inspection, and monitoring to protect man and his food supply from pesticide contamination be continued."

In its conclusions, the report - - which was prepared at the request of USDA - - said, "Registration requirements for persistent pesticides appear to provide adequate safeguards for human health, but continuing attention must be given to accommodating new knowledge and insuring against subtle long-term effects." In another of its conclusions, the NAS-NRC report said:

> "Present methods of regulating the marketing and use of persistent pesticides appear to accomplish the objectives of providing the user with a properly labeled product and holding the amounts of residue in man and his food at a low level. However, they do not appear to insure the prevention of environmental contamination."

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There was no recommendation for the replacement of persistent pesticides, as there was in a 1963 report of the President's Science Advisory Committee (See FOOD CHEMICAL NEWS, May 20, 1963, Page 3). The NAS-NRC panel said: "Although persistent pesticides have been replaced in some uses and are replaceable in others, they are at present essential in certain situations."

However, the report said that, "Changes in techniques for using these pesticides and the substitution of alternatives here and abroad are questions of immediate concern to all mankind." The Jensen Committee concluded that, "Contamination of the biosphere resulting from the use of persistent pesticides is an international problem."

The only recommendation on new methods of pest control was: "That public funds for research on chemical methods of pest control be increased without sacrifice of effort on nonchemical methods." The conclusions which led to this recommendation were as follows:

> "The availability and low cost of effective persistent pesticides have slowed the development and adoption of alternative methods of control. Work on nonchemical methods as alternatives to persistent pesticides has been emphasized in recent years, and continued support for this work is needed. Inadequate attention and support are being given to developing pesticidal chemicals and to improving techniques for using them."

General view of the Jensen Committee seemed to be that persistent pesticides pose no direct threat to life, but may pose a substantial indirect threat through contamination of the environment.

Because of this danger, the Committee recommended that: "(1) . . . further and more effective steps be taken to reduce the needless or inadvertent release of persistent pesticides into the environment;" and "(2) . . . in the public interest, action be increased at international, national, and local levels to minimize environmental contamination where the use of persistent pesticides remains advisable."

The Committee's conclusions regarding possible danger through environmental contamination were:

> "Residues of certain persistent pesticides in the environment have an adverse effect on some species of wild animals and threaten the existence of others. x x x Persistent pesticides are of special concern when their residues possess - - in addition to persistence - - toxicity, mobility in the environment, and a tendency for storage in the biota.
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> "A few organochlorine insecticides and their metabolites have become widely distributed in the biosphere, appearing in the biota at points far from their places of application. The biosphere has a large capacity for storage of persistent pesticides in the soil, water, air, and biota, but little is known concerning amounts of persistent pesticides and of their degradation products that are stored in the biosphere."

Therefore, the Committee recommended "that studies of the possible long-term effects of low levels of persistent pesticides on man and other mammals be intensified," and "that efforts to assess the behavior of persistent pesticides and their ecological implications in the environment be expanded and intensified."

The panel concluded that "knowledge is incomplete concerning the fate and degradation of persistent pesticides in the environment, their behavior in the environment, the toxicity of the degradation products, and the interaction of these products with other chemicals."

Casting doubt on the adequacy of the National Pesticide Monitoring Program, the Committee recommended that "the objectives and procedures" of the program "be reviewed and that the feasibility of obtaining data on quantities of persistent pesticides in the biosphere be studied." The monitoring program, the Committee concluded, "provides adequate information about residues in man and his food, but does not provide adequate information about the environment generally, because it can detect changes in residues only in selected parts of the biosphere."

Although the report raised many questions about environmental contamination, the Committee, in effect, gave a vote of confidence to current use of pesticides, saying: "Available evidence does not indicate that present levels of pesticide residues in man's food and environment produce an adverse effect on his health."

The Jensen panel concluded that "no decrease in the use of pesticides is expected in the foreseeable future," and predicted that on a worldwide basis "increased use is probable." Except for a decline in the use of DDT in the U.S., the report said "there was no important change in the use of other organochlorine insecticides in the U.S. during the 10-year period ending June 30, 1967."

