PN-ABA-956

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

DATE: 9/30/88

MEMORANDUM

TO: AID/PPC/CDIE/DI, room 209 SA-18

FROM: AID/SCI, Victoria Ose

SUBJECT: Transmittal of AID/SCI Progress Report(s)

Attached for permanent retention/proper disposition is the following:

AID/SCI Progress Report No. 5.240
lot
3d PR

Attachment

NATURAL INSECTICIDES FOR *SPODOPTERA LITURA* Fabr.

AID GRANT NO. 936-5542-G-00-5032-00

DR. PICHAET WIRIYACHITRA

FIRST SIX MONTH

INTERIM PROGRESS REPORT

FOR PERIOD JUNE 1 TO NOVEMBER 30, 1985

Rec'd in SOI: FEB 12 1986

Plants collection and identification

One hundred and sixty three species of plants were collected and identified. Herbarium specimens were deposited in the Herbarium of the Department of Biology, Prince of Songkla University.

Screening of Insecticidal and Antifeedant activities

Tests for insecticidal and antifeedant activities were carried out on the ethanolic extracts of 49 plant species and subsequently separated fractions and compounds

For the detection of stomach poisoning, and antifeeding activity, the third instars of *Spodoptera litura* larvae were left to feed on the leaves of *Vigna radiata* which had been immersed in the tested solution then air-dried. Ten larvae were used in each of the four replications (one as control). The number of dead organisms was recorded at the end of each day. The amount of the leaf consumption and the larva size were also estimated. The results of this leaf dipping method (LD) appeared in the table sheet.

For the detection of dermal toxicity, the tested solution was dropped on the thorax of the third instar larvae. The organisms were then left to feed on untreated leaves of *Vigna radiata* in a plastic container. Ten larvae were used in each of the four replications (one as control). The number of dead organisms was recorded at the end of each day. The results of this topical application method (TA) were tabulated in the result sheet.

In the result sheet, indentation in the Fraction column indicated further separation from the preceeding samples/fractions. 'Solvent A/ solvent B' in this column indicates a solvent fractionation and the substances contained in the first solvent were used for testing. Accumulative % mortality was taken from the average of all three replications. In the case of no obvious results at the end of the third day, the tests were usually terminated.

Other activities

The principal investigator made a trip to the United States to discuss collaboration with Dr. Michael Cava at the University of Pennsylvania in June 1985. He also made several trips to Bangkok for literature search and consultation with various scientists regarding the use of facilities and plant species used for testing.

One research associates, Miss Pornpipat Na Pattalung made a trip to Bangkok for literature search and to attend the Science Symposium in October 1985.

Dr. Kwanchai Sombatsiri and Dr. Boonyarit Sayampol from Kasetsart University were invited to give lectures on the use of plants material for eradication of *S. litura* and advise on the improvement of the test method.

ABBREVIATION

TA	-	Topical application	LD	-	leaf dipping
C_6H_{14}	-	Hexane	EtOAc	-	Ethyl acetate
QC	-	Quick column chromatography	EtOH	-	Ethanol
MeCOMe	-	Acetone	CH_2Cl_2	-	Dichloromethane
MeOH	-	Methanol			

