PROJECT ASSISTANCE COMPLETION REPORT
INSECTICIDAL PRINCIPLES OF SEEDS OF ANNONA SPECIES PROJECT

PROJECT NO. 936.5542.97.1

United States Agency for International Development
Jakarta, Indonesia
April 1990

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INSECTICIDAL PRINCIPLES OF SEEDS OF ANNONA SPECIES PROJECT
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PROJECT ASSISTANCE COMPLETION PROJECT

INTRODUCTION.

This Project Assistance Report of the Insecticidal Principles of Seeds of Annona[1] Species is written in accordance with section B.4 of Handbook No.3, Appendix 14 A. A Project Overview consisting of the project background, purpose, inputs and administration is presented in Chapter I. Chapter II discusses the current status of two project components -- technical assistance and procurement of commodities. Project input contributions made by the AID are indicated in Chapter III. Chapter IV describes project accomplishments including achievement of project outputs and the project purpose. Chapter V presents the AID's post-project monitoring responsibilities and evaluation. Lessons learned from the project are summarized in chapter VI.

A list of cited references is presented in Attachment I. The references include the principle investigator's progress reports and USAID project documents.

I. PROJECT OVERVIEW.

BACKGROUND.

Pesticides have been widely used in Indonesia in the agricultural sector in order to increase and maintain high crop productivity. In Indonesia more than 400 formulations of pesticides have been registered for pests control on food crops, vegetables, fruits, and estate crops. It is estimated that about 80% of the domestically produced pesticides are insecticides -- the other 20% are rodenticides, fungicides, herbicides, and other

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[1]) Annona species are fruit trees, 2 to 6 meters high, which, in Indonesia, are commonly grown in remote areas or mountainous dry areas for the edible fruit. Three most common Annona species found in Indonesia are : Annona muricata (soursop), Annona reticulata (custard apple), Annona squamosa (sweetsop).

sorts of pesticides.

Effective pesticides, when properly applied in a timely fashion, will significantly reduce insect pest population numbers, and prevent outbreaks of pests. However, pest resurgence, pest resistance to pesticides, secondary pest outbreaks, destruction of natural enemies, persistance, residual problems, various environmental problems, and other hazards are well known.

Some natural plant products are often used as insecticides for domestic purposes because such insecticides are less toxic to humans and non-target animals. Innovative insecticides with better characteristics such as safety, specificity, facile availability are required and it is very likely that such substances can be made from insecticidal plants.

In this context, USAID provided a PSTC grant to the University of Gadjah Mada, in the city of Yogyakarta, to isolate and test the insecticidal effects of seeds of two species of Annona and to identify the structure of the insecticidal compounds of the seed extracts. The Grant Project Agreement to implement the Insecticidal Principle of Seeds of Annona Species Project was signed on July 30, 1986.

PROJECT PURPOSE.

As defined in this Grant Project Agreement, the purpose of the project was to isolate and test the insecticidal effects of seeds of two species of Annona and to identify the structure of the insecticidal compounds of the seed extracts to produce botanical insecticides for possible use in less developed countries.

PROJECT INPUTS.

The total project grant inputs of US$ 27,000 from AID were to fund Technical Assistance, Commodities and Supplies, Travel, and Other Costs / Overhead. No counterpart inputs from the grantee were required under this project.

PROJECT ADMINISTRATION.

The project was implemented by the University of Gadjah Mada, with overall responsibility for general guidance and implementation vested in the Dean of Faculty of Pharmacy of this institution. Day-to-day implementation was carried out by Ms. Amini, Principle Investigator, attached to the Faculty of Pharmacy.

II. CURRENT PROJECT STATUS.

The Grant Project Agreement was signed on July 30, 1986. The Project Assistance Completion Date was December 31, 1988, and the Terminal Disbursement Date (TDD) was September 31, 1989.

COMPLETION OF PROJECT COMPONENTS.

Project components included Technical Assistance, Commodities and Supplies, Travel, and Other Costs/Overhead.

1. Technical Assistance. A total of 23 person-months (pm) of technical assistance consisting of two (2) expatriate consultants and two (2) local experts provided their services as indicated in Table 1.

Table 1. Technical Assistance.

T.A. Team	Assignment	Period of service	P.M.
1.Dr. STC.D.Black/ Univ.of South Wales, Australia	Research Chemist	Aug.1988, Dec.1988	2
2.Dr. Howard Miles/ Univ.of Central Florida	ditto	August 1987	1
3.Dr.Sastrohamidjojo/ Univ.of Gadjah Mada	ditto	July 1986 - Dec.1988	10
4.Ir. Oetoyo/ Univ.of Gadjah Mada	entomologist	ditto	10
		T o t a l	23

The three (3) research chemists were involved in assisting the Principle Investigator in screening the insecticidal compound and carrying out bioassay, isolation and spectral analysis of the active compound. The entomologist was involved in assisting the Principle Investigator in screening the insecticidal fractions for insecticidal activity.

2. Commodities and Supplies. One rotary evaporator, one suction pump, one personal computer, and miscellaneous laboratory glassware and chemicals were purchased during the life of the project as shown in Table 2.

Table 2. List of Equipment Purchased Under the Project

Description	Unit	Condition	Marked With AID Emblem
Buchi rotary evaporator	1	good	yes
Thomas suction pump	1	good	yes
IBS computer	1	good	yes
Laboratory glassware	-	good	n/a
Chemicals	-	-	n/a

Table 2 shows that the equipment is still in good condition, useable, and that the equipment has been marked with AID emblems.