"Public demand of attractiveness in fruit and vegetables, and statutory limits on the presence of insect parts in processed foods, have invited excessive use of pesticides," the report said.

The first conclusion in the report indicated the equivocal nature of the document, saying: "Persistent pesticides are contributing to the health, food supply, and comfort of mankind, but, in the absence of adequate information on their behavior in nature, prudence dictates that such long-lived chemicals should not be needlessly released in the biosphere."

Thus, it can be seen that the NAS-NRC report can be - - and doubtless will be - - interpreted to mean many things. Those in favor of use of persistent pesticides and those opposing such use can both take comfort in portions of the report, and both sides can find quotations to support their positions.

In releasing the report last week, USDA Secretary Hardin commented: "The Committee's appraisal of the situation relating to persistent pesticides appears to be reasonable and balanced. Its conclusions and recommendations imply some changes in Department programs that will require some additional time for full evaluation."

USDA said the report has been made available to Dr. Emil M. Mrak, who is chairman of a Secretary's Commission on Pesticides appointed by Health, Education and Welfare Secretary Finch. The HEW Commission was charged by Finch with covering essentially the same ground as the NAS-NRC group. Efforts are being made by the Mrak Committee to avoid too much overlap with the Jensen Committee.

The various pesticide panels and their recommendations could eventually be coordinated by the new Environmental Quality Council, a Cabinet-level advisory group recently created by President Nixon. The Executive Director of the Council, Presidential Science Advisor Dr. Lee A. DuBridge, has said that the problem of DDT will be one of the top priority subjects to come before the Council.

The group, which will hold its first meeting the middle of this month, is composed of President Nixon, Vice President Agnew, and the Secretaries of Agriculture, Commerce, HEW, Housing and Urban Development, Interior, and Transportation.

At the same time he created the Council, President Nixon also replaced the Advisory Committee on Recreation and Natural Beauty with a Citizens' Advisory Committee on Environmental Quality. Chairman of the 15-member Committee is conservationist Laurance S. Rockefeller.

Creation of the Environmental Quality Council preempts a number of bills introduced in Congress to establish organizations to deal with environmental hazards. One of the most recent of these (S. 1075) was introduced by Sen. Jackson (D-Wash.) last week.

In proposing some kind of regulation of residues "in the biosphere," the Jensen Committee suggested that possibly some form of "regulatory action" could make continued use of persistent pesticides less attractive. The report said:

> "There exists . . . a loop of cause and effect that tends to perpetuate the present pattern of materials used. The organochlorine insecticides are of relatively low cost; for many purposes, they are highly effective; from a restricted viewpoint, they are relatively safe. Therefore, they are used in large quantities. Substitute materials having less persistence would probably be used if they were available at equal cost and if they were equally effective. But such substitute materials will not be developed while the present persistent materials are in their advantageous position. Unless there is a change (possible in the form of regulatory action) by which the persistent materials lose their advantage, they will probably continue in general use."

Calling for regulation of residues in the biosphere, the panel said, "It is doubtful that control of residues in the biosphere can be achieved by the same methods that are effective in food production, because of the impossibility of fixing individual responsibility for contamination." The report added, "Regulations to achieve this type of control would be concerned with benefits in which few citizens have a special interest," requiring special educational efforts "to explain the benefits and promote public acceptance of the regulations."

Endorsing regulation of pesticides for food use, the Committee said, in part:

> "Increasing effort has been devoted to inspecting food supplies, and supplies in which residue levels were found to exceed legal tolerances have been condemned. As a result, residue in the

food supplies of the U.S. have been maintained at remarkably low levels during a time of great increase in pesticide use. The Committee believes that, at present, pesticidal chemical residues in food are being maintained at safe levels.

"The interaction of inspection and enforcement with research on agricultural practices has resulted in the discontinuance of some uses that were once approved. x x x

"Compliance by farmers is on a voluntary basis, but the fact that they operate under the threat of condemnation of their products if they fail to comply with recommended practices tends to enforce compliance. A precedent has been established for governmental reimbursement for produce found to be contaminated despite the use of approved materials in accordance with recommended practices. Evidence indicates that the objectives of this indirect method of control are being achieved, and that the entry of pesticides into the human diet is kept at a minimal and safe level. This method of control can be used to reduce further the levels of pesticidal chemicals in food. When new information reveals a formerly unsuspected health hazard, tolerance levels can be lowered, though not below the level of ecological availability."



