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PESTICIDES DEVELOPMENT PROGRAMME IN INDIA

DP/IND/8G/G37

INDIA

Technical report: Findings and recommendations*

Prepared for the Government of India
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of I.Gardi,
expert in pesticide analysis

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United Nations Industrial Development Organization
Vienna

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Explanatory Note :

The PDPI (Pesticide Development Programme India) has been consigned under the sponsorship of UNDP (United Nations Development Programme) and by the assistance of UNIDO (United Nations Industrial Development Organization) and being managed by HIL (Hindustan Insecticide Limited) to accumulate, use and disseminate the pesticide formulation technology and Quality Control activity throughout the country, and organizing the similar activity of the RENPAP countries.

This report covers the period of October 14, 1987 through November 6, 1987 while the writer Ivan Gardi, UNIDO expert on Quality Control of Pesticides, was assigned to PDPI in Gurgaon and New Delhi. This report contains the conclusions of the writer's one-month contract period.

ABSTRACT

Post : DP/Ind/80/037/ J13421 /11-57
Title : Consultant on Quality Control of Pesticides
Objective : Advise and assist PDPI in organizing practical oriented training programme, help in formulating specifications for pesticide products and compare analytical methods in the field of pesticide analysis.
Period : 11.10.87 - 10.11.87

Conclusions and Recommendations (Summary)

The scientific and instrumental capacity and the enthusiasm of PDPI with the helping activity of HIL management makes PDPI able to continue the systematic work on the field of development of analytical methods useful for small scale formulation industry in India, the organization of effective training courses for Indian Pesticide Industry and the members of RENPAP countries. At this stage of development can start to be an organizing centre for RENPAP countries in the field of formulating specifications for pesticide products and organizing collaborative studies of analysis of pesticides.

ACKNOWLEDGMENT

The writer is very grateful to UNDP, UNIDO, the management of HIL and PDPI for the opportunity to come to India and taking part in this very enthusiastic and of high scientific level work which has being done at PDPI Centre.

The writer particularly thanks the encouragement and kind cooperation to MR.G.HAMDY, MR. H.J. NASDI, MR. ISLAM and Mr. Sat Pal of UNDP, to Dr. S.P. Dhua of HIL, to Dr. S.K.Khetan, Dr. B.Y. Pandey, Dr. P.K.Ramas, Mr. V.N. Dutta, Mr. S. Kumar and the other scientist of PDPI.

FINDINGS AND ACTIVITY

The writer arrived to India after the beginning of the International Training Course on Quality Control of Pesticides Formulations Organized by HIL and PDPI, sponsored by World Bank, FAO, UNIDO and UNDP, and so had not the chance to study the daily work of PDPI.

During the time of being at PDPI the writer has had many consultations with the scientists of PDPI, and has been able to form a picture of the general activity of PDPI. Although it was not the task of the writer, having been some experience in the field of development of formulations, some discussions were taken on the field of formulation activity too.

Both the formulation laboratory and pilot plant, and the analytical laboratory have been installed and equipped with the necessary and rather sophisticated instruments and accessories. The initial steps have been taken to follow the good laboratory practice, and during the discussions the writer was convinced that the scientists of PDPI had good plans continuing this activity.

It needs a very conscientious and hard work to finish this activity, on which the writer tried to give his impressions and advice to the counterpart, giving exact literature of the good laboratory practice. Some major and minor problems are yet to be solved, i.e. the better insulations of the instrumental laboratories and instruments against dust, the proper storage of chemicals, the change of laboratory overcoat made from artificial fabrics to that of made from cotton, the construction of fume-hoods, the store of waste chemicals, etc.

The library has useful handbooks but is essential to complete with some other basic Handbooks and periodicals, journals to follow the most up-to-date methods in the field of the analysis of pesticides. The knowledge of the experts of PDPI in the field of analysis is of a very high level, their imaginations and plans to the future work is very realistic.

During the discussions the writer gave special examples comparing the different specifications and analytical methods of pesticides by giving exact literatures on FAO, WHO, EPA specifications and on CIPAC and AOAC methods of analysis. Some 50 standards was also given; on the Common Names of Pesticides and the Precision of test methods - Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests.

Because the analytical experts, particularly Dr. Pandey is of a very high level of knowledge, the writer encouraged them to take part in CIPAC collaborative studies in pesticide formulation analysis, having disposed of the necessary instrumentations and experience. A list of GIFAP publication and as a special example the " Guidelines for Quality Control of Pesticides", and the FAO Publication "International Code of Conduct on the Distribution and use of Pesticides" were also given to PDPI to help their activity in organizing Training Courses to the experts of Indian Pesticide Industry and RENPAP countries. During discussions with the formulation experts a general view and some literature was given from the latest development on pesticide formulations.