Reported date : 01/01/80

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
1	*Schasma megalocheilos*	rhizome,root	EtOH	Crude	20(EtOH)	TA 0.4 ul	3.33	3.33	3.33	-	-	-	-	
2						LD	0.00	0.00	0.00	-	-	-	-	
3	*Acronychia lauriforia*	leaf	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	0.00	0.00	-	-	-	-	
4						0.4 ul	0.00	0.00	0.00	-	-	-	-	
5						0.8 ul	0.00	0.00	0.00	-	-	-	-	
6						LD	0.00	0.00	0.00	-	-	-	-	
7				$EtOAc/H_2O$	20(EtOH)	TA 0.2 ul	6.67	36.67	46.67	-	-	-	-	
8						0.4 ul	6.67	36.67	43.33	-	-	-	-	
9						0.8 ul	20.00	36.67	40.00	-	-	-	-	
10						LD	3.33	16.67	20.00	-	-	-	-	
11				$C_6H_{14}/MeOH$	20(EtOH)	TA 0.4 ul	0.00	3.33	3.33	-	-	-	-	
12						LP	0.00	6.67	16.67	-	-	-	-	
13				$MeOH/C_6H_{14}$	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
14						LD	0.00	0.00	0.00	-	-	-	-	
15		bark	EtOH	Crude		-	-	-	-	-	-	-	-	
16				EtOH/oil	20(EtOH)	TA 0.4 ul	0.00	0.00	6.67	-	-	-	-	sticky
17						LD	0.00	0.00	3.33	6.67	13.33	13.33	13.33	larvae size 1/3
18				QC	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
19						LA	0.00	0.00	3.33	23.33	33.33	33.33	36.33	larvae size 1/2
20				oil/EtOH	-	-	-	-	-	-	-	-	-	
21				EtOAc(sol)	20(EtOH)	TA 0.4 ul	73.33	90.00	93.33	93.33	100.00	-	-	sticky
22						LD	23.33	60.00	86.67	100.00	-	-	-	do
23				QC(C_6H_{14})	20(EtOH)	TD 0.4 ul	100.00	-	-	-	-	-	-	very sticky
24						LD	43.33	96.67	100.00	-	-	-	-	do
25				MeOH(sol)	10(MeCOMe)	TA 0.4 ul	53.33	66.67	66.67	73.33	73.33	73.33	73.33	sticky
26						LD	33.33	73.33	90.00	100.00	-	-	-	do
27				MeOH(sol)	5(MeCOMe)	TA 0.4 ul	16.67	16.67	16.67	16.67	16.67	16.67	16.67	slightly sticky
28						LD	6.67	46.67	70.00	76.67	93.33	93.33	93.33	larvae size 1/8
29				MeOH(sol)	2.5(MeCOMe)	TA 0.4 ul	0.00	0.00	0.00	0.00	0.00	0.00	0.00	slightly sticky
30						LD	6.67	23.33	46.67	50.00	56.67	63.33	66.67	larvae size 1/8
31				QC(MeCOMe)	5(MeCOMe)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
32						LD	3.33	3.33	3.33	-	-	-	-	
33	*Aegle marmelos*	leaf	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
34						LD	0.00	0.00	3.33	-	-	-	-	
35	*Ageratum conyzoides*	leaf	EtOH	Crude	20(EtOH)	TA 0.4 ul	6.67	6.67	6.67	10.00	10.00	10.00	10.00	
36						LD	13.33	13.33	20.00	40.00	46.67	53.33	63.33	larvae size 1/4
37	*Amomum sp.*	rhizome,root	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
38						LD	0.00	0.00	0.00	-	-	-	-	
39	*Amomum testaceum*	rhizome	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
40						LD	0.00	6.67	26.67	-	-	-	-	small larvae
41	*Anacardium occidentale*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	13.33	13.33	13.33	-	-	-	-	
42						3 ul	20.00	20.00	20.00	-	-	-	-	
43						5 ul	33.33	33.33	33.33	-	-	-	-	
44						LD	3.33	3.33	3.33	-	-	-	-	
45				$EtOAc/H_2O$	20(EtOH)	TA 0.2 ul	3.33	3.33	3.33	-	-	-	-	5 larvae/rep.
46						0.4 ul	0.00	0.00	0.00	-	-	-	-	do

