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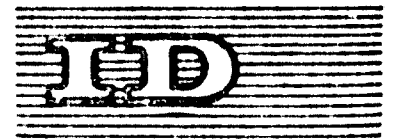
## CONTACT

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Proteins from Hydrocarbons

Vienna, Austria, 8 - 12 October 1973

NUTRITIONAL AND PRODUCT SAFETY CONSIDERATIONS  
FOR FOOD USE OF SCP 1

prepared by

the Secretariat of Protein Advisory Group  
of the United Nations System

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We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

The world food shortage and the problems of protein-calorie malnutrition in the developing countries have begun to be clearly recognized around the year 1950 when extensive studies on this subject have been undertaken by the United Nations Organization and by its specialized agencies FAO, WHO and UNICEF. The more recently born UNIDO is now actively involved in the international fight against world hunger and, judging from the high quality of the present meeting, it is clear that its contribution to this problem will be of topmost importance.

In regard to the protein supplies it was soon recognized that, in order to fill the gap of the present resources and to avert the impending deterioration of the situation due to the demographic pressure, the increase of the conventional protein sources for human consumption was insufficient and, therefore, it was necessary and urgent to develop new and non-conventional sources.

These considerations and the need to coordinate the actions of the agencies on these problems led to the creation by WHO in 1955 of the Protein Advisory Group (PAG). This initial PAG was transformed in 1960 to a tripartite FAO/WHO/UNICEF Group and in 1971 became the present PAG of the United Nations.

Concerning the novel sources of proteins, the PAG realized soon that the production of these would involve special problems in food sanitation and safety, toxicology, processing and quality control. For these purposes, the PAG has issued a series of Guidelines or Recommendations. The first of these, Guidelines nr. 6, on pre-clinical testing of novel sources of proteins, was published on 10 March 1970 and still constitutes the basic document. It was completed in June 1970 by Guidelines nr. 7 on the essays in man of supplement foods and in February 1971 by Guidelines Nr. 8 on the use of protein-rich composed foods for weaning.

In the meantime, the new developments of single cell proteins i.e. the industrial production of micro-organisms for direct alimentation of men lead to the creation by PAG of a specialized ad-hoc Working Group, which has already met three times; in 1971 in Marseilles, in 1972 in Moscow and in June 1973 in Boston (USA). This Working Group has published extensive reports

of these meetings and has drafted recommendations on the nutritional testing and safety control of SCP production which was approved by the PAC and now constitutes Guidelines nr. 12.

The time schedule does not allow me to comment in detail on these documents which are available free of charge from the PAC secretariat in New York and can therefore be easily consulted. I should also mention that these documents can also be found under the form of appendix to the proceedings of an important Symposium on the yeasts produced from alcanes, which was held in Aix en Provence in 1972, and have been published by Academic Press.

I should stress the fact that the PAC Guidelines nr. 12 on the production of single cell protein for human consumption will be of obvious interest to scientists, technologists and commercial producers of such products. It deals with suitable types of organisms, raw materials, process variables, composition, quality control requirements and related analytical requirements.

I should also stress the fact that for SCP production the main specifications may be summarized as follows:

1. The nutritional, toxicological and pre-clinical tests are valid only when they are performed on the commercial product itself. This means that the tests have to be performed on the real final product obtained with a given strain of micro-organism, a given processing and from a given substrate. Correlatively, it means that any change introduced in these different parameters should lead to a new complete testing of the product.
2. Similarly, it should be stressed that in the course of SCP production strict control has to be continuously exerted in order to verify the constancy of the product.

Another important remark is the fact that the existing PAC Guidelines on the novel sources of proteins in general and on SCP in particular (i.e. Guidelines Nr. 12) do concern specifically the use for direct human consumption. However, it is clear at the present time that the first industrial production of SCP is chiefly, if not exclusively, intended to be utilized for animal

feeding, i. e. for indirect consumption by men. Therefore, it is obvious that we greatly need special recommendations and specifications for this category of products.

In this regard it should be noted that standards of identity and related analytical requirements are being developed for yeast protein for animal feeding by the International Union of Pure and Applied Chemistry with which the PAG collaborates closely.

Also it should be noted that the European Economic Community has issued in 1972 a preliminary draft dealing with harmonization of the laws of member states concerning natural yeast and yeast residues. This European initiative is presently developed in close cooperation with the PAG.