As recently a method has been published in the Journal of A.O.A.C. On the analysis of the toxicant of Bacillus thuringiensis, the analysis of the toxicant of Bacillus Sphaericus, a product developed by PDPI seems possible to carry out by High Performance liquid chromatography.

In some cases the storage stability of the flowables developed by PDPI was not proper enough concerning the crystallization of the temperature during the milling process because the effectiveness of the tap-water cooling is not always sufficient.

It seems to be a very useful initiative that PDPI has invited the Pesticide Industry to become an Associate Member of the Pesticide Development Programme India. PDPI offers assistance in training in different fields of pesticide formulation technology and Quality Control activity, his problem solving capacity and biological testing of formulations, and fresh informations.

During the Training Course the writer chaired one session, gave an "ad-hoc" lecture on special topics of Quality Control, and prepared a lecture on tank-mix, compatibility tests. The scientific level of the lectures given by Indian Scientists and UNIDO experts were mostly very high, detailed, but in some cases too fast, and not all the participats could follow them.

It was, usually afternoon, a lot of demonstrations and practical training, perhaps more and longer hands-on training would have been more useful.

RECOMMENDATIONS

1. Field of Quality Control

1.1 It is recommended to complete the library with the most important Handbooks and periodicals, e.g.

- Whole CIPAC Handbook series
- Handbook of AOAC
- The relevant Handbooks of CRC series
- Journal of A.O.A.C.
- Journal of chromatography
- Analytical Chemistry
- The Analyst
- Journal of Agricultural & Food Chemistry
- Journal of High Resolution Chromatography
- Analytical Abstracts.

1.2 It is recommended to continue as quick as possible the improvement of laboratory order based on the "OECD guidelines for Good Laboratory Practice", because PDPI should be a good example to the trainees.

1.3 It is advisable to develop some simple, but specific analytical method for small-scale-formulators, e.g. Thin layer chromatographic clean-up followed by classical analytical method.

2. Formulation Technology

2.1 It is recommended to develop (being agreed with the recommendation of Dr. W. V. Valkenburg) analytical method for the analysis of the toxicant of Bacillus sphaericus, based on the published method on Bacillus thuringiensis. It is advisable to purchase some formulations of Bacillus thuringiensis from different sources, making comparative biological efficacy measurement with B.sphaericus.

- 2.2 It is recommended to purchase an external cooling system for more effective and controllable cooling of Dyno mills for scaling-up engineering measurements.
- 2.3 Because some natural polisaccharide (Xantan gum-Kelzan, Rhamsan-gum-a fermentation product of an Alcaligines species) are very good anti-settling agent for producing flowables, it is advisable to search some cooperation with Indian Biotechnology research.
- 2.4 Concerning the capacity of the PDPI formulation development, in the future seems to be worthy to start developing synergistic pesticide combinations, being more safe use by the farmers than tank - mix.
- 2.5 As the bentonite-type clay very efficient dispersing agent in liquid suspension fertilizer product, as a spin-off technology can be the target of the future development. Some good examples in the cooperatives between small farmers can encourage the initiation of using liquid fertilizers.

3. Training Course Organization

- 3.1 It is recommended, that after establishment the programme of the next International Training Course the lecturer should be asked to send their written lecture in advance, so at the beginning of the Course it would be possible to give it in edited form to the participants. In this case the oral lectures could concentrate to the most important problems giving specific examples from their topics, and the participants could follow more easily and effectively the lectures.

- 3.2 It is recommended to organize full day lectures and more full-day practical trainings, mainly hands - on training.
- 3.3 It is highly recommended to prepare for every hands - on practical measurement a written exercise sheet, containing the most important parameters of the instrument (equipment) used, the analytical method (process), the steps of computing the data and the statistical evaluation to be filled by the participants.
- 3.4 It is recommended, that the program contains lectures on Good Laboratory Practice and a list of proposed literature and publications (FAO, GIFAP, OECD, etc).
- 3.5 Concerning the scientific level and instrumentation of PDPI, they would be able to prepare audiovisual-video-training materials on different formulation development processes and physical and chemical analytical methods. The cassettes could be distributed into the Indian Formulation Industry and the RENPAP countries, perhaps in their native language.
- For this reason it is recommended to obtain a video-camera with two video-recorder, with dubbing capability.