



SEED GERMINATION OF ABELMOSCHUS ESCULENTUS (L) MOENCH (OKRA) UNDER VARIOUS APPLICATIONS OF NEEEM PESTICIDES

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ABSTRACT

Experiment conducted to investigate the effect of different neem based formulations on germination of okra seeds under laboratory and field conditions revealed that these botanicals at 1.00 percent concentration did not affect the germination of seed while 2.50 and 2.00 percent concentration prevented the invasion of the pests. Among all these treatments Bioneem was the best for seed germination of okra followed by Neemgold, Neemarin, Nimbicidine, Neemazal, whereas Achook proved to be the lowest. The germination of both seeds, in general was higher under laboratory conditions when compared with field data. The effectiveness of various neem based pesticides in respect of seed germination could be arranged in following descending order: Bioneem>Neemgold>Neemarin>Nimbicidine>Neemazal>Achook.

KEYWORDS: Neem based pesticides, Okra seed, Okra pests, Germination.

Introduction

Okra *Abelmoschus esculentus* (L) is one of the most fibrous fruit in India. These are annual vegetable crop of tropical and subtropical part of World. Okra widely grown for its immature edible pods which are consumed as vegetable (Sale et al. 2015 [1]). Okra fruit contains protein, carbohydrate and vitamins, A, B, C, minerals, iron, and iodine but it is low sodium, saturated fat and cholesterol (Lamont, 1999 [2]; Owalarafel and Shotonde, 2004 [3]), and play a vital role in human diet. The root and stems of okra are used for cleaning the cane juice from which gur or jiggery is prepared (Chauhan, 1972 [4]). The yield of okra may be influenced by biotic and abiotic factors. Okra infested by Jassids (*Amrasca biguttula biguttula* Ishida), shoot and fruit borer (*Earias vitella* Fabr.), red cotton bug (*Dysdercus koenigii* Fabr.), Leaf roller (*Sylepta derogata* Fabr.) and red spider mites (*Tetranychus cinnabarinus* Boisd.) which affects fruit yield and seed yield. Seed germination grows when taken up through seed treatment and control above pest. Jassids (*Amrasca* spp.) feed mostly lower surface of okra leaves, leading to hopper burn (Bindra and Mahal, 1979 [5]). The crop also suffers from yellow vein mosaic, powdery mildew, damping off, leaf spot, dry root rot, leaf and fruit spots (Vevai 1969 [6]). Therefore, present study was undertaken to investigate the influence of neem based pesticides products on crop growth.

Material and methods

The experiment was conducted at research laboratory and field of C.S. Azad University of Agricultural and Technology, Kanpur. The study of the effects of neem based pesticides viz Bioneem, Neemgold, Neemarin, Nimbicidine, Neemazal and Achook in laboratory test (vitro). Laboratory test were conducted with 150 seed per treatment and in three replication. These seed were treated with different neem based formulations and soaked for 24 hours in each concentration. In control seed were dipped in fresh water only. The seed were blotted dry and set to germination paper and stored loosely closed germinator in air condition room (28°C). The number of germinating seed was counted after 20 days of treatment. These experiments were done in laboratory of Seed technology of C.S. Azad University of Agricultural and Technology. Field test (vivo) 150 seed of okra were dipped in each concentration for 24 hours. Following this, the seeds were sown in the well manure and prepare field in Randomized Block Design. Each treatment

was replicated thrice. The observation on germination was recorded after 20 days of sowing and present germination was determined by counting the number of plants germinated.