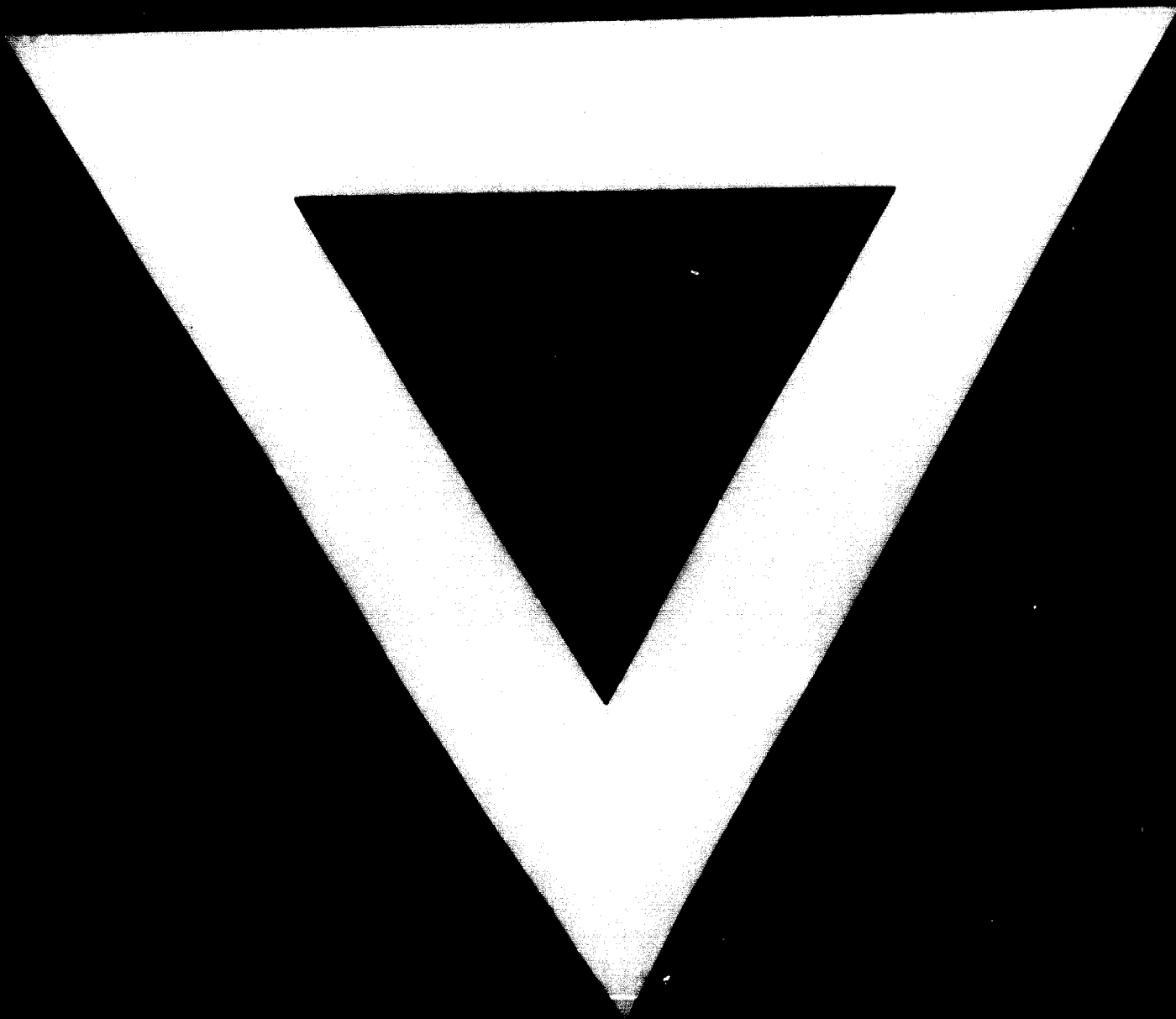
The necessity for the drafting of new and special Guidelines concerning the use of SCP for animal feeding has led the ad-hoc Working Group of PAG to consider this problem in a new meeting which will take place in New York at the end of this year on 13 and 14 December. For this most important meeting, the composition of the ad-hoc Group will be consistently enlarged in order to include qualified experts in animal husbandry, animal nutrition, food and feed technology and economists. A representative of UNIDO has been invited to participate.

In conclusion, I should like to make a few final remarks:

It is clear that the single cell proteins are no more relevant to Science Fiction as it was a few years ago, but are already an industrial reality with an immense economical future. It is obvious that this potentiality which may prove to be of topmost importance for the future of mankind, should not be explored to be ruined by premature commercialization of unsuitably tested products. It is essential also to overcome the irrational and purely emotional preventions of the populations against unconventional foods. A most suggestive example of this danger is provided by the situation which has recently developed in Japan and which was already reported and discussed during this meeting. In this regard, it may be pertinent to evoke a historical anecdote. When, at the end of the XVIII century, Parmentier tried to introduce in France the use of potatoes, the consumers were extremely reluctant and the potato tubercles were

even suspected to be poisonous. These preventions were overcome when the King of France, Louis XVI, in Versailles, wore on his jacket a potatoe flower. One can doubt, however, that if the General Secretary of the United Nations decided to wear a yeast cell in the button hole of his own jacket, it would have such a spectacular effect. But, no doubt, in the difficult problem of **SCP** acceptance, the United Nations may have a decisive role.





**12. 8. 74**