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
47						0.8 ul	0.00	0.00	0.00	-	-	-	-	do
48						LD	0.00	0.00	0.00	-	-	-	-	less feeding
49	*Annona muricata*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	0.00	0.00	0.00	-	-	-	-	5 larvae/rep.
50						3 ul	13.33	13.33	13.33	-	-	-	-	do
51						5 ul	20.00	20.00	20.00	-	-	-	-	do
52						LD	0.00	0.00	0.00	-	-	-	-	
53				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	3.33	3.33	-	-	-	-	
54						0.4 ul	6.67	6.67	6.67	-	-	-	-	
55						0.8 ul	3.33	3.33	3.33	-	-	-	-	
56						LD	0.00	0.00	0.00	-	-	-	-	
57	*Azadirachta indica*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	33.33	33.33	33.33	-	-	-	-	5 larvae/rep.
58						3 ul	26.67	26.67	26.67	-	-	-	-	do
59						5 ul	40.00	40.00	40.00	-	-	-	-	do
60						LD	3.33	3.33	3.33	-	-	-	-	
61				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	6.67	6.67	6.67	-	-	-	-	
62						0.4 ul	3.33	3.33	3.33	-	-	-	-	
63						0.8 ul	3.33	3.33	3.33	-	-	-	-	less feeding
64						LD	0.00	0.00	0.00	-	-	-	-	
65	*Barringtonia pterocarpa*	testa	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
66					-	LD	0.00	0.00	0.00	-	-	-	-	
67		endosperm	EtOH	Crude	20(EtOH)	TA 0.4	0.00	0.00	0.00	-	-	-	-	
68						LD	0.00	0.00	0.00	-	-	-	-	
69	*Blumea balsamifera*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.4 ul	6.67	6.67	6.67	-	-	-	-	5 larvae/rep.
70						3 ul	40.00	40.00	40.00	-	-	-	-	do
71						5 ul	33.33	33.33	33.33	-	-	-	-	do
72						LD	10.00	10.00	10.00	-	-	-	-	
73				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	0.00	0.00	-	-	-	-	
74						0.4 ul	3.33	3.33	3.33	-	-	-	-	
75						0.8 ul	3.33	3.33	3.33	-	-	-	-	
76						LD	0.00	0.00	0.00	-	-	-	-	
77	*Caesalpinia andamanica*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	0.00	0.00	-	-	-	-	
78						0.4 ul	0.00	0.00	0.00	-	-	-	-	
79						0.8 ul	0.00	0.00	0.00	-	-	-	-	
80						LD	0.00	0.00	0.00	-	-	-	-	
81				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	-	-	-	-	-	-	-	
82						LD	0.00	0.00	0.00	-	-	-	-	
83	*Caesalpinia pulcherrima*	leaf,flower,pod	EtOH	Crude	20(EtOH)	TA 0.2 ul	3.33	10.00	10.00	-	-	-	-	
84						0.4 ul	0.00	3.33	6.67	-	-	-	-	
85						0.8 ul	6.67	13.33	16.67	-	-	-	-	
86						LD	0.00	0.00	0.00	-	-	-	-	
87				EtOAc/H_2O	20(EtOH)	LD	0.00	0.00	0.00	-	-	-	-	
88	*Callicarpa cana*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.4 ul	3.33	3.33	3.33	-	-	-	-	
89						LD	0.00	0.00	6.67	-	-	-	-	
90	*Callicarpa longifolia*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	10.00	13.33	23.33	-	-	-	-	
91						0.4 ul	13.33	20.00	26.67	-	-	-	-	
92						0.8 ul	10.00	20.00	36.67	-	-	-	-	