Results and Discussion

The results of this study showed that the okra (*Abelmoschus esculentus*) seed growth of seed germination (seedling) percentage were higher at 1.00 of concentration neem based pesticides by different treatment. Bioneem percentage of 98.32 seed germination and Achook gave minimum percentage 59.73 in vitro (Table 1) and 96.44 and 59.33 in vivo (Table 2) condition. Thus, at higher dosages of 2.50, 2.00 the range of germination was 47.31- 79.36, 55.36 – 84.41 (in vitro) and 41.98-60.92, 47.67 – 68.97 (in vivo) all the experimental. Neem based formulation increasing trend of germination was visual at lower dosage of all the neem products. The germination was dependent on the dosage of the neem based formulation and their mode of treatment. Bioneem formed to be better and safer at 2.50 dosage as they gave 79.30 seed germination at higher percentage of this experimentation 98.32 at 1.00 of concentration. These results are in agreement with literature in fact that the inhibitory effect is dependent on the extract concentration (AL-Sherif, et al. 2013 [7]). Saleh and Maday (2013 [8]) studied that stated the lowest concentration (2.0) of the aqueous extract of *Alhagi graecorum* stimulated elongation of radicle and plumule as well as seedling biomass of bean and corn, while the highest concentration (6.0) was inhibitory. Inhibition of germination in Bioneem at higher concentration 2.50 and 2.00 shows 20.65 and 15.58 (in vitro Table -1), while 39.05, 31.04 in vivo condition. Dwivedi et al. (1995 [9]) while studying the effect of six commercially neem formulations like Nimbasol, Neemazal, Nethrin, Nimbicidine, Neemark and Achook at 1.00 concentration for seed dressing and revealed that germination was very poor in Neemazal in comparison to other formulation of neem. Similarly, Neelam et al. (2010 [10]) reported that effectiveness of experimental pesticides in respect of seed germination of cabbage seed at different concentration. Praveen et al. 2007 [11] reported in his worked. The study revealed the potentials of the neem based formulation, while neem leaf extract controlling whitefly pests on the field to increase okra growth and yield okra plant (Sale et al. 2015 [12]).

Table 1 : Effect of neem formulations on seed germination of okra seeds in vitro.

S. No.	Concentration used (%)	Number of seed tested	Neem based formulation											
			Bioneem		Neemgold		Neemarin		Nimbicidine		Neemazal		Achook	
			T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2
1	2.50	150	79.36	20.65	71.35	28.64	65.84	34.59	61.51	38.46	59.33	40.66	47.31	52.66
2	2.00	150	84.41	15.58	74.13	25.58	68.09	32.22	66.82	33.17	56.60	34.33	55.36	44.66
3	1.00	150	98.32	1.67	93.50	6.49	83.90	16.09	80.70	19.28	75.43	23.75	59.36	40.61
4	0.5	150	87.82	12.16	84.90	15.09	78.08	21.91	68.68	31.31	67.39	32.60	56.73	43.24
5	Control	150	98.69	1.30	98.69	1.30	98.69	1.30	98.69	1.30	98.69	1.30	98.69	1.30
S.E.(m) ±			4.48	4.49	5.01	5.01	4.59	4.56	3.77	3.77	3.69	3.68	3.38	3.38
C.D. at 5%			9.99	10.00	11.16	11.16	10.24	10.18	8.40	8.40	8.23	8.21	7.53	7.53

Figures in parentheses are the angular transformed values.

T 1 = Seed germination (AV.%)

T 2 = Inhibition of seed germination (AV.%)

Table 2 : Effect of neem formulations on seed germination of okra seeds in vivo.

S. No.	Concentration used (%)	Number of seed tested	Neem based formulation											
			Bioneem		Neemgold		Neemarin		Nimbicidine		Neeemazal		Achook	
			T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2
1	2.50	150	60.92	39.05	59.47	40.51	56.68	43.30	53.33	46.65	50.00	50.00	41.98	58.01
2	2.00	150	68.97	31.04	66.17	33.87	64.68	35.31	60.68	39.29	58.68	41.30	47.67	51.98
3	1.00	150	94.44	3.55	93.54	5.99	92.35	7.63	83.53	16.46	73.36	26.64	59.33	40.84
4	0.5	150	84.58	15.14	80.59	19.42	78.01	21.99	74.05	25.92	68.03	30.33	50.00	50.00
5	Control	150	97.97	2.02	97.97	2.02	97.97	2.02	97.97	2.02	97.97	2.02	97.97	2.02
S.E.(m) ±			6.29	6.29	4.55	4.55	4.81	4.81	4.05	4.05	3.81	3.81	3.84	3.84
C.D. at 5%			14.51	14.51	10.49	10.50	11.10	11.10	9.34	9.34	8.79	8.78	8.85	8.84

Figures in parentheses are the angular transformed values.

T 1 = Seed germination (AV.%)

T 2 = Inhibition of seed germination (AV.%)

Conclusion

The germination of okra seed in general was higher under laboratory conditions when compared with the field data. Neem based pesticides have significant result in controlling the effect of seed germination.

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