



Study of edible and non-edible oils for protecting of green gram seed during storage against *Callosobruchus maculatus*

SUBHASH KATARE*, ASHOK SHARMA¹ AND V.K. SHARMA²
Department of Zoology, Holkar Science College, INDORE (M.P.) INDIA

Abstract : The pulse beetle, *Callosobruchus maculatus* Fab. is most injurious to stored pulses having an important position among the stored pests. Considering the importance of the pest, attempt have been made to protect the pulses with edible and non-edible oils viz., sesame oil, mahua oil, coconut oil, mustard oil, groundnut oil, soybean oil, castor oil, karanj oil, neem oil and linseed oils. The ten oils of four doses selected for present investigation were also for assessment of these oils to record the per cent grain damage and per cent loss in seed weight at 150 days after treatment. Castor oil was most effective in which no seed damage and per cent loss in seed weight were recorded and it was found significantly superior to the rest of the treatments except neem oil. Whereas maximum seed damage (16.33%) and weight loss (13.56%) were found in coconut oil with the treatments 2.5 ml/kg. seed. Up to 90 days after treatment no loss in seed weight was found in mahua oil, groundnut oil, soybean oil, Castor oil, karanj oil and neem oil treatments.

Key Words : Edible and non-edible oils, Green gram, Storage, *Callosobruchus maculatus*

View Point Article : Katare, Subhash, Sharma, Ashok and Sharma, V.K. (2012). Study of edible and non-edible oils for protecting of green gram seed during storage against *Callosobruchus maculatus*. *Internat. J. agric. Sci.*, 8(2): 423-425.

Article History : Received : 20.01.2012; Revised : 09.04.2012; Accepted : 10.05.2012

INTRODUCTION

The pulse beetle *C. maculatus* is one of the important pest of tropical and sub-tropical region and it attacks wide range of legume (Gita and Smith, 1986). The total damage in terms of weight loss due to pest in storage pulse (5month period) was estimated to 60 per cent (Tenzubil, 1991; Credlend and Dick, 1987). In India approximately 50 per cent loss of stored pulse occurred due to a attack by insect pests within a period of three months (Hussain and Abdul Al, 1982). Pulse are more difficult to store than cereals. These suffer great damage due to insect pests. Among insect pests bruchids are known to inflict quantitative and qualitative losses to the store pulses. In insect pest management programme, use of conventional insecticides has caused problems, such as the development of resistance, toxic residues, worker safety and increasing costs. Hence, there is a growing interest among

the entomologists the world over search for alternatives which would minimize adverse effects on ecosystem. In this context the use of edible and non-edible oils used as grain protectants against pulse beetle, *C. maculatus* infesting green gram under laboratory condition.

MATERIALS AND METHODS

Present investigations Studies on use of edible and non-edible vegetable oils against pulse beetle, *Callosobruchus maculatus* (Fab.), was conducted under laboratory conditions in department of Zoology, Holkar Science College, Indore (M.P.) in the year 2008.

To work out losses and optimum concentration of the oils, green gram seed were treated with different concentrations of most effective oils i.e. sesame oil, mahua oil, coconut oil, mustard oil, groundnut oil, soybean oil, castor

* **Author for correspondence. (Present Address) :** Krishi Vigyan Kendra, Jaora, RATLAM (M.P.) INDIA

¹Choithram College of Professional Studies, INDORE (M.P.) INDIA

²PMB Gujarati College, INDORE (M.P.) INDIA

Table 1 : Effect of oils on grain damage and weight loss of green gram due to *C. maculatus*

Treatments	Dose (ml/kg)	Per cent seed damage		Per cent loss in weight
Control	0.00	46.51	43.00*	32.83
Sesame oil	2.50	4.87	12.72	6.67
	3.50	4.51	12.22	6.07
	4.50	4.34	11.90	5.00
	5.50	4.33	11.98	4.70
	2.50	5.37	13.38	5.10
Mahua oil	3.50	4.99	12.88	5.03
	4.50	4.67	12.45	4.70
	5.50	4.33	11.98	4.03
	2.50	16.33	23.81	13.56
Coconut oil	3.50	15.88	23.46	13.43
	4.50	15.43	23.07	13.24
	5.50	15.23	22.75	11.83
	2.50	4.33	11.95	5.77
Mustard oil	3.50	4.10	11.84	4.98
	4.50	3.67	10.95	4.78
	5.50	3.67	10.97	4.05
Groundnut oil	2.50	2.13	8.30	3.47
	3.50	1.87	7.77	3.40
	4.50	1.85	7.75	2.70
	5.50	1.67	7.32	2.43
Soybean oil	2.50	9.99	18.39	8.87
	3.50	9.69	18.12	8.57
	4.50	9.25	17.68	8.03
	5.50	9.00	17.40	7.66
Castor oil	2.50	0.00	0.00	0.00
	3.50	0.00	0.00	0.00
	4.50	0.00	0.00	0.00
	5.50	0.00	0.00	0.00
Karanj oil	2.50	3.91	11.38	5.01
	3.50	3.84	11.33	4.42
	4.50	3.00	10.10	3.62
	5.50	2.98	9.93	3.12
Neem oil	2.50	0.00	0.00	0.00
	3.50	0.00	0.00	0.00
	4.50	0.00	0.00	0.00
	5.50	0.00	0.00	0.00
Linseed oil	2.50	10.07	18.48	10.21
	3.50	9.92	18.31	9.94
	4.50	9.58	18.01	9.23
	5.50	9.33	17.72	8.86
C.D. (P=0.05)			0.500	0.276
S.E. _±			0.255	0.141

