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EFFECT OF SYNERGISTS ON THE TOXICIITY OF FENITROTHION AND AMINOCARB TO SPRUCE BUDWORM LARVAE

by

P. C. NIGAM

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Chemical Control Research Institute
Canadian Forestry Service
Department of the Environment
Ottawa, Canada

Introduction

Approximately 2 to 3 million pounds of insecticides are being used for the control of spruce budworm annually, depending upon the infestation. In an attempt to reduce the quantity of insecticides used in future, three synergists were tested for increasing the toxicity of aminocarb and fenitrothion, which are applied operationally at the moment.

The results of preliminary study are described in this paper.

SLIDE 1: Presents the three synergists used in the study. These were synthesized by Dr. Hennesey.

SLIDE 2: This Slide presents the common and trade names of insecticides used in this study along with their structural and empirical formula. Aminocarb is a carbamate and fenitrothion is an organophosphorous compound.

SLIDE 3: This slide presents the 5th instar larvae of spruce budworm used in the study. These are laboratory reared insects.

SLIDE 4: PRESENTS THE MODIFIED SPRAY TOWER USED FOR TESTING THE CONTACT TOXICITY OF MIXTURES OF SYNERGISTS AND INSECTICIDES. THE INSECTS WERE ANESTHETIZED WITH CO_2 AND SPRAYED. THE DEPOSITS OF ACTIVE INGREDIENT WAS DETERMINED BY USING TRACER DYE. THE INSECTS WERE OBSERVED 24, 48 AND 72 HOURS AFTER TREATMENT AND PROBIT ANALYSIS FOR DOSE MORTALITY RESPONSE WAS CARRIED OUT. THE RESULTS ARE EXPRESSED AS LD_{50} IN $\mu G/CM^2$ OF ACTIVE INGREDIENTS AFTER 48 HOURS OF TREATMENT.

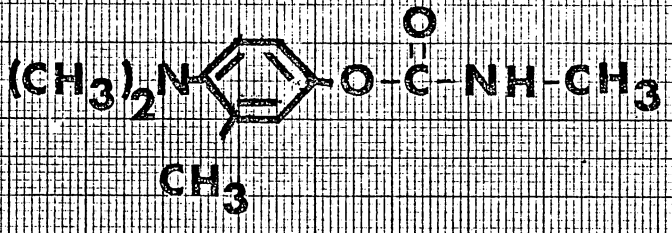
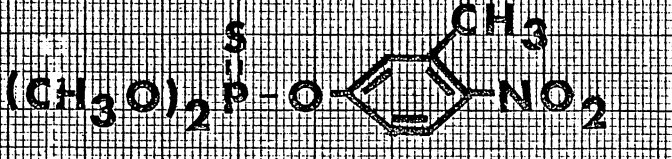
SLIDE 5: PRESENTS THE RESULTS OF FENITROTHION AND MIXTURE OF THE THREE SYNERGISTS AT 0.005% CONCENTRATION. THE LD_{50} OF FENITROTHION ALONE IS 0.1 $\mu G/CM^2$. THERE IS SLIGHT INCREASE IN TOXICITY OF FENITROTHION WITH 279 & 282, AND DECREASE IN TOXICITY WITH 421. HOWEVER, GA-4-282 APPEARS TO BE PROMISING AND FUTURE EFFORTS WILL BE CONCENTRATED ON THIS SYNERGIST AND FENITROTHION.

SLIDE 6: GIVES THE SYNERGISTIC ACTIVITY WITH AMINOCARB. THE SYNERGISTS WERE TESTED AT TWO CONCENTRATIONS 0-001% AND 0.005%. THE LD_{50} OF AMINOCARB IS 0.02 $\mu G/CM^2$ AND THE SYNERGISTS HAVE NOT INCREASED ITS TOXICITY AGAINST SPRUCE BUDWORM.

Conclusion

Out of these three synergists, Dichlorobenzyl propynyl ether has increased toxicity of fenitrothion approximately 1.5 times and should be tested in future along with other synergists. Non of the synergists have increased the toxicity of aminocarb.

INSECTICIDE

COMMON OR TRADE NAME	STRUCTURAL FORMULA	EMPIRICAL FORMULA
AMINOCARB OR MATACIL®		$C_{11}H_{16}N_2O_2$
FENITROTHION OR SUMITHION®		$C_9H_{12}NO_5PS$

SYNERGISTS

SYNERGIST CODE	CHEMICAL NAME
GA-4-279	CHLORO-6-NITROBENZYL PROPYNYL ETHER
GA-4-282	DICHLOROBENZYL PROPYNYL ETHER
GA-4-421	NITROBENZYL PROPYNYL ETHER

EFFECT OF SYNERGISTS ON THE CONTACT TOXICITY OF FENITROTHION TO LAB. FIFTH INSTAR SPRUCE BUDWORM

INSECTICIDE		LD50 (ug/cm² 48 hr)	FIDUCIAL LIMITS
FENITROTHION		0.10	0.078 - .115
	%		
+ GA-4-279	.005	0.08	.060 - .096
+ GA-4-282	.005	0.06	.033 - .091
+ GA-4-421	.005	0.13	----------

EFFECT OF SYNERGISTS ON THE CONTACT TOXICITY OF AMINOCARB TO LAB. FIFTH INSTAR SPRUCE BUDWORM

INSECTICIDE			LD_{50} ($\mu g/cm^2$ 48 hr)	FIDUCIAL LIMITS
AMINOCARB			0.022	0.018 - .025
"	+ GA-4-279	.001%	.020	.018 - .022
	"	.005	.024	.022 - .026
"	+ GA-4-282	.001	.025	.023 - .028
	"	005	.023	----------
"	+ GA-4-421	.001	.021	----------
	"	.005	.022	.020 - .025