"No adequate alternative for the use of pesticides . . . is expected in the foreseeable future," the Committee said, adding that, "Under some conditions, persistent pesticides are the most effective means of controlling pests; under others, they are the only practical means." Noting that "reasonably priced alternative chemicals or nonchemical means may be found in time," the report said, "Meanwhile, any action to reduce the availability of persistent pesticides needed by developing countries might have serious health consequences."

In the U.S., the report continued, "persistent pesticides have some uses for which satisfactory alternatives do not exist," noting control of insects which attack "cotton, corn, wheat, alfalfa, fruit, forest trees, lawns, and turf."

However, the Jensen panel wrote, " . . . for the good of mankind, it is conceivable that society may wish to put restraints on the use of certain pesticides regardless of economic considerations and crop quality."

Nonchemical methods of control "for most purposes" are "not expected to supplant the use of chemicals in the foreseeable future," the Committee said. Regarding use of nonpersistent pesticides, the Committee said:

"Although environmental contamination can be reduced by substituting a nonpersistent pesticide for a persistent one, this substitution can lead to other problems. Certain nonpersistent pesticidal chemicals are much more hazardous to apply than the chemicals they replace. Others tend to cause immediate injury to pollinating insects or to other animal

species of interest to man. Such potential hazards and side effects should be evaluated thoroughly before substitutions are made."

In favor of nonpersistent pesticides, however, the report said, "If a long-lived chemical is released and is later found to be toxic, nothing can be done about the store already dispersed," whereas if a short-lived material is released and is later found to be hazardous, the store in the biosphere will be rapidly reduced once the use of the material is discontinued."

"In some instances," the Jensen Committee said, "it may be desirable to reexamine the basis of market quality in the interest of reducing pesticide residues in the environment."

The Committee based its conclusion that residues in man's food and environment do not "produce an adverse effect on his health" on: (1) studies with workers involved in the manufacture of DDT, chlordane, dieldrin, heptachlor, and endrin; (2) a nationwide epidemiological study of residues in several thousand persons; (3) data showing that "a dosage-storage equilibrium develops" in the storage dynamics of DDT and dieldrin in human volunteers; and (4) animal studies showing that aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, and aldrin did not produce significant toxicological effects at dosage levels under 1.0 p.p.m. in the diet . . ."

Although studies "do not indicate the low-level exposure to persistent pesticides is a health hazard for the general public or that higher-level, but subacute exposure is a hazard to persons in certain occupations," the report called for "additional research on the effects on long-term, low-level exposure . . ." The Committee said "it does not necessarily follow that such exposure would be deleterious to health."

Noting widespread measurable residues of DDT in "most foods," the report said, "There is no evidence that these traces are of significance to human health."

However, expressing concern about use of metallic pesticides, the Committee said "the increasing use of organic arsenical herbicides presents a growing arsenic-contamination problem."

In calling for studies, the report said that, "No public agency is conducting or sponsoring research on the broad ecological effects of pesticides." Urging research on "biosphere stores" of residues, the Committee said: "Evidence that degradation destroys residues about as fast as the pesticides are released would be reason to believe that global environmental levels can be controlled by raising or lowering the rate of release."

However, it continued, "Evidence of continued accretion in the biosphere should force a prompt reappraisal of continued use." Data now available "do not permit estimation of the rate of disappearance of any of the persistent pesticides from the biosphere," the Committee said. Estimates of the store of persistent chemicals in the environment "must be on a global scale" and involve "international cooperation," the Jensen panel said.

In a general statement, summing up its position, the Committee said:

> "Expanded research on pesticidal chemicals will help in identifying the best one for a given pest-control problem as well as the best method of using it in each situation, thereby providing opportunities for reducing the dissemination of persistent pesticides. To be fully successful, expanded research on pesticides must be accompanied by effective action in three areas: registration of labels, state and federal recommendations, and education. The educational effort should be directed to insuring that pesticides are used with minimum contamination of the environment."

