

Inhibitory effect of weed-based extracts as bio-control against common cutworm (*Spodoptera litura*) in green vegetable cultivation

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Background and Aim

- Developing Thai herbal weeds in controlling pest insect with use of bioactive natural compounds in environmentally and consumer-friendly manner.
- In order to develop innovative pest management in agricultural area or pest control products prototype with integrative appropriate biotechnology.
- To assess efficacy of crude extracts of *Chromolaena odorata* (Siam weed) and *Vernonia cinerea* (L.) (Little ironweed) using 95% EtOH soaking, EM, and organic solvents (EtOH, EtOAc, and Hexane) in controlling 2nd larvae of *S. litura* (Fabricius).

Method

Crude extracts of *C. odorata* (Siam weed) and *V. cinerea* (L.) (Little ironweed) using 95% EtOH soaking, EM, and organic solvents (EtOH, EtOAc, and Hexane) in controlling 2nd larvae of *S. litura* (Fabricius) were assessed by leaf-dipping test for 24, 48, and 72 hr.



Fig.1 *C. odorata* (Siam weed)



Fig.2 *V. cinerea* (L.) (Little ironweed)

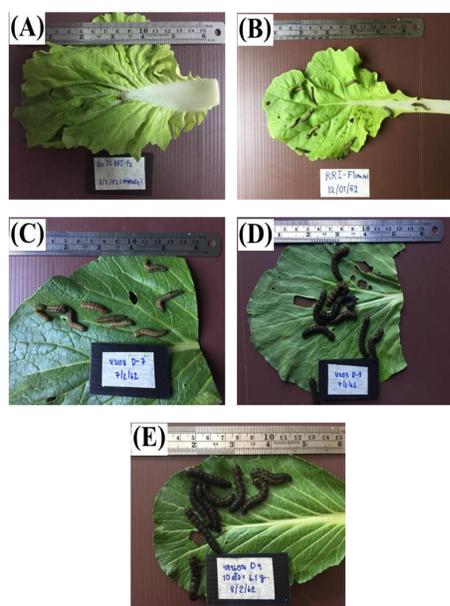


Fig.4 Larvae of *S. litura* at (A) Stage 1: 1-2 day, (B) Stage 2: 3-5 day, (C) Stage 3: 7-10 day, (D) Stage 4: 11-13 day, and (E) Stage 5: 14-16 day



Fig.3 Crude extracts of *C. odorata* and *V. cinerea* (L.) using (A) 95% EtOH soaking, EM, and (B) organic solvents.



Fig.5 Leaf-dipping test

Result and Discussion

Table 1. Mortality (%) of 2nd larvae *S. litura* (F.) at 24, 48 and 72 hr as affect by crude extracts from *C. odorata* (Siam weed) and *V. cinerea* (L.) (Little ironweed)

Extraction & Concentration	% Mortality of <i>S. litura</i> (F.) by <i>C. odorata</i> (Siam weed)			% Mortality of <i>S. litura</i> (F.) by <i>V. cinerea</i> (L.) (Little ironweed)		
	24 hr.	48 hr.	72 hr.	24 hr.	48 hr.	72 hr.
SOAK	5.0%	0.0	100.0*	100.0	0.0	100.0*
	12.5%	0.0	0.0	100.0	0.0	100.0*
	25.0%	5.0	95.0*	100.0	0.0	100.0*
EM	3.3%	10.0	85.0*	100.0	0.0	60.0
	8.25%	0.0	25.0	100.0	5.0	45.0
	16.5%	5.0	35.0	100.0	5.0	65.0
EtOH	0.001 mg/ml	50.0	60.0	100.0	5.0	75.0*
	0.01 mg/ml	35.0	45.0	100.0	25.0	100.0*
	0.1 mg/ml	35.0	45.0	100.0	0.0	100.0*
	1.0 mg/ml	25.0	60.0	100.0	0.0	100.0*
	5.0 mg/ml	40.0	55.0	100.0	0.0	100.0*
EtOAc	0.001 mg/ml	30.0	50.0	100.0	65.0	70.0*
	0.01 mg/ml	20.0	20.0	100.0	50.0	65.0
	0.1 mg/ml	10.0	25.0	100.0	45.0	55.0
	1.0 mg/ml	0.0	45.0	100.0	35.0	50.0
	5.0 mg/ml	60.0	70.0*	100.0	65.0	80.0*
HEX	0.001 mg/ml	55.0	75.0*	100.0	60.0	65.0
	0.01 mg/ml	40.0	55.0	95.0	40.0	60.0
	0.1 mg/ml	45.0	60.0	80.0	45.0	55.0
	1.0 mg/ml	30.0	85.0*	100.0	50.0	65.0
	5.0 mg/ml	35.0	95.0*	100.0	35.0	80.0*

Note: * Test unit set that is effective at killing wormat least 70% at 48 hr.

EtOH = Ethanol, EtOAc = Ethyl acetate, HEX = Hexane

Mortality (%) of 2nd larvae *S. litura* (F.) at 48 hr.

❖ Siam weed crude extracts using:

- Soaking at 5% (w/w) at 100%,
- Hexane at 5 mg/ml at 95%
- EM at 3.33% (w/w) at 85%

❖ Little ironweed crude extracts using

- Soaking at all tested concentrations and EtOH (at 0.01-5.0 mg/ml) at 100%

Conclusion

At 72 hr both of Thai weed crude extracts using EtOH soaking and EM could effectively kill 2nd larvae of common cutworm at 100%, as comparable to their crude extracts using tested organic solvents. This implied good trend with use of both Thai weed extracts for controlling the pest insect in further semi-field setting.

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