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# Management of Pulse Beetle, *Callosobruchus Maculatus* by Protection of Stored Cowpea Seeds through Plant Based Toxicants

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#### ABSTRACT

The research paper mainly describes the concepts and Biocontrol measures to control Callosobruchus maculatus (Fab.) in stored Cowpea Seeds. The pulse beetle Callosobruchus maculatus (Fab.) is an obnoxious pest of several pulses including cowpea. Hence the present study is aimed at the search of an eco-friendly pesticide e.g. neem seed kernel extracts against Callosobruchus maculatus. It has been estimated that 0.06% and 0.02% concentrations of neem seed kernel extracts in ether and alcohol were effective for a greater period of storage against bruchid attack. 0.06% concentration of ether extract and alcoholic extract of neem seed kernel were found effective for more than 75 days while 0.02% concentration of ether and alcoholic extracts in both concentrations were however found somewhat more effective in comparison to alcoholic extracts of NSKE.

**Keywords**: Bruchid, Callosobruchus Maculatus, Ether and Alcoholic Extracts, Neem Seed Kernel, Cowpea Seed.

#### Introduction

In agriculture field, the pest control is undergoing a quick revolution at ground level. The botanicals have additional advantage over synthetic insecticides, since these are safe to non-target animals. Neem seed kernel extract is being used as a biopesticide to control various pests, here it was targeted to control *Callosobruchus maculatus*. Chemical pesticides result in the management to control the pests but it would be hazardous to health, so the use of botanical pesticides have been found safe as next best alternative practice.



#### **Materials and Methods**

Neem seed kernel extraction was done through the Soxhlet apparatus. Extract preparation was done for eight hours over heating mantle at a temperature of 70 degree Celsius in petroleum ether and at 55 degree Celsius in ethyl alcohol. Cowpea seeds sprayed with requisite dosages of neem seed kernel extracts, were observed till the mortality of *Callosobruchus maculatus* (released in treated seeds) was noticed. Thus, the residual toxicity of NSKE was worked out. During investigation, 20 gm of cowpea

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seeds were treated with requisite dosage (0.06%) of NSKE at minimum 100% mortality rate and 0.02% dosage at minimum 50% mortality rate. Ten pairs of *Callosobruchus maculatus* were released in cowpea seeds and mortality was recorded after 24 hours of their release regularly till minimum (about 5%) mortality was observed. Each experiment was done in triplicate.





**Soxhlet Apparatus** 

## **Result and Discussion**

- Neem seed kernel extract in ether (0.06%) at minimum 100% mortality was found effective for more than 75 days.
- In alcoholic extract of NSKE (0.06%) also the mortality was reported for more than 75 days, but it was a little bit lesser in comparison to ether extract.
- Neem seed kernel extract in Ether (0.02%) at 50% mortality was found effective for more than 60 days.
- Alcoholic extract (0.02%) at 50% mortality was also reported to be effective for more than 60 days but to a lesser extent in comparison to ether extract.

Table: Residual Toxicity of deposits of Ether and Alcoholic Extracts of Neem Seed Kernel at minimum 100% and 50% mortality of *Callosobruchus maculatus (F.)* at different intervals after spraying.

S.	Name of	%	Residual Toxicity of Deposits at Intervals of															
No.	Plant	Conc.	1 DAT		3 DAT		7 DAT		15 DAT		30 DAT		45 DAT		60 DAT		75 DAT	
	Product		W %	W%D	Μ%	W%D	Μ%	W%D	Μ%	W%D	W %	C%M	Μ%	C%M	C%M	W%D	<b>W%</b>	W%D
1	N.S.K.E. Ether	0.06	93.33	92.97	0.06	89.47	99.98	85.95	80.00	78.94	65.00	63.15	41.66	38.58	33.33	29.82	18.33	14.03
2	N.S.K.E. Ether	0.02	50.00	47.36	41.6	38.58	35.00	31.57	28.33	24.55	25.00	21.05	21.66	17.53	18.33	14.03		
3	N.S.K.E. Alcohol	0.06	90.00	89.47	85.0	84.21	71.66	70.16	99.99	64.90	60.00	57.89	38.33	35.08	28.33	24.55	15.00	10.52
4	N.S.K.E. Alcohol	0.02	48.33	45.61	40.0	36.84	33.33	29.82	28.33	24.55	23.33	19.29	18.33	14.03	15.00	10.52	-	-

# N.S.K.E.: Neem seed kernel extract

DAT: Days after treatment

%M: Percent Mortality

C%M: Corrected percent Mortality



Graph: Residual toxicity of deposits of Ether and Alcoholic extracts of Neem seed kernel at minimum 100% and 50% Concentrations

N.S.K.E.: Neem seed kernel extract

#### Conclusion

Neem seed kernel extracts in ether as well as alcohol have been found beneficial and alternative to control pulse beetle and to discourage the use of chemical pesticides. It can be suggested to be sprayed over the stored cowpea seeds to save it from the infestation of *Callosobruchus maculatus (Fab.)* without leaving any toxicants in the seed.

### References

- 1. Adgesh, B. J. (1989). Residual toxicity of three plant materials against three plant materials against three storage insect pests. *Laguna College* (Philippines) Sept., 1989, 84 Leaves.
- 2. Das, G.P (1986). Pesticidal effect of some indigenous plant oils against the pulse beetle, *Callosobruchus chinensis* (Lin). *Bangladesh J. Zool*. 14(1): 15-18.
- 3. Gupta, H.C.; Bareth, S.S and Sharma, S.K. (1991), Bioefficacy of edible and non-edible oils against pulse beetle *Callosobruchus chinensis* (L.). on storage pulses and their effect on germination. *Agric. Bio. Res.* 7(2): !01-107.
- 4. Jadhav, K.B. and Jadhav, L.D, (1984). Use of some vegetable oils, plant extracts and synthetic products as protectants from pulse beetle, *Callosobruchus maculatus* (Fab.). *In. grain Jour. Food Sci.* Tech. 21(2): 110-113.
- 5. Jood, S.; Kapoor, A.C. and Singh, R. (1993). Evaluation of some plant products against *Trogoderma granarium* (Everts) in stored maize and their effect on nutritional composition and organoleptic characteristics of kernels. *Jour. Agric. Food chemistry* (U. S. A.), 41(10): 1644-1648.
- 6. Jotwani, M.G. and Sircar, P. (1965). Neem seed as a protectant against grain pests infesting wheat seed. *Ind. Jour. Ento.* 27:160-164.
- 7. Kachare, B. V.; Khaire, V.M. and Mote, U. N. (1994). Efficacy of different vegetable oils as seed treatment in increasing storage ability of pigeon pea seed against pulse beetle, *Callosobruchus chinensis*(I.). *Ind. Jour. Ento.* 56(1): 58-62.
- 8. Mishra, N.C. (1996) Investigation of *Callosobruchus chinensis* on black gram during storage using botanicals. *Insects Environment*. 1(4): !2-13.
- Reddy, A.V. and Singh, R. P. (1998). Studies on the fumigant toxicity of neem seed oil (*Azadiractha indica* A. Juss) volatiles against pulse beetle, *Callosobruchus maculatus* (Fab.) *Jour. Appl. Ento.* 122(9/10): 607-611.
- 10. Yadav, T.D. (1985). Anti ovipositional and ovicidal toxicity of neem oil (*Azadiractha indica*) against three species of *Callosobruchus*. *Neem News letter*, 2 (1): 5-6.

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