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
93						LD	0.00	10.00	23.33	-	-	-	-	
94				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	13.33	-	-	-	-	-	-	5 larvae/rep.
95						0.4 ul	13.33	-	-	-	-	-	-	do
96						0.8 ul	13.33	-	-	-	-	-	-	do
97						LD	0.00	-	-	-	-	-	-	
98	*Calycopteris floribunda*	leaf	EtOH	Crude	20(EtOH)	TA 0.2 ul	3.33	20.00	30.00	-	-	-	-	
99						0.4 ul	3.33	13.33	20.00	-	-	-	-	
100						0.8 ul	12.33	16.67	23.33	-	-	-	-	
101						LD	0.00	36.67	63.33	-	-	-	-	
102				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	larvae size 1/2
103						LD	3.33	33.33	53.33	73.33	93.33	96.67	100.00	
104				C_6H_{14}/MeOH	20(EtOH)	TA 0.4 ul	3.33	3.33	6.67	-	-	-	-	
105						LD	0.00	0.00	6.67	-	-	-	-	
106				MeOH/C_6H_{14}	20(EtOH)	TA 0.4 ul	10.00	10.00	10.00	-	-	-	-	
107						LD	0.00	3.33	16.67	-	-	-	-	small larvae
108		bark	EtOH	Crude			-	-	-	-	-	-	-	
109				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
110						LD	0.00	0.00	0.00	-	-	-	-	
111				H_2O/EtOAc	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
112	*Cassia alata*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	46.67	-	-	-	-	-	-	5 larvae/rep.
113						1 ul	46.67	-	-	-	-	-	-	do
114						[illegible]	66.67	-	-	-	-	-	-	do
115						LD	0.00	-	-	-	-	-	-	
116				EtOAc/H_2O	20(EtOH)	TA 0.[illegible] ul	0.00	-	-	-	-	-	-	
117						0.[illegible] ul	0.00	-	-	-	-	-	-	
118						0.[illegible] ul	10.00	-	-	-	-	-	-	
119						LD	0.00	-	-	-	-	-	-	
120	*Cerbera manghas*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	23.33	23.33	26.67	-	-	-	-	
121						0.4 ul	3.33	6.67	13.33	-	-	-	-	
122						0.8 ul	13.33	13.33	16.67	-	-	-	-	
123						LD	6.67	13.33	13.33	-	-	-	-	
124				EtOAc/H_2O	20(EtOH)	LD	0.00	0.00	16.67	-	-	-	-	
125	*Derris sp.*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	0.00	0.00	-	-	-	-	5 larvae/rep.
126						0.4 ul	0.00	-	-	-	-	-	-	do
127						0.8 ul	13.33	-	-	-	-	-	-	do
128						LD	0.00	-	-	-	-	-	-	
129				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	6.67	10.00	-	-	-	-	
130						0.4 ul	3.33	3.33	23.33	-	-	-	-	
131						0.8 ul	6.67	6.67	10.00	-	-	-	-	
132						LD	0.00	3.33	10.00	-	-	-	-	
133	*Dalbergia rostrata*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
134						LD	0.00	3.33	10.00	13.33	13.33	13.33	13.33	larvae size 1/6
135	*Derris amoena* var. *amoena*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	13.33	-	-	-	-	-	-	5 larvae/rep.
136						0.4 ul	20.00	-	-	-	-	-	-	do
137						0.8 ul	33.33	-	-	-	-	-	-	do
138						LD	0.00	-	-	-	-	-	-	

