News of Science

Impure Biochemical Products

Many biochemists have expressed concern about the quality of commercial biochemical products, feeling that investigators were unsuspectingly using materials of dubious quality. The governing bodies of the Division of Biological Chemistry of the American Chemical Society and the American Society of Biological Chemists recommended at their spring 1955 meetings that the problem of quality of biochemicals be referred to the Committee on Biological Chemistry, Division of Chemistry and Chemical Technology of the National Research Council. In May of that year, this committee sent questionnaires to all members of the two afore-mentioned biochemical groups in order to obtain opinions and guidance with respect to the magnitude of the problem. Approximately 2200 questionnaires were mailed out and 922 were returned.

On the basis of the large percentage of replies and the nature of the answers and the additional comments, it was clear that there was widespread interest in the present status of commercial biochemicals. Of those replying, 90 percent felt there is a serious need for attempting to improve the quality of biochemicals. A large majority indicated that an NRC committee "representative of academic research and industry" should have responsibility for making efforts toward the betterment of the situation. The same percentage felt that a broad program should be organized for the establishment of minimum specifications of commercially produced biochemicals.

In addition to the routine answers, more than 120 respondents made comments, almost all of which recommended positive action. Many described specific instances wherein faulty commercial biochemicals resulted in serious research difficulties. However, nearly all of the complaints were directed against two firms. Many suggested that, in lieu of reference standards and/or specifications, manufacturers might supply a better description of their products, including information about sources, purification procedures, chemical analyses, and impurities.

The questionnaire also requested suggestions concerning specific biochemicals for which there was need for minimum specifications and/or reference substances. Categories of biochemicals that were named more than 100 times are listed in Table 1.

Table 1. Categories of biochemicals for which there is need for minimum specifications and/or reference substances. The numbers indicate how many times each category was named in answers to the questionnaire.

Category	Specifications only	Reference substances
Nucleic acid	334	251
Amino acids and peptides	243	191
Coenzymes	143	69
Enzymes	173	68
Lipids	136	126
Carbohydrates	125	146

The committee regarded the response to the questionnaire as a mandate for action. It was generally agreed that the best solution to the problem would be the establishment of minimum standard specifications for biochemicals, possibly supplemented with reference substances. However, after a survey of the experience of the American Chemical Society in the establishment of standards for inorganic chemicals, and the experience of the U.S. Pharmacopeia and the National Formulary in similar tasks, it was obvious that such an undertaking would be of very great magnitude and would require such a long time that it would provide little benefit for the near future.

As a first step, it was decided to draw up description sheets for biochemicals and to distribute these in such form that biochemists could obtain them at a nominal cost. These description sheets will cover physical constants, methods of preparation, methods of purification and assay, likely impurities and their methods of determination, information concerning stability and storage conditions, and a list of suppliers.

It was decided to assign the task of drawing up these description sheets to various subcommittees representing specialized areas of biochemistry that would work in close collaboration with the biochemical producers. Because the questionnaire revealed the greatest need for information on nucleic acids, amino acids, and nucleotide coenzymes, committees covering these fields were set up first with George B. Brown, Jesse P. Greenstein, and Nathan O. Kaplan as the respective chairmen. As experience is gained in their work, it is anticipated that subcommittees will be set up later for enzymes, lipids, carbohydrates, and other fields.

This program is being financed partly by a grant from the National Institutes of Health and partly by a Rockefeller Public Service award. Further suggestions will be welcomed by the committee. Address: Committee on Biological Chemistry, Division of Chemistry and Chemical Technology, National Research Council, 2101 Constitution Ave., Washington 25, D.C.

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AAAS Newcomb Cleveland Prize

Seymour S. Cohen, professor of biochemistry at the University of Pennsylvania, received the AAAS Newcomb Cleveland prize on 30 Dec. during the association's annual meeting in Atlanta, Ga. Collaborators in parts of the research for which Cohen was honored were G. R. Wyatt and T. T. Weed, now of Yale University.

The award address was entitled "Molecular bases of the parasitism of some bacterial viruses." An extreme parasitism occurs in the infection of *Escherichia coli* by the T2, T4, or T6 bacteriophages. These viruses prevent bacterial growth and division, eventually lysing the cells.

Cohen has shown that these viruses inhibit the synthesis of bacterial nucleoprotein and enzymes. Cell synthesis is directed almost exclusively to the production of virus desoxyribonucleic acid (DNA) and virus protein. Virus DNA contains a new pyrimidine base, 5-hydroxymethyl cytosine (HMC), in contrast to host nucleic acids which contain cystosine. Virus infection compels the conversion of cytosine to HMC, making the former unavailable for the synthesis of cell nucleic acids and shifting nucleic acid synthesis to that characteristic of virus—that is, DNA containing HMC.

Cohen has demonstrated that hydroxymethylation is an irreversible trap for cytosine. Once formed, HMC and HMC desoxyriboside are practically inert to bacterial enzymes which degrade cyto-