In addition to Jensen, the members of the NAS-NRC Committee were: Lilly's Edwin F. Alder; Cornell University's Martin Alexander; Public Health Service's William E. Dale; Auburn University's Donald E. Davis; Oregon State University's Virgil H. Freed; North Carolina State University's Don W. Hayne; University of Texas' James G. Hilton; University of Wisconsin's E. Paul Lichtenstein; University of California's (Berkeley) Louis Lykken; University of California's (Riverside) Ralph B. March; Ohio State University's Tony J. Peterle; Utah State University's Joseph C. Street; Monsanto's Robert P. Upchurch; and University of Florida's C. H. Van Middelem.

Meanwhile, 60 marine scientists from California and Hawaii last week sent a letter to California Governor Reagan asking a ban on use of DDT. The group, headed by Stanford University's Dr. John H. Phillips, asked Reagan to back pending California State legislation to ban the pesticide. The letter said DDT residues cause "damage" to fish and birds, and added that many pests have developed resistance to DDT. " . . . many other pesticides less destructive to man's environment . . . are now available to take its place," the letter said.

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## PROPOSED LOWFAT CREAMED COTTAGE CHEESE STANDARD SUBMITTED

The Milk Industry Foundation and the Ohio and New York Departments of Agriculture last week jointly submitted to the Food and Drug Administration a proposed food standard for Lowfat Creamed Cottage Cheese.

This was the second go-round for such a proposal, since FDA in 1955 rejected an industry proposal for a similar product under the name Partially Creamed Cottage Cheese. The MIF statement submitted last week attempted to refute some findings of facts issued by FDA after a public hearing on the earlier proposal.

Co-petitioners with MIF were John M. Stackhouse, Director of the Ohio Department of Agriculture, and Herbert Kling, Director of the Division of Milk Control of the New York Department of Agriculture. The product which would be covered by the standard is marketed in Ohio as Lowfat Creamed Cottage Cheese and in New York as Partially Creamed Cottage Cheese. In a statement attached to the

"Chlortetracycline, a closely related antibiotic, has a tolerance for edible tissues of calves of 4 p.p.m. for kidney and liver, and 1 p.p.m. for muscle and fat," Upjohn wrote, adding: "There does not appear to be any valid reason why the tolerance for tetracycline should be lower than that established for chlortetracycline."

The firm urged that tolerances for tetracycline residues in food should be "similar" to those established in §121.1014 for chlortetracycline residues.

## NELSON USES USDI FISH STUDY TO WARN OF PESTICIDE DANGERS

Sen. Nelson (D-Wis.), chief critic of the use of DDT and other persistent pesticides, last week used data from a two-year study conducted by the Department of Interior's Bureau of Sport Fisheries and Wildlife on residues of pesticides in sport fish as further evidence of the alleged threat of their use to man and his environment.

However, the conclusions of the report were less emphatic, and acknowledged considerable "uncertainties regarding the data."

In one of two major conclusions, USDI's report declared:

> "There is considerable variation in residue levels in different samples, which could be caused by variation in laboratory analyses, or variations in fish from movement, food habits, species, size, age, fat content, etc. Because of these variations, caution should be applied in using and interpreting these data."

Nelson exercised little caution, asserting that this study "confirms that there is accelerating pollution of the environment by hard pesticides and is further evidence to confirm Rachel Carson's assertion in 1963 that there will be an environmental disaster unless this is quickly brought under control."

He noted that results of the study conducted in 1967 and 1968 showed DDT residues in 584 of 590 samples of fish taken from 50 monitoring locations in 45 rivers and lakes across the United States.

The study results showed DDT ranging up to 45.27 p.p.m. in whole fish, he said, a count more than twice as high as found in Lake Michigan Coho salmon seized recently by the Food and Drug Administration, and nine times higher than FDA's interim tolerance of 5 p.p.m. for DDT in fish.

"These accumulations are a threat to the future of our fish and wildlife, and have ominous implications for the health of man," Nelson declared.

In the other major conclusion, the USDI report stated:

> "There are a number of widely scattered waters in which fish show consistently high residues of DDT, dieldrin, and other organochlorine insecticides (some of these waters are in agricultural drainages and others in highly industrialized areas)."