Reported date : 01/01/80

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
139				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	
140						0.4 ul	3.33	-	-	-	-	-	-	
141						0.8 ul	3.33	-	-	-	-	-	-	
142						LD	0.00	-	-	-	-	-	-	
143	*Derris scandens*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
144						3 ul	6.67	-	-	-	-	-	-	do
145						5 ul	13.33	-	-	-	-	-	-	
146						LD	0.00	-	-	-	-	-	-	
147				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
148						0.4 ul	13.33	-	-	-	-	-	-	
149						0.8 ul	16.67	-	-	-	-	-	-	
150						LD	6.67	-	-	-	-	-	-	
151	*Derris thyrsiflora*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
152						0.4 ul	0.00	-	-	-	-	-	-	do
153						0.8 ul	13.33	-	-	-	-	-	-	do
154						LD	0.00	-	-	-	-	-	-	
155				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	26.67	36.67	43.33	-	-	-	-	
156						0.4 ul	36.67	40.00	40.00	-	-	-	-	
157						0.8 ul	46.67	53.33	56.67	-	-	-	-	
158						LD	0.00	0.00	3.33	-	-	-	-	
159				C_6H_{14}/MeOH	20(EtOH)	TA 0.4 ul	3.33	3.33	3.33	-	-	-	-	
160						LD	0.00	0.00	0.00	-	-	-	-	
161				MeOH/C_6H_{14}	20(EtOH)	TA 0.4 ul	10.00	10.00	10.00	-	-	-	-	
162						LD	0.00	0.00	0.00	-	-	-	-	
163	*Diospyros wallichii*	leaf	EtOH	Crude	20(EtOH)	TA 1 ul	26.67	-	-	-	-	-	-	5 larvae/rep.
164						3 ul	33.33	-	-	-	-	-	-	do
165						5 ul	40.00	-	-	-	-	-	-	do
166						LD	0.00	-	-	-	-	-	-	
167				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	
168						0.4 ul	0.00	-	-	-	-	-	-	
169						0.8 ul	3.33	-	-	-	-	-	-	
170						LD	3.33	-	-	-	-	-	-	
171	*Entada spiralis*	seed	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
172						LD	0.00	0.00	0.00	-	-	-	-	
173				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	10.00	10.00	10.00	10.00	10.00	10.00	10.00	
174						LD	40.00	53.33	76.67	-	-	-	-	
175	*Erythroxylum cuneatum*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
176						0.4 ul	0.00	-	-	-	-	-	-	do
177						0.8 ul	6.67	-	-	-	-	-	-	do
178						LD	0.00	-	-	-	-	-	-	
179				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	10.00	20.00	23.33	-	-	-	-	
180						0.4 ul	13.33	16.67	26.67	-	-	-	-	
181						0.8 ul	13.33	16.67	26.67	-	-	-	-	
182						LD	3.33	3.33	3.33	-	-	-	-	
183	*Eupatorium odoratum*	leaf	EtOH	Crude	20(EtOH)	TA 1 ul	13.33	-	-	-	-	-	-	5 larvae/rep.
184						3 ul	53.33	-	-	-	-	-	-	do

Reported date : 01/01/80

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
185						5 ul	66.67	-	-	-	-	-	-	do
186						LD	0.00	-	-	-	-	-	-	
187				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
188						0.4 ul	6.67	-	-	-	-	-	-	
189						0.8 ul	0.00	-	-	-	-	-	-	
190						LD	0.00	-	-	-	-	-	-	
191			H_2O	Crude	50(H2O)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
192						LD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
193	*Hura crepitans*	leaf	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
194						0.4 ul	0.00	-	-	-	-	-	-	do
195						0.8 ul	0.00	-	-	-	-	-	-	do
196						LD	3.33	-	-	-	-	-	-	
197				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
198						0.4 ul	6.67	-	-	-	-	-	-	
199						0.8 ul	6.67	-	-	-	-	-	-	
200						LD	0.00	-	-	-	-	-	-	
201	*Steinhovia hospita*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
202						0.4 ul	0.00	-	-	-	-	-	-	do
203						0.8 ul	0.00	-	-	-	-	-	-	do
204						LD	3.33	-	-	-	-	-	-	
205				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
206						0.4 ul	13.33	-	-	-	-	-	-	
207						0.8 ul	0.00	-	-	-	-	-	-	
208						LD	0.00	0.00	0.00	-	-	-	-	
209	*Lantana camara*	flower	C_6H_{14}	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
210						LD	0.00	0.00	0.00	-	-	-	-	
211			CH_2Cl_2	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
212						LD	0.00	0.00	0.00	-	-	-	-	
213			EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
214						LD	0.00	3.33	6.67	13.33	16.67	16.67	20.00	larvae size 1/2
215		leaf	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
216						LD	0.00	0.00	0.00	-	-	-	-	
217	*Lantana camara*(local type)	leaf	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
218						LD	3.33	3.33	3.33	-	-	-	-	
219	*Milia azedarach*	leaf	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
220						0.4 ul	0.00	-	-	-	-	-	-	do
221						0.8 ul	0.00	-	-	-	-	-	-	do
222						LD	3.33	-	-	-	-	-	-	
223				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
224						0.4 ul	6.67	-	-	-	-	-	-	
225						0.8 ul	10.00	-	-	-	-	-	-	
226						LD	0.00	-	-	-	-	-	-	
227	*Millettia atropurpurea*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	40.00	-	-	-	-	-	-	5 larvae/rep.
228						3 ul	66.67	-	-	-	-	-	-	do
229						5 ul	80.00	-	-	-	-	-	-	do
230						LD	3.33	-	-	-	-	-	-	