*Angular transformed value

oil, karanj oil, neem oil and linseed oils were purchase from local market of Ratlam. 250g. seed treated with each effective oils were kept in plastic jars for six months. Five pairs of newly

emerged adults of *C. maculatus* (Fab.) were released in each jar covered with a piece of cloth and kept under laboratory condition. Each sample was replicated thrice with an untreated

Control. The weight of damaged grains was taken after 150 days of treatment with all the oils doses separately and calculated the percentage of loss in weight over control from the observations taken on decreased weight of grain from all oil doses treated seeds. Similarly number of damaged grains was counted and calculated in to percentage of damaged grain after 150 days. Data were transformed by angular transformed value.

RESULTS AND DISCUSSION

It was found that after 150 days after treatment all the oil treatments recorded significantly reduced per cent seed damage (0.00 to 16.33%) over control (46.51%) (Table 1). Castor oil was most effective in which no seed damage was recorded and it was found significantly superior to the rest of the treatments except neem oil. Whereas maximum seed damage (16.33%) was found in coconut oil with the treatments 2.5 ml./kg. seed which was significantly higher than rest of the treatments.

It was found that after 150 days the all of the oil treatments recorded significantly reduced weight loss (0.00 to 13.56%) over control (32.83%). Castor oil was most effective in which there was no loss in seed weight and it was found that significantly superior to rest of the treatments except neem oil. Where as maximum weight loss (13.56%) was found in coconut oil. Findings are in agreement with the results of the Singh *et al.* (2001) in respect of castor, neem, and mahua oil, Tripathi (2007) in respect of castor, neem, and coconut oil which was found most effective in protecting the seeds for about 9 months after treatments, Singh (2003) in respect of coconut, mustard, sesame, mahua, neem, karanj and castor oils as these were highly effective in protecting the seed up to

9 months. Yadav *et al.* (2004), reported that castor oil found was to be most effective.

REFERENCES

- Credlend, P.F. and Dick, K.M. (1987).** Food consumption by larvae of three strain of *Callosobruchus maculatus*. (Coleoptera: Bruchidae). *J. Stor. Prod. Res.*, **23** : 31-38.
- Gita, D.P. and Smith, R.H. (1986).** Egg production and development of *Callosobruchus maculatus* (F.) (Coleoptera: Bruchidae) on several commodities at two different temperature. *J. Stor. Prod. Res.*, **23**: 9-14.
- Hussain, M.H. and Abdul-AI, V.A.I. (1982).** Toxicity of some compound against the seed beetle, *Callosobruchus maculatus* (F.) (Coleoptera: Bruchidae). *Int. Pest Control.*, **24**: 12-13,16-17.
- Singh, P.K. (2003).** Effect of some oils against pulse beetle, *Callosobruchus chinensis* in infesting pigeon pea. *Indian J. Entomol.*, **65**(1):55-58
- Singh, Veer, Yadav, C.P.S. and Singh, V. (2001b).** Evaluation of some grain protectants against *Callosobruchus maculatus* on moth bean. *Indian J. Ento.*, **63**(4): 471-474.
- Tenzubil, P.B. (1991).** Control of some insect pests of cowpea (*Vigna unguiculata*) with neem (*Azadirachta indica* A. Juss) in Northern Ghana. *Trop. Pest. Management*, **37** : 216-217.
- Tripathi, S., Avasthi, S. and Chandralekha (2007).** Management of *Callosobruchus chinensis* by use of oils in stored pigeonpea. *Ann. Plant Prot. Sci.* **15**(1):250-251.
- Yadav, A.S., Bhadoria, N.S and Jakhamola, S.S. (2004).** Efficacy of edible/ non edible vegetable oils against pulse beetle *Callosobruchus maculatus* (Fab) in green gram. *Indian J. Entomol.*, **66** (4): 364-381.

*_*_*_*_*_*_*_*