Noting the problem encountered with differences from the analyses of five commercial laboratories and differences in sample collections, the report concluded that the modest fish monitoring program "could not be expected to resolve all the differences," and added: "The major functions should be to provide a continuing assay which would indicate the magnitude of pesticide residues in this substrate of the environment, to determine trends in residue levels, and to locate the possible problem areas where significantly high levels may indicate the need for special studies."

Urging that special studies be conducted along with the present monitoring program, the report suggested the use of a single laboratory for residue determinations plus a few more sampling stations to provide more uniform nationwide coverage.

The report also foresaw the possibility of correlating the fish data with residue data from water, soils, or wildlife, which are being obtained by other participants in the National Pesticide Monitoring Program (See FOOD CHEMICAL NEWS, Feb. 17, Page 2). "The data might be more useful if lipid content were determined for each sample," USDI observed, saying that FDA tolerances for meat are on a fat basis while the results reported in the USDI study are on a whole fish basis.

If these results were reported as residues in fat, the report stated, "the levels shown would be roughly tenfold." The study conceded that much accumulation of these residues may be in portions of the fish not normally consumed by humans, but cautioned that these are consumed by and "might be hazardous" to fish-eating birds and other animals.

In the discussion of the results, the report acknowledged that initial instructions to the field collectors were not adequate, as much more uniformity was obtained in later collections.

## USDI Acknowledges Laboratory Inconsistencies on Pesticide Analyses

On laboratory analyses, the report recognized that there were inconsistencies in the results reported by different laboratories even on subsamples of the same homogenate. As an example, the report said, one laboratory found relatively low levels of DDT and its metabolites and little or no residues of other pesticides, while a second reported somewhat higher values, but the abnormal value of the DDT metabolites "make some of their results open to question."

The report also questioned findings of some of the laboratories on others of the 11 pesticides which were sampled by USDI.

In addition to the report of near 100% presence of DDT at levels consistently above 1.0 p.p.m., dieldrin was reported in approximately 75% of all samples analyzed, with values up to 1.94 p.p.m. Nelson noted that FDA's guideline for dieldrin is 0.3 p.p.m. in fish.

Heptachlor and heptachlor epoxide were found in 32% of the samples, with levels greater than 0.1 p.p.m. at a number of stations, the report said. Chlordane levels were reported from 22% of the samples, with levels over 0.1 p.p.m. from one sampling station in three of four reporting periods.

Aldrin residues were not reported consistently from any station during all the sampling periods, the report said, adding that a few scattered values greater than 0. 1 p.p.m. were reported in the spring of 1968 samples. However, it said practically all of these were reported from one laboratory which had also reported relatively high values in the laboratory cross-checks.

Some lindane residues were found in 16% of the total samples, but levels were usually less than 0.1 p.p.m., and were not found consistently at any station during all sampling periods, USDI said.

Endrin was reported in samples from only three stations and the levels were less than 0.1 p.p.m., according to the report.

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## CODEX COMMITTEE DEVELOPS MODIFIED STARCH DATA

The Codex Alimentarius Committee on Processed Fruits and Vegetables at its recent meeting in Washington, adopted a standard for modified starch, according to the National Canners Association's Information Letter.

The commodity committee had been asked by the Codex Food Additive Committee to develop data on food starch-modified, as it is used in canned green and wax beans and in canned sweet corn (See FOOD CHEMICAL NEWS, May 27, 1968, Page 10). The new "standard" will probably be referred for consideration to the Joint FAO/WHO Committee of Experts on Food Additives. Modified starches had been eliminated from the Codex standards for canned green and wax beans and canned sweet corn, pending further evaluation.

In another move, the Processed Fruits and Vegetables Committee affirmed a proposed 50% maximum mold count fields in canned tomatoes. At a recent meeting of the Institute of Food Technologists (See FOOD CHEMICAL NEWS, May 19, Page 3), it was indicated that neither the U.S. nor Canada would be able to adopt the 50% maximum on mold. The U.S. has an action level of 30% and Canada a maximum of 25%.

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