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
231				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	
232						0.4 ul	0.00	-	-	-	-	-	-	
233						0.8 ul	3.33	-	-	-	-	-	-	
234						LD	0.00	-	-	-	-	-	-	
235	*Myrica esculenta*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
236						3 ul	13.33	-	-	-	-	-	-	do
237						5 ul	46.67	-	-	-	-	-	-	do
238						LD	0.00	-	-	-	-	-	-	
239				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	3.33	-	-	-	-	-	-	
240						0.4 ul	3.33	-	-	-	-	-	-	
241						0.8 ul	0.00	-	-	-	-	-	-	
242						LD	0.00	-	-	-	-	-	-	
243	*Neonauclea pallida*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	20.00	-	-	-	-	-	-	5 larvae/rep.
244						0.4 ul	13.33	-	-	-	-	-	-	do
245						0.8 ul	0.00	-	-	-	-	-	-	do
246						LD	0.00	-	-	-	-	-	-	
247				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	6.67	6.67	10.00	-	-	-	-	
248						0.4 ul	6.67	6.67	16.67	-	-	-	-	
249						0.8 ul	3.33	13.33	13.33	-	-	-	-	
250						LD	3.33	6.67	16.67	-	-	-	-	
251	*Pachyrhizus erosus*	seed	C_6H_{14}	Crude	20(EtOH)	TA 0.4 ul	16.67	20.00	20.00	-	-	-	-	
252						LD	53.33	90.00	96.67	96.67	100.00	-	-	dead from fat-like substances?
253			CH_2Cl_2	Crude	4(EtOH)	TA 0.4 ul	10.00	20.00	20.00	-	-	-	-	
254						LD	20.00	93.33	96.67	100.00	-	-	-	larvae size 1/3
255			EtOH	Crude	20(EtOH)	TA 0.4 ul	10.00	10.00	10.00	-	-	-	-	
256						LD	46.67	73.33	76.67	83.33	83.33	86.67	90.00	larvae size 1/3
257	*Persea americana*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	6.67	10.00	10.00	10.00	10.00	10.00	
258						LD	0.00	0.00	0.00	10.00	10.00	16.67	16.67	larvae size 1/2
259	*Pittosporum ferrugineum*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
260						0.4 ul	0.00	-	-	-	-	-	-	do
261						0.8 ul	0.00	-	-	-	-	-	-	do
262						LD	0.00	-	-	-	-	-	-	
263				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	
264						0.4 ul	0.00	-	-	-	-	-	-	
265						0.8 ul	3.33	-	-	-	-	-	-	
266						LD	0.00	-	-	-	-	-	-	
267	*Polygonum tomentosum*	leaf,branch	EtOH	Crude	20(EtOH)	TA 1 ul	20.00	-	-	-	-	-	-	5 larvae/rep.
268						3 ul	0.00	-	-	-	-	-	-	do
269						5 ul	20.00	-	-	-	-	-	-	do
270						LD	10.00	-	-	-	-	-	-	
271				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	
272						0.4 ul	0.00	-	-	-	-	-	-	
273						0.8 ul	0.00	-	-	-	-	-	-	
274						LD	0.00	-	-	-	-	-	-	
275	*Sapium indicum*	leaf,branch	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
276						0.4 ul	0.00	-	-	-	-	-	-	do