III. PROJECT INPUT CONTRIBUTIONS.

The Grant Project Agreement called for grant project inputs of US$ 27,000 from AID. Total AID cash contribution was US$ 26,643. This represents 98 % of the total planned AID budget of US$ 27,000. Although the Grant Project Agreement did not require any counterpart budget from the University of Gadjah Mada, it was estimated that, during the life of the project, the University of Gadjah Mada contributed Rp.12,000,000 or US$ 7,000[2]) for in-kind expenditures for office and laboratory space, and value of time of researchers.

The AID planned versus actual funding contribution is presented in Table 3.

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[2]) USAID Project Officer estimate based on observation at the University of Gadjah Mada's project facilities. The dollar value was based on the exchange rate of 1US$ = Rp.1,715 due to the exchange rate fluctuations during the life of the project.

Table 3. AID Funding Contribution (US$).

Project Component	Planned	Actual	%
Technical Assistance	12,000	11,806	98
Commodities & Supplies	13,350	14,481	107
Travel	150	152	101
Other Cost and Overhead	1,500	204	13
T o ta l	27,000	26,643	98

IV. PROJECT ACCOMPLISHMENTS.

ACHIEVEMENT OF OUTPUTS. The Grant Project Agreement called for two major project outputs:

1) Isolation and testing of insecticidal compounds of seeds of two annona species; and

2) Characterization of the pure insecticidal compounds using spectral techniques.

Work related to these two outputs has been accomplished. Isolation of insecticidal compounds of Annona muricata (soursop), Annona reticulata (custard apple), and Annona squamosa (sweetsop) was completed. Testing of insecticidal activities of the fractions and the purified isolated compounds was conducted on Sitophylus oryzae (rice borer). Characterization of the pure insecticidal compounds was also carried out. The characterization was done by the Technical Advisor, Dr.D. Black, in Australia due to the lack of equipment at the University of Gadjah Mada.

A copy of the final report by the Principle Investigator entitled "A Study on Insecticidal Principal of Seeds of Annona Species Found in Indonesia" is attached to this Project Assistance

Completion Report for more details.

ATTAINTMENT OF PROJECT PURPOSE. There was no project evaluation during the life of the project given the life and size of the project. However, notes of periodic visits made by the AID backstop project officer to the project site indicate that the grantee demonstrated a constant commitment to the project and its purpose. Although the project ended on December 31, 1988, the principle investigator is still committed to this research area. For example, she participated in the Annual Meeting of Pharmacologist on October 30, 1989 in Surabaya and presented a paper entitled "Analysis of Fatty Oil of Annona muricata using Gas Chromatography".

In addition, using the remaining chemicals bought under the project, the principle investigator still carries out research work in this area.

Although there was no study on the impact of the project towards farmers income, information from the Principle Investigator indicated that many farmers from whom the seeds of annona were collected, positively benefited from the project. The farmers became aware that the seeds of the Annona fruits that they produced could be sold as raw material for insecticidal substances, thus, becoming a more valuable commodity.

It was also felt that the project has established a strong foundation for the Faculty of Pharmacy, University of Gadjah Mada in doing research in this area given the fact that the research carried out under this activity was innovative.

V. POST-PROJECT AID MONITORING RESONSIBILITIES AND EVALUATION.

Besides implementing the Insecticidal Principles of Seeds of Annona Project, the University of Gadjah Mada has proposed another project for funding under the PSTC program. The new proposal, entitled "Separation of Coconut Protein and Oil from the Coconut Cream (10.036)", is being resubmitted to AID/SCI to be considered for 1990 funding. If the latter project is approved, AID will be able to monitor post-project activities of the Insecticidal Principles of Seeds of Annona Project.

VI. LESSONS LEARNED FROM THE PROJECT.

A number of lessons have been learned from the implementation of the Insecticidal Principles of Seeds of Annona Project. The Principle Investigator and the USAID backstop project officer agreed that the following should be noted:

1. The project budget should be realistically planned. The project proposal planned only US$ 27,000 to fund all project activities. Due to this limited budget, there was no equipment in place for doing characterization of the insecticidal compounds. Consequently, the characterization had to be done in the Technical Advisor's laboratory in Australia. This resulted in late submission of the analysis by the TA due to slow communication between the TA and the principle investigator.

2. An interim evaluation which measures accomplishment of project activities versus planned project objectives should be budgeted in future PSTC projects.

3. A post-project study on the impact of PSTC projects to beneficiaries may be necessary.

4. A project site visit by AID/W technical backstop officer should be budgeted in future PSTC projects.

5. Contacts with the private sector should be made in order to attract them to invest in this research area.

This Project Assistance Completion Report on the Insecticidal Principles of Seeds od Annona Project has been:

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D a t e: 5/10/90

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Distribution: DIR, DD, PPS, FIN, ANE/PD, Indonesian Desk, S&T/DIU.

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Attachment I

LIST OF REFERENCES

1. Amini, Final Report: A Study on Insecticidal Principles of Seeds of Annona Species Found in Indonesia, Faculty of Pharmacy, University of Gadjah Mada, May 31, 1989.

2. Faculty of Pharmacy, Gadjah Mada University, Progress Report: A Study on Insecticidal Principles of Seeds of Annona Species Found in Indonesia--January 1 to June 1987, No date.

3. Ministry of Agriculture, Agency for Agricultural Research and Development, Indonesian Agricultural Research and Development Journal, volume 4, number 2, 1982.

4. Ministry of Industry of the Republic of Indonesia, Directorate General for Basic Chemical Industries, Pesticide Industry Profile in Indonesia--Paper Presented for the Regional Expert Consultation of Trade and Tariff Considerations in Colombo, Sri Lanka, August 13 - 17, 1984.

5. USAID/Indonesia, Grant Project Agreement Between the United States of America, Acting through the Agency for International Development (AID) and Gadjah Mada University, July 30, 1986.