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
277						0.8 ul	0.00	-	-	-	-	-	-	do
278						LD	0.00	-	-	-	-	-	-	
279				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	6.67	-	-	-	-	-	-	
280						0.4 ul	0.00	-	-	-	-	-	-	
281						0.8 ul	10.00	-	-	-	-	-	-	
282						LD	0.00	-	-	-	-	-	-	
283	*Schisa wallichii*	leaf,branch, fruit	EtOH	Crude	20(EtOH)	TA 0.2 ul	0.00	-	-	-	-	-	-	5 larvae/rep.
284						0.4 ul	6.67	-	-	-	-	-	-	do
285						0.8 ul	20.00	-	-	-	-	-	-	do
286						LD	0.00	-	-	-	-	-	-	
287				EtOAc/H_2O	20(EtOH)	TA 0.2 ul	10.00	-	-	-	-	-	-	
288						0.4 ul	16.67	-	-	-	-	-	-	
289						0.8 ul	16.00	-	-	-	-	-	-	
290						LD	0.00	-	-	-	-	-	-	
291	*Spilanthes paniculata*	whole	EtOH	Crude	20(EtOH)		-	-	-	-	-	-	-	
292	*Wedelia biflora*	whole	EtOH	Crude			-	-	-	-	-	-	-	
293				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	10.00	10.00	10.00	13.33	13.33	13.33	13.33	very sticky
294						LD	33.33	66.67	70.00	86.67	90.00	93.33	93.33	do
295			C_6H_{14}	Crude	20(EtOH)	TA 0.4 ul	6.67	30.00	30.00	30.00	30.00	40.00	40.00	sticky
296						LD	10.00	33.33	33.33	36.67	36.67	40.00	40.00	do
297			CH_2Cl_2	Crude	20(EtOH)	TA 0.4 ul	6.60	10.00	10.00	10.00	10.00	10.00	10.00	
298						LD	3.33	3.33	3.33	-	-	-	-	
299			EtOH	Crude	20(EtOH)	TA 0.4 ul	6.67	6.67	6.67	16.67	16.67	16.67	16.67	
300						LD	0.00	3.33	23.33	33.33	53.33	63.33	63.33	
301				GC(C_6H_{14})	20(EtOH)	TA 0.4 ul	0.00	6.67	6.67	-	-	-	-	
302						LD	0.00	0.00	0.00	-	-	-	-	
303				GC(CH_2Cl_2)	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
304						LD	0.00	0.00	0.00	30.00	46.67	54.67	60.00	black,lumpy solid
305				GC(MeOH)	20(EtOH)	TA 0.4 ul	0.00	0.00	3.33	-	-	-	-	
306						LD	0.00	10.00	16.67	16.67	56.67	70.00	83.33	larvae size 1/4
307	*Wedelia trilobata*	whole	EtOH	Crude			-	-	-	-	-	-	-	
308				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	0.00	3.33	3.33	3.33	3.33	3.33	6.67	very sticky
309						LD	20.00	76.67	80.00	83.33	90.00	90.00	96.67	do
310			C_6H_{14}	Crude	10(EtOH)	TA 0.4 ul	20.00	30.00	30.00	-	-	-	-	
311						LD	23.33	33.33	50.00	50.00	53.33	60.00	73.33	sticky ,larvae size 1/6
312			CH_2Cl_2	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
313						LD	10.00	50.00	86.67	93.33	100.00	-	-	very sticky,larvae size 1/3
314			EtOH	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
315						LD	30.00	43.33	46.67	53.33	53.33	53.33	53.33	slighty sticky,repellent,larvae size 1/4
316	*Zingiber cassumunar*	rhizome	EtOH	Crude	8(EtOH)	TA 0.4 ul	-	-	-	-	-	-	-	
317						LD	0.00	6.67	86.67	-	-	-	-	
318				MeOH(insol)	8(H_2O:MeCOMe)3:1	TA 0.4 ul	-	-	-	-	-	-	-	
319						LD	0.00	0.00	3.33	-	-	-	-	
320				MeOH(sol)	-		-	-	-	-	-	-	-	
321				MeOH/C_6H_{14}	8(EtOH)	TA 0.4 ul	-	-	-	-	-	-	-	
322						LD	13.33	46.67	100.00	-	-	-	-	

SCREENING OF INSECTICIDAL ACTIVITY FOR *Spodoptera litura* Fabr

NO.	PLANT SPECIES	PART	SOLVENT	FRACTION	% CONC (SOLV.)	TEST METHOD	ACCUMULATIVE % MORTALITY Day 1	2	3	4	5	6	7	REMARKS
323				C_6H_{14}/MeOH	8(EtOH)	TA 0.4 ul	-	-	-	-	-	-	-	
324						LD	20.00	80.00	100.00	-	-	-	-	
325	*Zingiber ottensii*	rhizome	C_6H_{14}	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
326						LD	0.00	0.00	0.00	-	-	-	-	
327			CH_2Cl_2	Crude	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
328						LD	0.00	0.00	0.00	-	-	-	-	
329			EtoH	Crude(upper layer)	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
330						LD	0.00	0.00	0.00	-	-	-	-	
331				Crude(lower layer)	20(EtOH)	TA 0.4 ul	0.00	0.00	0.00	-	-	-	-	
332						LD	10.00	16.67	16.67	16.67	20.00	20.00	20.00	larvae size 1/3
333	*Zingiber zerumbet*	rhizome	EtOH	Crude			-	-	-	-	-	-	-	
334				EtOAc/H_2O	20(EtOH)	TA 0.4 ul	90.00	93.33	93.33	93.33	93.33	93.33	93.33	
335						LD	63.33	90.00	100.00	-	-	-	-	
336				C_6H_{14}(sol)	5(EtOH)	TA 0.4 ul	3.33	3.33	3.33	-	-	-	-	
337						LD	0.00	10.00	16.67	-	-	-	-	
338				C_6H_{14}(insol)	5(EtOH)	TA 0.4 ul	20.00	20.00	23.33	30.00	30.00	30.00	30.00	
339						LD	0.00	0.00	3.33	10.00	-	-	-	larvae size 1/3
340				QC(C_6H_{14})	5(EtOH)	TA 0.4 ul	96.67	96.67	96.67	-	-	-	-	dead in 4-5 hour after application
341						LD	0.00	10.00	23.33	40.00	43.33	43.33	46.67	larvae size 1/6
342					5(EtOH)	TA 0.4 ul	56.67	56.67	60.00	-	-	-	-	
343						LD	59.00	96.67	100.00	-	-	-	-	
344					2.5(EtOH)	TA 0.4 ul	36.67	36.67	40.00	-	-	-	-	
345						LD	53.33	70.00	70.00	73.33	86.67	86.67	86.67	larvae size 1/5
346					1.25(EtOH)	TA 0.4 ul	3.33	3.33	3.33	-	-	-	-	
347						LD	30.00	50.00	60.00	60.00	60.00	60.00	60.00	larvae size 1/3
348				QC(CH_2Cl_2)	5(EtOH)	TA 0.4 ul	0.00	3.33	3.33	-	-	-	-	
349						LD	0.00	43.33	43.33	43.33	43.33	46.67	46.67	larvae size 1/2
350				QC(MeCOMe)	5(EtOH)	TA 0.4 ul	0.00	6.67	10.00	-	-	-	-	
351						LD	0.00	3.33	3.33	-	-	-	-	
352		flower	C_6H_{14}	Crude	10(EtOH)	TA 0.4 ul	0.00	6.67	6.67	10.00	13.33	13.33	13.33	
353						LD	0.00	0.00	3.33	-	-	-	-	
354														